

Radio Regulations

Articles

Edition of 2024

1



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1



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Note by the Secretariat

This revision of the Radio Regulations, complementing the Constitution and the Convention of the International Telecommunication Union, incorporates the decisions of the World Radiocommunication Conferences of 1995 (WRC-95), 1997 (WRC-97), 2000 (WRC-2000), 2003 (WRC-03), 2007 (WRC-07), 2012 (WRC-12), 2015 (WRC-15), 2019 (WRC-19) and 2023 (WRC-23). The majority of the provisions of these Regulations shall enter into force as from 1 January 2025; the remaining provisions shall apply as from the special dates of application indicated in Article 59 of the revised Radio Regulations.

In preparing the Radio Regulations, Edition of 2024, the Secretariat corrected the typographical errors that were drawn to the attention of WRC-23 and which were approved by WRC-23.

This edition uses the same numbering scheme as the 2001 edition of the Radio Regulations, notably:

With respect to Article numbers, this edition follows the standard sequential numbering. The Article numbers are not followed by any abbreviation (such as “(WRC-97)”, “(WRC-2000)”, “(WRC-03)”, “(WRC-07)”, “(WRC-12)”, “(WRC-15)”, “(WRC-19)” or “(WRC-23)”). Consequently, any reference to an Article, in any of the provisions of these Radio Regulations (e.g. in No. 13.1 of Article 13), in the texts of the Appendices as contained in Volume 2 of this edition (e.g. in § 1 of Appendix 2), in the texts of the Resolutions included in Volume 3 of this edition (e.g. in Resolution 1 (Rev.WRC-97)), and in the texts of the Recommendations included in Volume 3 of this edition (e.g. in Recommendation 8), is considered as a reference to the text of the concerned Article which appears in this edition, unless otherwise specified.

With respect to provision numbers in Articles, this edition continues to use composite numbers indicating the number of the Article and the provision number within that Article (e.g. No. 9.2B means provision No. 2B of Article 9). The abbreviation “(WRC-23)”, “(WRC-19)”, “(WRC-15)”, “(WRC-12)”, “(WRC-07)”, “(WRC-03)”, “(WRC-2000)” or “(WRC-97)” at the end of such a provision means that the relevant provision was modified or added by WRC-23, by WRC-19, by WRC-15, by WRC-12, by WRC-07, by WRC-03, by WRC-2000 or by WRC-97, as applicable. The absence of an abbreviation at the end of the provision means that the provision is identical with the provision of the simplified Radio Regulations as approved by WRC-95, and whose complete text was contained in Document 2 of WRC-97.

With respect to Appendix numbers, this edition follows the standard sequential numbering, with the addition of the appropriate abbreviation after the Appendix number (such as “(WRC-97)”, “(WRC-2000)”, “(WRC-03)”, “(WRC-07)”, “(WRC-12)”, “(WRC-15)”, “(WRC-19)” or “(WRC-23)”), where applicable. As a rule, any reference to an Appendix, in any of the provisions of these Radio Regulations, in the texts of the Appendices as contained in Volume 2 of this edition, in the texts of the Resolutions and of the Recommendations included in Volume 3 of this edition, is presented in the standard manner (e.g. “Appendix 30 (Rev.WRC-23)”) if not explicitly described in the text (e.g. Appendix 4 as modified by WRC-23). In the texts of Appendices that were partially modified by WRC-23, the provisions that were modified by WRC-23 are indicated with the abbreviation “(WRC-23)” at the end of the concerned text. If an Appendix is referenced without any abbreviation after the Appendix number, in the texts of this edition (e.g. in No. 13.1), or without other description, such reference is considered as a reference to the text of the concerned Appendix which appears in this edition.

Within the text of the Radio Regulations, the symbol, ↑, has been used to represent quantities associated with an uplink. Similarly, the symbol, ↓, has been used to represent quantities associated with a downlink.

Abbreviations have generally been used for the names of world administrative radio conferences and world radiocommunication conferences. These abbreviations are shown below.

Abbreviation	Conference
WARC Mar	World Administrative Radio Conference to Deal with Matters Relating to the Maritime Mobile Service (Geneva, 1967)
WARC-71	World Administrative Radio Conference for Space Telecommunications (Geneva, 1971)
WMARC-74	World Maritime Administrative Radio Conference (Geneva, 1974)
WARC SAT-77	World Broadcasting-Satellite Administrative Radio Conference (Geneva, 1977)
WARC-Aer2	World Administrative Radio Conference on the Aeronautical Mobile (R) Service (Geneva, 1978)
WARC-79	World Administrative Radio Conference (Geneva, 1979)
WARC Mob-83	World Administrative Radio Conference for the Mobile Services (Geneva, 1983)
WARC HFBC-84	World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1984)
WARC Orb-85	World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilising It (First Session – Geneva, 1985)
WARC HFBC-87	World Administrative Radio Conference for the Planning of the HF Bands Allocated to the Broadcasting Service (Geneva, 1987)
WARC Mob-87	World Administrative Radio Conference for the Mobile Services (Geneva, 1987)
WARC Orb-88	World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilising It (Second Session – Geneva, 1988)
WARC-92	World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992)
WRC-95	World Radiocommunication Conference (Geneva, 1995)
WRC-97	World Radiocommunication Conference (Geneva, 1997)
WRC-2000	World Radiocommunication Conference (Istanbul, 2000)
WRC-03	World Radiocommunication Conference (Geneva, 2003)
WRC-07	World Radiocommunication Conference (Geneva, 2007)
WRC-12	World Radiocommunication Conference (Geneva, 2012)
WRC-15	World Radiocommunication Conference (Geneva, 2015)
WRC-19	World Radiocommunication Conference (Sharm El-Sheikh, 2019)
WRC-23	World Radiocommunication Conference (Dubai, 2023)
WRC-27	World Radiocommunication Conference, 2027 ¹

¹ The date of this conference has not been finalized.

VOLUME 1

Articles

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ARTICLES

RADIO REGULATIONS

Preamble

0.1 These Regulations are founded on the following principles:

0.2 Members* shall endeavour to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services. To that end, they shall endeavour to apply the latest technical advances as soon as possible (No. 195 of the Constitution of the International Telecommunication Union (Geneva, 1992)).

0.3 In using frequency bands for radio services, Members shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of these Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries (No. 196 of the Constitution).

0.4 All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of these Regulations (No. 197 of the Constitution).

0.5 With a view to fulfilling the purposes of the International Telecommunication Union set out in Article 1 of the Constitution, these Regulations have the following objectives:

0.6 to facilitate equitable access to and rational use of the natural resources of the radio-frequency spectrum and the geostationary-satellite orbit;

0.7 to ensure the availability and protection from harmful interference of the frequencies provided for distress and safety purposes;

0.8 to assist in the prevention and resolution of cases of harmful interference between the radio services of different administrations;

0.9 to facilitate the efficient and effective operation of all radiocommunication services;

0.10 to provide for and, where necessary, regulate new applications of radiocommunication technology.

0.11 The application of the provisions of these Regulations by the International Telecommunication Union does not imply the expression of any opinion whatsoever on the part of the Union concerning the sovereignty or the legal status of any country, territory or geographical area.

* Note by the Secretariat: Provision No. 195 (PP-02) uses the term "Member States".

CHAPTER I

Terminology and technical characteristics

ARTICLE 1

Terms and definitions

Introduction

1.1 For the purposes of these Regulations, the following terms shall have the meanings defined below. These terms and definitions do not, however, necessarily apply for other purposes. Definitions identical to those contained in the Annex to the Constitution or the Annex to the Convention of the International Telecommunication Union (Geneva, 1992) are marked “(CS)” or “(CV)” respectively.

NOTE – If, in the text of a definition below, a term is printed in italics, this means that the term itself is defined in this Article.

Section I – General terms

1.2 *administration*: Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations (CS 1002).

1.3 *telecommunication*: Any transmission, *emission* or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, *radio*, optical or other electromagnetic systems (CS).

1.4 *radio*: A general term applied to the use of *radio waves*.

1.5 *radio waves or hertzian waves*: Electromagnetic waves of frequencies arbitrarily lower than 3 000 GHz, propagated in space without artificial guide.

1.6 *radiocommunication*: *Telecommunication* by means of *radio waves* (CS) (CV).

1.7 *terrestrial radiocommunication*: Any *radiocommunication* other than *space radiocommunication* or *radio astronomy*.

1.8 *space radiocommunication*: Any *radiocommunication* involving the use of one or more *space stations* or the use of one or more *reflecting satellites* or other objects in space.

1.9 *radiodetermination*: The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of *radio waves*.

1.10 *radionavigation*: *Radiodetermination* used for the purposes of navigation, including obstruction warning.

1.11 *radiolocation*: *Radiodetermination* used for purposes other than those of *radionavigation*.

1.12 *radio direction-finding:* Radiodetermination using the reception of *radio waves* for the purpose of determining the direction of a *station* or *object*.

1.13 *radio astronomy:* Astronomy based on the reception of *radio waves* of cosmic origin.

1.14 *Coordinated Universal Time (UTC):* Time scale, based on the second (SI), as described in Resolution **655 (Rev.WRC-23)**. (WRC-23)

1.15 *industrial, scientific and medical (ISM) applications* (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of *telecommunications*.

Section II – Specific terms related to frequency management

1.16 *allocation* (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space *radiocommunication services* or the *radio astronomy service* under specified conditions. This term shall also be applied to the frequency band concerned.

1.17 *allotment* (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more *administrations* for a terrestrial or space *radiocommunication service* in one or more identified countries or geographical areas and under specified conditions.

1.18 *assignment* (of a radio frequency or radio frequency channel): Authorization given by an *administration* for a *radio station* to use a radio frequency or radio frequency channel under specified conditions.

Section III – Radio services

1.19 *radiocommunication service:* A service as defined in this Section involving the transmission, *emission* and/or reception of *radio waves* for specific *telecommunication* purposes.

In these Regulations, unless otherwise stated, any radiocommunication service relates to *terrestrial radiocommunication*.

1.20 *fixed service:* A radiocommunication service between specified fixed points.

1.21 *fixed-satellite service:* A radiocommunication service between *earth stations* at given positions, when one or more *satellites* are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the *inter-satellite service*; the fixed-satellite service may also include *feeder links* for other space *radiocommunication services*.

1.22 *inter-satellite service:* A radiocommunication service providing links between artificial *satellites*.

1.23 *space operation service:* A radiocommunication service concerned exclusively with the operation of *spacecraft*, in particular *space tracking*, *space telemetry* and *space telecommand*.

These functions will normally be provided within the service in which the *space station* is operating.

1.24 *mobile service:* A radiocommunication service between *mobile* and *land stations*, or between *mobile stations* (CV).

1.25 *mobile-satellite service:* A radiocommunication service:

- between *mobile earth stations* and one or more *space stations*, or between *space stations* used by this service; or
- between *mobile earth stations* by means of one or more *space stations*.

This service may also include *feeder links* necessary for its operation.

1.26 *land mobile service:* A *mobile service* between *base stations* and *land mobile stations*, or between *land mobile stations*.

1.27 *land mobile-satellite service:* A *mobile-satellite service* in which *mobile earth stations* are located on land.

1.28 *maritime mobile service:* A *mobile service* between *coast stations* and *ship stations*, or between *ship stations*, or between associated *on-board communication stations*; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.29 *maritime mobile-satellite service:* A *mobile-satellite service* in which *mobile earth stations* are located on board ships; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.30 *port operations service:* A *maritime mobile service* in or near a port, between *coast stations* and *ship stations*, or between *ship stations*, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons.

Messages which are of a *public correspondence* nature shall be excluded from this service.

1.31 *ship movement service:* A *safety service* in the *maritime mobile service* other than a *port operations service*, between *coast stations* and *ship stations*, or between *ship stations*, in which messages are restricted to those relating to the movement of ships.

Messages which are of a *public correspondence* nature shall be excluded from this service.

1.32 *aeronautical mobile service*: A *mobile service* between *aeronautical stations* and *aircraft stations*, or between *aircraft stations*, in which *survival craft stations* may participate; *emergency position-indicating radiobeacon stations* may also participate in this service on designated distress and emergency frequencies.

1.33 *aeronautical mobile (R)* service*: An *aeronautical mobile service* reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

1.34 *aeronautical mobile (OR)** service*: An *aeronautical mobile service* intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes.

1.35 *aeronautical mobile-satellite service*: A *mobile-satellite service* in which *mobile earth stations* are located on board aircraft; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.36 *aeronautical mobile-satellite (R)* service*: An *aeronautical mobile-satellite service* reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

1.37 *aeronautical mobile-satellite (OR)** service*: An *aeronautical mobile-satellite service* intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes.

1.38 *broadcasting service*: A *radiocommunication service* in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission (CS).

1.39 *broadcasting-satellite service*: A *radiocommunication service* in which signals transmitted or retransmitted by *space stations* are intended for direct reception by the general public.

In the broadcasting-satellite service, the term “direct reception” shall encompass both *individual reception* and *community reception*.

1.40 *radiodetermination service*: A *radiocommunication service* for the purpose of *radiodetermination*.

1.41 *radiodetermination-satellite service*: A *radiocommunication service* for the purpose of *radiodetermination* involving the use of one or more *space stations*.

This service may also include *feeder links* necessary for its own operation.

1.42 *radionavigation service*: A *radiodetermination service* for the purpose of *radionavigation*.

* (R): route.

** (OR): off-route.

1.43 *radionavigation-satellite service*: A *radiodetermination-satellite service* used for the purpose of *radionavigation*.

This service may also include *feeder links* necessary for its operation.

1.44 *maritime radionavigation service*: A *radionavigation service* intended for the benefit and for the safe operation of ships.

1.45 *maritime radionavigation-satellite service*: A *radionavigation-satellite service* in which *earth stations* are located on board ships.

1.46 *aeronautical radionavigation service*: A *radionavigation service* intended for the benefit and for the safe operation of aircraft.

1.47 *aeronautical radionavigation-satellite service*: A *radionavigation-satellite service* in which *earth stations* are located on board aircraft.

1.48 *radiolocation service*: A *radiodetermination service* for the purpose of *radiolocation*.

1.49 *radiolocation-satellite service*: A *radiodetermination-satellite service* used for the purpose of *radiolocation*.

This service may also include the *feeder links* necessary for its operation.

1.50 *meteorological aids service*: A *radiocommunication service* used for meteorological, including hydrological, observations and exploration.

1.51 *Earth exploration-satellite service*: A *radiocommunication service* between *earth stations* and one or more *space stations*, which may include links between *space stations*, in which:

- information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from *active sensors* or *passive sensors* on Earth *satellites*;
- similar information is collected from airborne or Earth-based platforms;
- such information may be distributed to *earth stations* within the system concerned;
- platform interrogation may be included.

This service may also include *feeder links* necessary for its operation.

1.52 *meteorological-satellite service*: An *earth exploration-satellite service* for meteorological purposes.

1.53 *standard frequency and time signal service*: A *radiocommunication service* for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception.

1.54 *standard frequency and time signal-satellite service:* A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *standard frequency and time signal service*.

This service may also include *feeder links* necessary for its operation.

1.55 *space research service:* A *radiocommunication service* in which *spacecraft* or other objects in space are used for scientific or technological research purposes.

1.56 *amateur service:* A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

1.57 *amateur-satellite service:* A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *amateur service*.

1.58 *radio astronomy service:* A service involving the use of *radio astronomy*.

1.59 *safety service:* Any *radiocommunication service* used permanently or temporarily for the safeguarding of human life and property.

1.60 *special service:* A *radiocommunication service*, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to *public correspondence*.

Section IV – Radio stations and systems

1.61 *station:* One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a *radiocommunication service*, or the *radio astronomy service*.

Each station shall be classified by the service in which it operates permanently or temporarily.

1.62 *terrestrial station:* A *station* effecting *terrestrial radiocommunication*.

In these Regulations, unless otherwise stated, any *station* is a terrestrial station.

1.63 *earth station:* A *station* located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

- with one or more *space stations*; or
- with one or more *stations* of the same kind by means of one or more *reflecting satellites* or other objects in space.

1.64 *space station:* A *station* located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

1.65 *survival craft station:* A *mobile station* in the *maritime mobile service* or the *aeronautical mobile service* intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment.

1.66 *fixed station:* A *station* in the *fixed service*.

1.66A *high altitude platform station:* A *station* located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.

1.67 *mobile station:* A *station* in the *mobile service* intended to be used while in motion or during halts at unspecified points.

1.68 *mobile earth station:* An *earth station* in the *mobile-satellite service* intended to be used while in motion or during halts at unspecified points.

1.69 *land station:* A *station* in the *mobile service* not intended to be used while in motion.

1.70 *land earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *mobile-satellite service*, located at a specified fixed point or within a specified area on land to provide a *feeder link* for the *mobile-satellite service*.

1.71 *base station:* A *land station* in the *land mobile service*.

1.72 *base earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *land mobile-satellite service*, located at a specified fixed point or within a specified area on land to provide a *feeder link* for the *land mobile-satellite service*.

1.73 *land mobile station:* A *mobile station* in the *land mobile service* capable of surface movement within the geographical limits of a country or continent.

1.74 *land mobile earth station:* A *mobile earth station* in the *land mobile-satellite service* capable of surface movement within the geographical limits of a country or continent.

1.75 *coast station:* A *land station* in the *maritime mobile service*.

1.76 *coast earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *maritime mobile-satellite service*, located at a specified fixed point on land to provide a *feeder link* for the *maritime mobile-satellite service*.

1.77 *ship station:* A *mobile station* in the *maritime mobile service* located on board a vessel which is not permanently moored, other than a *survival craft station*.

1.78 *ship earth station:* A *mobile earth station* in the *maritime mobile-satellite service* located on board ship.

1.79 *on-board communication station:* A low-powered *mobile station* in the *maritime mobile service* intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions.

1.80 *port station:* A coast station in the *port operations service*.

1.81 *aeronautical station:* A *land station* in the *aeronautical mobile service*.

In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

1.82 *aeronautical earth station:* An *earth station* in the *fixed-satellite service*, or, in some cases, in the *aeronautical mobile-satellite service*, located at a specified fixed point on land to provide a *feeder link* for the *aeronautical mobile-satellite service*.

1.83 *aircraft station:* A *mobile station* in the *aeronautical mobile service*, other than a *survival craft station*, located on board an aircraft.

1.84 *aircraft earth station:* A *mobile earth station* in the *aeronautical mobile-satellite service* located on board an aircraft.

1.85 *broadcasting station:* A *station* in the *broadcasting service*.

1.86 *radiodetermination station:* A *station* in the *radiodetermination service*.

1.87 *radionavigation mobile station:* A *station* in the *radionavigation service* intended to be used while in motion or during halts at unspecified points.

1.88 *radionavigation land station:* A *station* in the *radionavigation service* not intended to be used while in motion.

1.89 *radiolocation mobile station:* A *station* in the *radiolocation service* intended to be used while in motion or during halts at unspecified points.

1.90 *radiolocation land station:* A *station* in the *radiolocation service* not intended to be used while in motion.

1.91 *radio direction-finding station:* A *radiodetermination station* using *radio direction-finding*.

1.92 *radio beacon station:* A *station* in the *radionavigation service* the *emissions* of which are intended to enable a *mobile station* to determine its bearing or direction in relation to the *radio beacon station*.

1.93 *emergency position-indicating radio beacon station:* A *station* in the *mobile service* the *emissions* of which are intended to facilitate search and rescue operations.

1.94 *satellite emergency position-indicating radio beacon:* An *earth station* in the *mobile-satellite service* the *emissions* of which are intended to facilitate search and rescue operations.

1.95 *standard frequency and time signal station:* A *station* in the *standard frequency and time signal service*.

1.96 *amateur station:* A *station* in the *amateur service*.

1.97 *radio astronomy station:* A *station* in the *radio astronomy service*.

1.98 *experimental station:* A *station* utilizing *radio waves* in experiments with a view to the development of science or technique.

This definition does not include *amateur stations*.

- 1.99** *ship's emergency transmitter*: A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes.
- 1.100** *radar*: A *radiodetermination* system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined.
- 1.101** *primary radar*: A *radiodetermination* system based on the comparison of reference signals with radio signals reflected from the position to be determined.
- 1.102** *secondary radar*: A *radiodetermination* system based on the comparison of reference signals with radio signals retransmitted from the position to be determined.
- 1.103** *radar beacon (racon)*: A transmitter-receiver associated with a fixed navigational mark which, when triggered by a *radar*, automatically returns a distinctive signal which can appear on the display of the triggering *radar*, providing range, bearing and identification information.
- 1.104** *instrument landing system (ILS)*: A *radionavigation* system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing.
- 1.105** *instrument landing system localizer*: A system of horizontal guidance embodied in the *instrument landing system* which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway.
- 1.106** *instrument landing system glide path*: A system of vertical guidance embodied in the *instrument landing system* which indicates the vertical deviation of the aircraft from its optimum path of descent.
- 1.107** *marker beacon*: A transmitter in the *aeronautical radionavigation service* which radiates vertically a distinctive pattern for providing position information to aircraft.
- 1.108** *radio altimeter*: *Radionavigation* equipment, on board an aircraft or *spacecraft*, used to determine the height of the aircraft or the *spacecraft* above the Earth's surface or another surface.
- 1.108A** *meteorological aids land station*: A station in the *meteorological aids service* not intended to be used while in motion. (WRC-15)
- 1.108B** *meteorological aids mobile station*: A station in the *meteorological aids service* intended to be used while in motion or during halts at unspecified points. (WRC-15)
- 1.109** *radiosonde*: An automatic radio transmitter in the *meteorological aids service* usually carried on an aircraft, free balloon, kite or parachute, and which transmits meteorological data.
- 1.109A** *adaptive system*: A *radiocommunication* system which varies its radio characteristics according to channel quality.
- 1.110** *space system*: Any group of cooperating *earth stations* and/or *space stations* employing *space radiocommunication* for specific purposes.

1.111 *satellite system*: A *space system* using one or more artificial earth *satellites*.

1.112 *satellite network*: A *satellite system* or a part of a *satellite system*, consisting of only one *satellite* and the cooperating *earth stations*.

1.113 *satellite link*: A radio link between a transmitting *earth station* and a receiving *earth station* through one *satellite*.

A satellite link comprises one up-link and one down-link.

1.114 *multi-satellite link*: A radio link between a transmitting *earth station* and a receiving *earth station* through two or more *satellites*, without any intermediate *earth station*.

A multi-satellite link comprises one up-link, one or more satellite-to-satellite links and one down-link.

1.115 *feeder link*: A radio link from an *earth station* at a given location to a *space station*, or vice versa, conveying information for a *space radiocommunication service* other than for the *fixed-satellite service*. The given location may be at a specified fixed point, or at any fixed point within specified areas.

Section V – Operational terms

1.116 *public correspondence*: Any *telecommunication* which the offices and *stations* must, by reason of their being at the disposal of the public, accept for transmission (CS).

1.117 *telegraphy*¹: A form of *telecommunication* in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use (CS 1016).

1.118 *telegram*: Written matter intended to be transmitted by *telegraphy* for delivery to the addressee. This term also includes *radiotelegrams* unless otherwise specified (CS).

In this definition the term *telegraphy* has the same general meaning as defined in the Convention.

1.119 *radiotelegram*: A *telegram*, originating in or intended for a *mobile station* or a *mobile earth station* transmitted on all or part of its route over the *radiocommunication channels* of the *mobile service* or of the *mobile-satellite service*.

1.120 *radiotelex call*: A telex call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication channels* of the *mobile service* or the *mobile-satellite service*.

¹ **1.117.1** A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of a fixed image.

1.121 *frequency-shift telegraphy*: *Telegraphy* by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values.

1.122 *facsimile*: A form of *telegraphy* for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.

1.123 *telephony*: A form of *telecommunication* primarily intended for the exchange of information in the form of speech (CS 1017).

1.124 *radiotelephone call*: A telephone call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or of the *mobile-satellite service*.

1.125 *simplex operation*: Operating method in which transmission is made possible alternately in each direction of a *telecommunication* channel, for example, by means of manual control².

1.126 *duplex operation*: Operating method in which transmission is possible simultaneously in both directions of a *telecommunication* channel².

1.127 *semi-duplex operation*: A method which is *simplex operation* at one end of the circuit and *duplex operation* at the other.²

1.128 *television*: A form of *telecommunication* for the transmission of transient images of fixed or moving objects.

1.129 *individual reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by simple domestic installations and in particular those possessing small antennas.

1.130 *community reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by receiving equipment, which in some cases may be complex and have antennas larger than those used for *individual reception*, and intended for use:

- by a group of the general public at one location; or
- through a distribution system covering a limited area.

1.131 *telemetry*: The use of *telecommunication* for automatically indicating or recording measurements at a distance from the measuring instrument.

1.132 *radiotelemetry*: *Telemetry* by means of *radio waves*.

² **1.125.1**, **1.126.1** and **1.127.1** In general, *duplex operation* and *semi-duplex operation* require two frequencies in *radiocommunication*; *simplex operation* may use either one or two.

1.133 *space telemetry*: The use of *telemetry* for the transmission from a *space station* of results of measurements made in a *spacecraft*, including those relating to the functioning of the *spacecraft*.

1.134 *telecommand*: The use of *telecommunication* for the transmission of signals to initiate, modify or terminate functions of equipment at a distance.

1.135 *space telecommand*: The use of *radiocommunication* for the transmission of signals to a *space station* to initiate, modify or terminate functions of equipment on an associated space object, including the *space station*.

1.136 *space tracking*: Determination of the *orbit*, velocity or instantaneous position of an object in space by means of *radiodetermination*, excluding *primary radar*, for the purpose of following the movement of the object.

Section VI – Characteristics of emissions and radio equipment

1.137 *radiation*: The outward flow of energy from any source in the form of *radio waves*.

1.138 *emission*: *Radiation* produced, or the production of *radiation*, by a radio transmitting *station*.

For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a *radiation*.

1.139 *class of emission*: The set of characteristics of an *emission*, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics.

1.140 *single-sideband emission*: An amplitude modulated *emission* with one sideband only.

1.141 *full carrier single-sideband emission*: A *single-sideband emission* without reduction of the carrier.

1.142 *reduced carrier single-sideband emission*: A *single-sideband emission* in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation.

1.143 *suppressed carrier single-sideband emission*: A *single-sideband emission* in which the carrier is virtually suppressed and not intended to be used for demodulation.

1.144 *out-of-band emission**: Emission on a frequency or frequencies immediately outside the *necessary bandwidth* which results from the modulation process, but excluding *spurious emissions*.

1.145 *spurious emission**: Emission on a frequency or frequencies which are outside the *necessary bandwidth* and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic *emissions*, parasitic *emissions*, intermodulation products and frequency conversion products, but exclude *out-of-band emissions*.

1.146 *unwanted emissions**: Consist of *spurious emissions* and *out-of-band emissions*.

1.146A *out-of-band domain* (of an emission): The frequency range, immediately outside the *necessary bandwidth* but excluding the *spurious domain*, in which *out-of-band emissions* generally predominate. *Out-of-band emissions*, defined based on their source, occur in the *out-of-band domain* and, to a lesser extent, in the *spurious domain*. *Spurious emissions* likewise may occur in the *out-of-band domain* as well as in the *spurious domain*. (WRC-03)

1.146B *spurious domain* (of an emission): The frequency range beyond the *out-of-band domain* in which *spurious emissions* generally predominate. (WRC-03)

1.147 *assigned frequency band*: The frequency band within which the *emission* of a *station* is authorized; the width of the band equals the *necessary bandwidth* plus twice the absolute value of the *frequency tolerance*. Where *space stations* are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface.

1.148 *assigned frequency*: The centre of the frequency band assigned to a *station*.

1.149 *characteristic frequency*: A frequency which can be easily identified and measured in a given *emission*.

A carrier frequency may, for example, be designated as the characteristic frequency.

* The terms associated with the definitions given by Nos. 1.144, 1.145 and 1.146 shall be expressed in the working languages as follows:

Numbers	In French	In English	In Spanish	In Arabic	In Chinese	In Russian
1.144	Emission hors bande	Out-of-band emission	Emisión fuera de banda	بث خارج النطاق	带外发射	внеполосное излучение
1.145	Rayonnement non essentiel	Spurious emission	Emisión no esencial	بث هامشي	杂散发射	побочное излучение
1.146	Rayonnements non désirés	Unwanted emissions	Emisiones no deseadas	بث غير مطلوب	无用发射	нежелательные излучения

1.150 *reference frequency*: A frequency having a fixed and specified position with respect to the *assigned frequency*. The displacement of this frequency with respect to the *assigned frequency* has the same absolute value and sign that the displacement of the *characteristic frequency* has with respect to the centre of the frequency band occupied by the *emission*.

1.151 *frequency tolerance*: The maximum permissible departure by the centre frequency of the frequency band occupied by an *emission* from the *assigned frequency* or, by the *characteristic frequency* of an *emission* from the *reference frequency*.

The frequency tolerance is expressed in parts in 10^6 or in hertz.

1.152 *necessary bandwidth*: For a given *class of emission*, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

1.153 *occupied bandwidth*: The width of a frequency band such that, below the lower and above the upper frequency limits, the *mean powers* emitted are each equal to a specified percentage $\beta/2$ of the total *mean power* of a given *emission*.

Unless otherwise specified in an ITU-R Recommendation for the appropriate *class of emission*, the value of $\beta/2$ should be taken as 0.5%.

1.154 *right-hand* (clockwise) *polarized wave*: An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction.

1.155 *left-hand* (anticlockwise) *polarized wave*: An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left-hand or anticlockwise direction.

1.156 *power*: Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of *emission*, using the arbitrary symbols indicated:

- *peak envelope power* (P_X or p_X);
- *mean power* (P_Y or p_Y);
- *carrier power* (P_Z or p_Z).

For different *classes of emission*, the relationships between *peak envelope power*, *mean power* and *carrier power*, under the conditions of normal operation and of no modulation, are contained in ITU-R Recommendations which may be used as a guide.

For use in formulae, the symbol p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level.

1.157 *peak envelope power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

1.158 *mean power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

1.159 *carrier power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.

1.160 *gain of an antenna*: The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum *radiation*. The gain may be considered for a specified polarization.

Depending on the choice of the reference antenna a distinction is made between:

- a) absolute or isotropic gain (G_i), when the reference antenna is an isotropic antenna isolated in space;
- b) gain relative to a half-wave dipole (G_d), when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;
- c) gain relative to a short vertical antenna (G_v), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction.

1.161 *equivalent isotropically radiated power (e.i.r.p.)*: The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (*absolute or isotropic gain*).

1.162 *effective radiated power (e.r.p.)* (in a given direction): The product of the power supplied to the antenna and its *gain relative to a half-wave dipole* in a given direction.

1.163 *effective monopole radiated power (e.m.r.p.)* (in a given direction): The product of the power supplied to the antenna and its *gain relative to a short vertical antenna* in a given direction.

1.164 *tropospheric scatter*: The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere.

1.165 *ionospheric scatter*: The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere.

Section VII – Frequency sharing

1.166 *interference*: The effect of unwanted energy due to one or a combination of *emissions*, *radiations*, or inductions upon reception in a *radiocommunication system*, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.

1.167 *permissible interference*³: Observed or predicted *interference* which complies with quantitative *interference* and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.

1.168 *accepted interference*³: *Interference* at a higher level than that defined as *permissible interference* and which has been agreed upon between two or more *administrations* without prejudice to other *administrations*.

1.169 *harmful interference*: *Interference* which endangers the functioning of a *radionavigation service* or of other *safety services* or seriously degrades, obstructs, or repeatedly interrupts a *radiocommunication service* operating in accordance with Radio Regulations (CS).

1.170 *protection ratio* (R.F.): The minimum value of the wanted-to-unwanted signal ratio, usually expressed in decibels, at the receiver input, determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output.

1.171 *coordination area*: When determining the need for coordination, the area surrounding an *earth station* sharing the same frequency band with *terrestrial stations*, or surrounding a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required. (WRC-2000)

1.172 *coordination contour*: The line enclosing the *coordination area*.

1.173 *coordination distance*: When determining the need for coordination, the distance on a given azimuth from an *earth station* sharing the same frequency band with *terrestrial stations*, or from a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required. (WRC-2000)

1.174 *equivalent satellite link noise temperature*: The noise temperature referred to the output of the receiving antenna of the *earth station* corresponding to the radio frequency noise power which produces the total observed noise at the output of the *satellite link* excluding noise due to *interference* coming from *satellite links* using other *satellites* and from terrestrial systems.

³ **1.167.1** and **1.168.1** The terms “*permissible interference*” and “*accepted interference*” are used in the coordination of frequency assignments between *administrations*.

1.175 *effective boresight area* (of a steerable satellite beam): An area on the surface of the Earth within which the boresight of a *steerable satellite beam* is intended to be pointed.

There may be more than one unconnected effective boresight area to which a single *steerable satellite beam* is intended to be pointed.

1.176 *effective antenna gain contour* (of a steerable satellite beam): An envelope of antenna gain contours resulting from moving the boresight of a *steerable satellite beam* along the limits of the *effective boresight area*.

Section VIII – Technical terms relating to space

1.177 *deep space*: Space at distances from the Earth equal to, or greater than, 2×10^6 km.

1.178 *spacecraft*: A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere.

1.179 *satellite*: A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.

1.180 *active satellite*: A *satellite* carrying a *station* intended to transmit or retransmit *radiocommunication* signals.

1.181 *reflecting satellite*: A *satellite* intended to reflect *radiocommunication* signals.

1.182 *active sensor*: A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by transmission and reception of *radio waves*.

1.183 *passive sensor*: A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by reception of *radio waves* of natural origin.

1.184 *orbit*: The path, relative to a specified frame of reference, described by the centre of mass of a *satellite* or other object in space subjected primarily to natural forces, mainly the force of gravity.

1.185 *inclination of an orbit* (of an earth satellite): The angle determined by the plane containing the *orbit* and the plane of the Earth's equator measured in degrees between 0° and 180° and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the *orbit*. (WRC-2000)

1.186 *period* (of a satellite): The time elapsing between two consecutive passages of a *satellite* through a characteristic point on its *orbit*.

1.187 *altitude of the apogee or of the perigee*: The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth.

1.188 *geosynchronous satellite*: An earth *satellite* whose period of revolution is equal to the period of rotation of the Earth about its axis.

1.189 *geostationary satellite*: A *geosynchronous satellite* whose circular and direct *orbit* lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a *geosynchronous satellite* which remains approximately fixed relative to the Earth. (WRC-03)

1.190 *geostationary-satellite orbit*: The *orbit* of a *geosynchronous satellite* whose circular and direct *orbit* lies in the plane of the Earth's equator.

1.191 *steerable satellite beam*: A *satellite* antenna beam that can be re-pointed.

ARTICLE 2

Nomenclature

Section I – Frequency and wavelength bands

2.1 The radio spectrum shall be subdivided into nine frequency bands, which shall be designated by progressive whole numbers in accordance with the following table. As the unit of frequency is the hertz (Hz), frequencies shall be expressed:

- in kilohertz (kHz), up to and including 3 000 kHz;
- in megahertz (MHz), above 3 MHz, up to and including 3 000 MHz;
- in gigahertz (GHz), above 3 GHz, up to and including 3 000 GHz.

However, where adherence to these provisions would introduce serious difficulties, for example in connection with the notification and registration of frequencies, the lists of frequencies and related matters, reasonable departures may be made¹. (WRC-15)

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision
4	VLF	3 to 30 kHz	Myriametric waves
5	LF	30 to 300 kHz	Kilometric waves
6	MF	300 to 3 000 kHz	Hectometric waves
7	HF	3 to 30 MHz	Decametric waves
8	VHF	30 to 300 MHz	Metric waves
9	UHF	300 to 3 000 MHz	Decimetric waves
10	SHF	3 to 30 GHz	Centimetric waves
11	EHF	30 to 300 GHz	Millimetric waves
12		300 to 3 000 GHz	Decimillimetric waves

NOTE 1: “Band N” (N = band number) extends from 0.3×10^N Hz to 3×10^N Hz.

NOTE 2: Prefix: k = kilo (10^3), M = mega (10^6), G = giga (10^9).

2.2 In communications between administrations and the ITU, no names, symbols or abbreviations should be used for the various frequency bands other than those specified in No. **2.1**.

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- 1 2.1.1** In the application of the Radio Regulations, the Radiocommunication Bureau uses the following units:
- | | |
|-----|---|
| kHz | for frequencies up to 28 000 kHz inclusive |
| MHz | for frequencies above 28 000 kHz up to 10 500 MHz inclusive |
| GHz | for frequencies above 10 500 MHz. |

Section II – Dates and times

2.3 Any date used in relation to radiocommunication shall be according to the Gregorian Calendar.

2.4 If in a date the month is not indicated either in full or in an abbreviated form, it shall be expressed in an all-numeric form with the fixed sequence of figures, two of each representing the day, month and year.

2.5 Whenever a date is used in connection with Coordinated Universal Time (UTC), this date shall be that at the prime meridian, the prime meridian corresponding to zero degrees geographical longitude. (WRC-15)

2.6 Whenever a specified time is used in international radiocommunication activities, UTC shall be applied, unless otherwise indicated, and it shall be presented as a four-digit group (0000-2359). The abbreviation UTC shall be used in all languages.

Section III – Designation of emissions

2.7 Emissions shall be designated according to their necessary bandwidth and their classification in accordance with the method described in Appendix 1.

ARTICLE 3

Technical characteristics of stations

3.1 The choice and performance of equipment to be used in a station and any emissions therefrom shall satisfy the provisions of these Regulations.

3.2 Also, as far as is compatible with practical considerations, the choice of transmitting, receiving and measuring equipment shall be based on the most recent advances in the technique as indicated, *inter alia*, in ITU-R Recommendations.

3.3 Transmitting and receiving equipment intended to be used in a given part of the frequency spectrum should be designed to take into account the technical characteristics of transmitting and receiving equipment likely to be employed in neighbouring and other parts of the spectrum, provided that all technically and economically justifiable measures have been taken to reduce the level of unwanted emissions from the latter transmitting equipment and to reduce the susceptibility to interference of the latter receiving equipment.

3.4 To the maximum extent possible, equipment to be used in a station should apply signal processing methods which enable the most efficient use of the frequency spectrum in accordance with the relevant ITU-R Recommendations. These methods include, *inter alia*, certain bandwidth expansion techniques, and in particular, in amplitude-modulation systems, the use of the single-sideband technique.

3.5 Transmitting stations shall conform to the frequency tolerances specified in Appendix 2.

3.6 Transmitting stations shall conform to the maximum permitted power levels for unwanted emissions in the spurious domain specified in Appendix 3. (WRC-12)

3.7 Transmitting stations shall conform to the maximum permitted power levels for out-of-band emissions, or unwanted emissions in the out-of-band domain, specified for certain services and classes of emission in the present Regulations. In the absence of such specified maximum permitted power levels transmitting stations should, to the maximum extent possible, satisfy the requirements relating to the limitation of the out-of-band emissions, or unwanted emissions in the out-of-band domain, specified in the relevant ITU-R Recommendations. (WRC-12)

3.8 Moreover, every effort should be made to keep frequency tolerances and levels of unwanted emissions at the lowest values which the state of the technique and the nature of the service permit.

3.9 The bandwidths of emissions also shall be such as to ensure the most efficient utilization of the spectrum; in general this requires that bandwidths be kept at the lowest values which the state of the technique and the nature of the service permit. Appendix 1 is provided as a guide for the determination of the necessary bandwidth.

3.10 Where bandwidth-expansion techniques are used, the minimum spectral power density consistent with efficient spectrum utilization shall be employed.

3.11 Wherever necessary for efficient spectrum use, the receivers used by any service should comply as far as possible with the frequency tolerances of the transmitters of that service, due regard being paid to the Doppler effect where appropriate.

3.12 Receiving stations should use equipment with technical characteristics appropriate for the class of emission concerned; in particular, selectivity should be appropriate having regard to No. 3.9 on the bandwidths of emissions.

3.13 The performance characteristics of receivers should be adequate to ensure that they do not suffer from interference due to transmitters situated at a reasonable distance and which operate in accordance with these Regulations.

3.14 To ensure compliance with these Regulations, administrations shall arrange for frequent checks to be made of the emissions of stations under their jurisdiction. For this purpose, they shall use the means indicated in Article 16, if required. The technique of measurements and the intervals of measurements to be employed shall be, as far as is practicable, in accordance with the most recent ITU-R Recommendations.

3.15 The use of damped wave emissions is forbidden in all stations.

CHAPTER II
Frequencies

ARTICLE 4

Assignment and use of frequencies

4.1 Member States shall endeavour to limit the number of frequencies and the spectrum used to the minimum essential to provide in a satisfactory manner the necessary services. To that end they shall endeavour to apply the latest technical advances as soon as possible (CS 195).

4.2 Member States undertake that in assigning frequencies to stations which are capable of causing harmful interference to the services rendered by the stations of another country, such assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of these Regulations.

4.3 Any new assignment or any change of frequency or other basic characteristic of an existing assignment (see Appendix 4) shall be made in such a way as to avoid causing harmful interference to services rendered by stations using frequencies assigned in accordance with the Table of Frequency Allocations in this Chapter and the other provisions of these Regulations, the characteristics of which assignments are recorded in the Master International Frequency Register.

4.4 Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations.

4.5 The frequency assigned to a station of a given service shall be separated from the limits of the band allocated to this service in such a way that, taking account of the frequency band assigned to a station, no harmful interference is caused to services to which frequency bands immediately adjoining are allocated.

4.6 For the purpose of resolving cases of harmful interference, the radio astronomy service shall be treated as a radiocommunication service. However, with regard to emissions from services operating in other bands, it shall be afforded the same degree of protection as such services are afforded vis-à-vis each other.

4.7 For the purpose of resolving cases of harmful interference, the space research (passive) service and the earth exploration-satellite (passive) service shall be afforded protection from different services in other bands only to the extent that these different services are protected from each other.

4.8 Where, in adjacent Regions or sub-Regions, a band of frequencies is allocated to different services of the same category (see Sections I and II of Article 5), the basic principle is the equality of right to operate. Accordingly, the stations of each service in one Region or sub-Region must operate so as not to cause harmful interference to any service of the same or higher category in the other Regions or sub-Regions. (WRC-03)

4.9 No provision of these Regulations prevents the use by a station in distress, or by a station providing assistance to it, of any means of radiocommunication at its disposal to attract attention, make known the condition and location of the station in distress, and obtain or provide assistance.

4.10 Member States recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.

4.11 Member States recognize that among frequencies which have long-distance propagation characteristics, those in the bands between 5 MHz and 30 MHz are particularly useful for long-distance communications; they agree to make every possible effort to reserve these bands for such communications. Whenever frequencies in these bands are used for short- or medium-distance communications, the minimum power necessary shall be employed.

4.12 To reduce requirements for frequencies in the bands between 5 MHz and 30 MHz and thus to prevent harmful interference to long-distance radiocommunications, administrations are encouraged to use, whenever practicable, any other possible means of communication.

4.13 When special circumstances make it indispensable to do so, an administration may, as an exception to the normal methods of working authorized by these Regulations, have recourse to the special methods of working enumerated below, on the sole condition that the characteristics of the stations still conform to those inserted in the Master International Frequency Register:

4.14 *a)* a station in the fixed service or an earth station in the fixed-satellite service may, under the conditions defined in Nos. **5.28** to **5.31**, transmit to mobile stations on its normal frequencies;

4.15 *b)* a land station may communicate, under the conditions defined in Nos. **5.28** to **5.31**, with fixed stations in the fixed service or earth stations in the fixed-satellite service or other land stations of the same category.

4.15A (SUP - WRC-12)

4.16 However, in circumstances involving the safety of life, or the safety of a ship or aircraft, a land station may communicate with fixed stations or land stations of another category.

4.17 Any administration may assign a frequency in a band allocated to the fixed service or allocated to the fixed-satellite service to a station authorized to transmit, unilaterally, from one specified fixed point to one or more specified fixed points provided that such transmissions are not intended to be received directly by the general public.

4.18 Any mobile station using an emission which satisfies the frequency tolerance applicable to the coast station with which it is communicating may transmit on the same frequency as the coast station on condition that the latter requests such transmission and that no harmful interference is caused to other stations.

4.19 In certain cases provided for in Articles **31** and **51**, aircraft stations are authorized to use frequencies in the bands allocated to the maritime mobile service for the purpose of communicating with stations of that service (see No. **51.73**). (WRC-07)

4.20 Aircraft earth stations are authorized to use frequencies in the bands allocated to the maritime mobile-satellite service for the purpose of communicating, via the stations of that service, with the public telegraph and telephone networks.

4.21 In exceptional cases, land mobile earth stations in the land mobile-satellite service may communicate with stations in the maritime mobile-satellite and aeronautical mobile-satellite services. Such operations shall comply with the relevant provisions of the Radio Regulations relating to those services and shall be subject to agreement among administrations concerned, taking due account of No. **4.10**.

4.22 Any emission capable of causing harmful interference to distress, alarm, urgency or safety communications on the international distress and emergency frequencies established for these purposes by these Regulations is prohibited. Supplementary distress frequencies available on less than a worldwide basis should be afforded adequate protection.

4.23 Transmissions to or from high altitude platform stations shall be limited to bands specifically identified in Article **5**. (WRC-12)

4.24 Space research systems intended to operate in deep space may also use the space research service (deep space) allocations, with the same status as those allocations, when the spacecraft is near the Earth, such as during launch, early orbit, flying by the Earth and returning to the Earth. (WRC-15)

ARTICLE 5

Frequency allocations

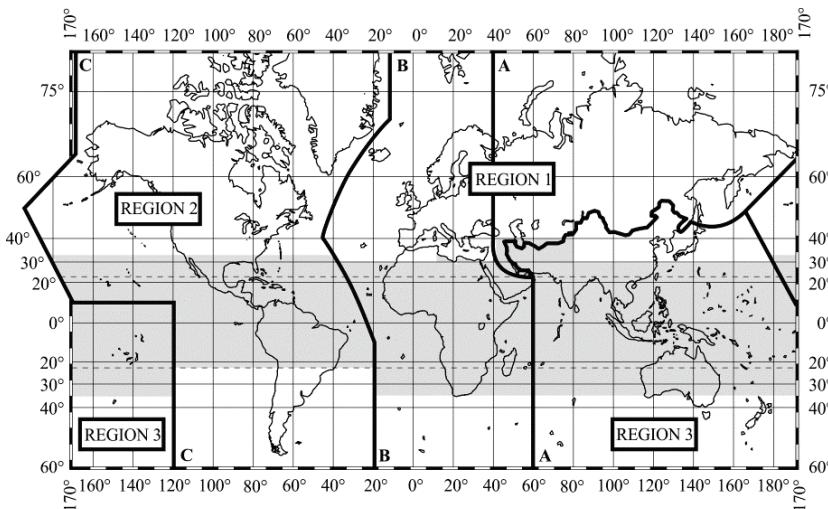
Introduction

5.1 In all documents of the Union where the terms *allocation*, *allotment* and *assignment* are to be used, they shall have the meaning given them in Nos. 1.16 to 1.18, the terms used in the six working languages being as follows:

Frequency distribution to	French	English	Spanish	Arabic	Chinese	Russian
Services	Attribution (attribuer)	Allocation (to allocate)	Atribución (atribuir)	توزيع (توزيع)	划分	распределение (распределять)
Areas or countries	Allotissement (allotir)	Allotment (to allot)	Adjudicación (adjudicar)	تعيين (يعين)	分配	выделение (выделять)
Stations	Assignation (assigner)	Assignment (to assign)	Asignación (asignar)	تحصيص (يخصّص)	指配	присвоение (присваивать)

Section I – Regions and areas

5.2 For the allocation of frequencies the world has been divided into three Regions¹ as shown on the following map and described in Nos. 5.3 to 5.9:



5-01

The shaded part represents the Tropical Zones as defined in Nos. 5.16 to 5.20 and 5.21.

1 5.2.1 It should be noted that where the words “regions” or “regional” are without a capital “R” in these Regulations, they do not relate to the three Regions here defined for purposes of frequency allocation.

5.3 *Region 1:* Region 1 includes the area limited on the east by line A (lines A, B and C are defined below) and on the west by line B, excluding any of the territory of the Islamic Republic of Iran which lies between these limits. It also includes the whole of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Türkiye, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine and the area to the north of Russian Federation which lies between lines A and C. (WRC-23)

5.4 *Region 2:* Region 2 includes the area limited on the east by line B and on the west by line C.

5.5 *Region 3:* Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Türkiye, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine and the area to the north of Russian Federation. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits. (WRC-23)

5.6 The lines A, B and C are defined as follows:

5.7 *Line A:* Line A extends from the North Pole along meridian 40° East of Greenwich to parallel 40° North; thence by great circle arc to the intersection of meridian 60° East and the Tropic of Cancer; thence along the meridian 60° East to the South Pole.

5.8 *Line B:* Line B extends from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South; thence along meridian 20° West to the South Pole.

5.9 *Line C:* Line C extends from the North Pole by great circle arc to the intersection of parallel 65° 30' North with the international boundary in Bering Strait; thence by great circle arc to the intersection of meridian 165° East of Greenwich and parallel 50° North; thence by great circle arc to the intersection of meridian 170° West and parallel 10° North; thence along parallel 10° North to its intersection with meridian 120° West; thence along meridian 120° West to the South Pole.

5.10 For the purposes of these Regulations, the term “African Broadcasting Area” means:

5.11 *a)* African countries, parts of countries, territories and groups of territories situated between the parallels 40° South and 30° North;

5.12 *b)* islands in the Indian Ocean west of meridian 60° East of Greenwich, situated between the parallel 40° South and the great circle arc joining the points 45° East, 11° 30' North and 60° East, 15° North;

5.13 *c)* islands in the Atlantic Ocean east of line B defined in No. 5.8 of these Regulations, situated between the parallels 40° South and 30° North.

5.14 The “European Broadcasting Area” is bounded on the west by the western boundary of Region 1, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North so as to include the northern part of Saudi Arabia and that part of those countries bordering the Mediterranean within these limits. In addition, Armenia, Azerbaijan, Georgia and those parts of the territories of Iraq, Jordan, Syrian Arab Republic, Türkiye and Ukraine lying outside the above limits are included in the European Broadcasting Area. (WRC-23)

5.15 The “European Maritime Area” is bounded to the north by a line extending along parallel 72° North from its intersection with meridian 55° East of Greenwich to its intersection with meridian 5° West, then along meridian 5° West to its intersection with parallel 67° North, thence along parallel 67° North to its intersection with meridian 32° West; to the west by a line extending along meridian 32° West to its intersection with parallel 30° North; to the south by a line extending along parallel 30° North to its intersection with meridian 43° East; to the east by a line extending along meridian 43° East to its intersection with parallel 60° North, thence along parallel 60° North to its intersection with meridian 55° East and thence along meridian 55° East to its intersection with parallel 72° North.

5.16 1) The “Tropical Zone” (see map in No. 5.2) is defined as:

5.17 a) the whole of that area in Region 2 between the Tropics of Cancer and Capricorn;

5.18 b) the whole of that area in Regions 1 and 3 contained between the parallels 30° North and 35° South with the addition of:

5.19 i) The area contained between the meridians 40° East and 80° East of Greenwich and the parallels 30° North and 40° North;

5.20 ii) that part of Libya north of parallel 30° North.

5.21 2) In Region 2, the Tropical Zone may be extended to parallel 33° North, subject to special agreements between the countries concerned in that Region (see Article 6).

5.22 A sub-Region is an area consisting of two or more countries in the same Region.

Section II – Categories of services and allocations

5.23 *Primary and secondary services*

5.24 1) Where, in a box of the Table in Section IV of this Article, a band is indicated as allocated to more than one service, either on a worldwide or Regional basis, such services are listed in the following order:

5.25 a) services the names of which are printed in “capitals” (example: FIXED); these are called “primary” services;

5.26 b) services the names of which are printed in “normal characters” (example: Mobile); these are called “secondary” services (see Nos. 5.28 to 5.31).

5.27 2) Additional remarks shall be printed in normal characters (example: MOBILE except aeronautical mobile).

- 5.28** 3) Stations of a secondary service:
- 5.29** a) shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;
- 5.30** b) cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;
- 5.31** c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date.

5.32 4) Where a band is indicated in a footnote of the Table as allocated to a service “on a secondary basis” in an area smaller than a Region, or in a particular country, this is a secondary service (see Nos. **5.28** to **5.31**).

5.33 5) Where a band is indicated in a footnote of the Table as allocated to a service “on a primary basis”, in an area smaller than a Region, or in a particular country, this is a primary service only in that area or country.

5.34 *Additional allocations*

5.35 1) Where a band is indicated in a footnote of the Table as “also allocated” to a service in an area smaller than a Region, or in a particular country, this is an “additional” allocation, i.e. an allocation which is added in this area or in this country to the service or services which are indicated in the Table (see No. **5.36**).

5.36 2) If the footnote does not include any restriction on the service or services concerned apart from the restriction to operate only in a particular area or country, stations of this service or these services shall have equality of right to operate with stations of the other primary service or services indicated in the Table.

5.37 3) If restrictions are imposed on an additional allocation in addition to the restriction to operate only in a particular area or country, this is indicated in the footnote of the Table.

5.38 *Alternative allocations*

5.39 1) Where a band is indicated in a footnote of the Table as “allocated” to one or more services in an area smaller than a Region, or in a particular country, this is an “alternative” allocation, i.e. an allocation which replaces, in this area or in this country, the allocation indicated in the Table (see No. **5.40**).

5.40 2) If the footnote does not include any restriction on stations of the service or services concerned, apart from the restriction to operate only in a particular area or country, these stations of such a service or services shall have an equality of right to operate with stations of the primary service or services, indicated in the Table, to which the band is allocated in other areas or countries.

5.41 3) If restrictions are imposed on stations of a service to which an alternative allocation is made, in addition to the restriction to operate only in a particular country or area, this is indicated in the footnote.

5.42 *Miscellaneous provisions*

5.43 1) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not causing harmful interference to another service or to another station in the same service, this means also that the service which is subject to not causing harmful interference cannot claim protection from harmful interference caused by the other service or other station in the same service. (WRC-2000)

5.43A *1bis*) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not claiming protection from another service or from another station in the same service, this means also that the service which is subject to not claiming protection shall not cause harmful interference to the other service or other station in the same service. (WRC-2000)

5.44 2) Except if otherwise specified in a footnote, the term “fixed service”, where appearing in Section IV of this Article, does not include systems using ionospheric scatter propagation.

5.45 Not used.

Section III – Description of the Table of Frequency Allocations

5.46 1) The heading of the Table in Section IV of this Article includes three columns, each of which corresponds to one of the Regions (see No. **5.2**). Where an allocation occupies the whole of the width of the Table or only one or two of the three columns, this is a worldwide allocation or a Regional allocation, respectively.

5.47 2) The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.

5.48 3) Within each of the categories specified in Nos. **5.25** and **5.26**, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.

5.49 4) In the case where there is a parenthetical addition to an allocation in the Table, that service allocation is restricted to the type of operation so indicated.

5.50 5) The footnote references which appear in the Table below the allocated service or services apply to more than one of the allocated services, or to the whole of the allocation concerned. (WRC-2000)

5.51 6) The footnote references which appear to the right of the name of a service are applicable only to that particular service.

5.52 7) In certain cases, the names of countries appearing in the footnotes have been simplified in order to shorten the text.

Section IV – Table of Frequency Allocations
(See No. 2.1)

8.3-110 kHz

Allocation to services		
Region 1	Region 2	Region 3
Below 8.3	(Not allocated) 5.53 5.54	
8.3-9	METEOROLOGICAL AIDS 5.54A 5.54B 5.54C	
9-11.3	METEOROLOGICAL AIDS 5.54A RADIONAVIGATION	
11.3-14	RADIONAVIGATION	
14-19.95	FIXED MARITIME MOBILE 5.57 5.55 5.56	
19.95-20.05	STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)	
20.05-70	FIXED MARITIME MOBILE 5.57 5.56 5.58	
70-72 RADIONAVIGATION 5.60	70-90 FIXED MARITIME MOBILE 5.57 MARITIME RADIO-NAVIGATION 5.60 Radiolocation	70-72 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59
72-84 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60 5.56		72-84 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60
84-86 RADIONAVIGATION 5.60		84-86 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59
86-90 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.56	5.61	86-90 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60
90-110	RADIONAVIGATION 5.62 Fixed 5.64	

5.53 Administrations authorizing the use of frequencies below 8.3 kHz shall ensure that no harmful interference is caused to services to which the bands above 8.3 kHz are allocated. (WRC-12)

5.54 Administrations conducting scientific research using frequencies below 8.3 kHz are urged to advise other administrations that may be concerned in order that such research may be afforded all practicable protection from harmful interference. (WRC-12)

5.54A Use of the 8.3-11.3 kHz frequency band by stations in the meteorological aids service is limited to passive use only. In the band 9-11.3 kHz, meteorological aids stations shall not claim protection from stations of the radionavigation service submitted for notification to the Bureau prior to 1 January 2013. For sharing between stations of the meteorological aids service and stations in the radionavigation service submitted for notification after this date, the most recent version of Recommendation ITU-R RS.1881 should be applied. (WRC-12)

5.54B *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Kuwait, Lebanon, Morocco, Qatar, the Syrian Arab Republic, Sudan and Tunisia, the frequency band 8.3-9 kHz is also allocated to the radionavigation, fixed and mobile services on a primary basis. (WRC-15)

5.54C *Additional allocation:* in China, the frequency band 8.3-9 kHz is also allocated to the maritime radionavigation and maritime mobile services on a primary basis. (WRC-12)

5.55 *Additional allocation:* in Armenia, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequency band 14-17 kHz is also allocated to the radionavigation service on a primary basis. (WRC-15)

5.56 The stations of services to which the frequency bands 14-19.95 kHz and 20.05-70 kHz and in Region 1 also the frequency bands 72-84 kHz and 86-90 kHz are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC-23)

5.57 The use of the bands 14-19.95 kHz, 20.05-70 kHz and 70-90 kHz (72-84 kHz and 86-90 kHz in Region 1) by the maritime mobile service is limited to coast radiotelegraph stations (A1A and F1B only). Exceptionally, the use of class J2B or J7B emissions is authorized subject to the necessary bandwidth not exceeding that normally used for class A1A or F1B emissions in the band concerned.

5.58 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequency band 67-70 kHz is also allocated to the radionavigation service on a primary basis. (WRC-23)

5.59 *Different category of service:* in Bangladesh and Pakistan, the allocation of the bands 70-72 kHz and 84-86 kHz to the fixed and maritime mobile services is on a primary basis (see No. 5.33). (WRC-2000)

5.60 In the bands 70-90 kHz (70-86 kHz in Region 1) and 110-130 kHz (112-130 kHz in Region 1), pulsed radionavigation systems may be used on condition that they do not cause harmful interference to other services to which these bands are allocated.

5.61 In Region 2, the establishment and operation of stations in the maritime radionavigation service in the bands 70-90 kHz and 110-130 kHz shall be subject to agreement obtained under No. 9.21 with administrations whose services, operating in accordance with the Table, may be affected. However, stations of the fixed, maritime mobile and radiolocation services shall not cause harmful interference to stations in the maritime radionavigation service established under such agreements.

5.62 Administrations which operate stations in the radionavigation service in the band 90-110 kHz are urged to coordinate technical and operating characteristics in such a way as to avoid harmful interference to the services provided by these stations.

5.63 (SUP - WRC-97)

5.64 Only classes A1A or F1B, A2C, A3C, F1C or F3C emissions are authorized for stations of the fixed service in the bands allocated to this service between 90 kHz and 160 kHz (148.5 kHz in Region 1) and for stations of the maritime mobile service in the bands allocated to this service between 110 kHz and 160 kHz (148.5 kHz in Region 1). Exceptionally, class J2B or J7B emissions are also authorized in the bands between 110 kHz and 160 kHz (148.5 kHz in Region 1) for stations of the maritime mobile service.

110-255 kHz

Allocation to services		
Region 1	Region 2	Region 3
110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	110-130 FIXED MARITIME MOBILE MARITIME RADIO- NAVIGATION 5.60 Radiolocation	110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64
112-115 RADIONAVIGATION 5.60		112-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65
115-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.66		117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64
117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64		126-129 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65
126-129 RADIONAVIGATION 5.60		129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64
129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	5.61 5.64	130-135.7 FIXED MARITIME MOBILE RADIONAVIGATION 5.64
130-135.7 FIXED MARITIME MOBILE 5.64 5.67	130-135.7 FIXED MARITIME MOBILE 5.64	130-135.7 FIXED MARITIME MOBILE RADIONAVIGATION 5.64
135.7-137.8 FIXED MARITIME MOBILE Amateur 5.67A 5.64 5.67 5.67B	135.7-137.8 FIXED MARITIME MOBILE Amateur 5.67A 5.64	135.7-137.8 FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B
137.8-148.5 FIXED MARITIME MOBILE 5.64 5.67	137.8-160 FIXED MARITIME MOBILE 5.64	137.8-160 FIXED MARITIME MOBILE RADIONAVIGATION 5.64
148.5-255 BROADCASTING 5.68 5.69 5.70	160-190 FIXED	160-190 FIXED Aeronautical radionavigation
	190-200 AERONAUTICAL RADIONAVIGATION	

5.65 *Different category of service:* in Bangladesh, the allocation of the bands 112-117.6 kHz and 126-129 kHz to the fixed and maritime mobile services is on a primary basis (see No. 5.33). (WRC-2000)

5.66 *Different category of service:* in Germany, the allocation of the band 115-117.6 kHz to the fixed and maritime mobile services is on a primary basis (see No. 5.33) and to the radionavigation service on a secondary basis (see No. 5.32).

5.67 *Additional allocation:* in Kyrgyzstan and Turkmenistan, the frequency band 130-148.5 kHz is also allocated to the radionavigation service on a secondary basis. Within and between these countries this service shall have an equal right to operate. (WRC-19)

5.67A Stations in the amateur service using frequencies in the band 135.7-137.8 kHz shall not exceed a maximum radiated power of 1 W (e.i.r.p.) and shall not cause harmful interference to stations of the radionavigation service operating in countries listed in No. 5.67. (WRC-07)

5.67B The use of the frequency band 135.7-137.8 kHz in Algeria, Egypt, Iraq, Lebanon, Syrian Arab Republic, Sudan, South Sudan and Tunisia is limited to the fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the frequency band 135.7-137.8 kHz, and this should be taken into account by the countries authorizing such use. (WRC-19)

5.68 *Alternative allocation:* in Congo (Rep. of the), the Dem. Rep. of the Congo and South Africa, the frequency band 160-200 kHz is allocated to the fixed service on a primary basis. (WRC-15)

5.69 *Additional allocation:* in Somalia, the band 200-255 kHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.70 *Alternative allocation:* in Angola, Botswana, Burundi, the Central African Rep., Congo (Rep. of the), Eswatini, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, the Dem. Rep. of the Congo, South Africa, Tanzania, Chad, Zambia and Zimbabwe, the frequency band 200-283.5 kHz is allocated to the aeronautical radionavigation service on a primary basis. (WRC-19)

200-415 kHz

Allocation to services		
Region 1	Region 2	Region 3
255-283.5 BROADCASTING AERONAUTICAL RADIONAVIGATION 5.70	200-275 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile
283.5-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73 5.74	275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	285-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73
315-325 AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radiobeacons) 5.73 5.75	315-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation	315-325 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73
325-405 AERONAUTICAL RADIONAVIGATION	325-335 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	325-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile
	335-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	
405-415 RADIONAVIGATION 5.76	405-415 RADIONAVIGATION 5.76 Aeronautical mobile	

5.71 (SUP - WRC-19)

5.72 (SUP - WRC-12)

5.73 The band 285-325 kHz (283.5-325 kHz in Region 1) in the maritime radionavigation service may be used to transmit supplementary navigational information using narrow-band techniques, on condition that no harmful interference is caused to radiobeacon stations operating in the radionavigation service. (WRC-97)

5.74 *Additional Allocation:* in Region 1, the frequency band 285.3-285.7 kHz is also allocated to the maritime radionavigation service (other than radiobeacons) on a primary basis.

5.75 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Romania, the allocation of the band 315-325 kHz to the maritime radionavigation service is on a primary basis under the condition that in the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned. (WRC-07)

5.76 The frequency 410 kHz is designated for radio direction-finding in the maritime radionavigation service. The other radionavigation services to which the band 405-415 kHz is allocated shall not cause harmful interference to radio direction-finding in the band 406.5-413.5 kHz.

415-495 kHz

Allocation to services		
Region 1	Region 2	Region 3
415-435 MARITIME MOBILE 5.79 AERONAUTICAL RADIONAVIGATION	415-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.78 5.80	
435-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.82	5.82	
472-479 MARITIME MOBILE 5.79 Amateur 5.80A Aeronautical radionavigation 5.77 5.80 5.80B 5.82		
479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.82	479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.80 5.82	

5.77 *Different category of service:* in Australia, China, the French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea, the Dem. People's Rep. of Korea and Sri Lanka, the allocation of the frequency band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. In Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Latvia, Uzbekistan and Kyrgyzstan, the allocation of the frequency band 435-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in all the aforementioned countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the frequency band 435-495 kHz do not cause interference to reception by coast stations of transmissions from ship stations on frequencies designated for ship stations on a worldwide basis. (WRC-19)

5.78 *Different category of service:* in Cuba, the United States of America and Mexico, the allocation of the band 415-435 kHz to the aeronautical radionavigation service is on a primary basis.

5.79 In the maritime mobile service, the frequency bands 415-495 kHz and 505-526.5 kHz are limited to radiotelegraphy and may also be used for the NAVDAT system in accordance with the most recent version of Recommendation ITU-R M.2010, subject to agreement between interested and affected administrations. NAVDAT transmitting stations are limited to coast stations. (WRC-19)

5.79A When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz, administrations are strongly recommended to coordinate the operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution 339 (Rev.WRC-07)). (WRC-07)

5.80 In Region 2, the use of the band 435-495 kHz by the aeronautical radionavigation service is limited to non-directional beacons not employing voice transmission.

5.80A The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service using frequencies in the band 472-479 kHz shall not exceed 1 W. Administrations may increase this limit of e.i.r.p. to 5 W in portions of their territory which are at a distance of over 800 km from the borders of Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia, Ukraine and Yemen. In this frequency band, stations in the amateur service shall not cause harmful interference to, or claim protection from, stations of the aeronautical radionavigation service. (WRC-12)

5.80B The use of the frequency band 472-479 kHz in Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia and Yemen is limited to the maritime mobile and aeronautical radionavigation services. The amateur service shall not be used in the above-mentioned countries in this frequency band, and this should be taken into account by the countries authorizing such use. (WRC-12)

5.81 (SUP - WRC-2000)

5.82 In the maritime mobile service, the frequency 490 kHz is to be used exclusively for the transmission by coast stations of navigational and meteorological warnings and urgent information to ships, by means of narrow-band direct-printing telegraphy. The conditions for use of the frequency 490 kHz are prescribed in Articles 31 and 52. In using the frequency band 415-495 kHz for the aeronautical radionavigation service, administrations are requested to ensure that no harmful interference is caused to the frequency 490 kHz. In using the frequency band 472-479 kHz for the amateur service, administrations shall ensure that no harmful interference is caused to the frequency 490 kHz. (WRC-12)

495-1 800 kHz

Allocation to services		
Region 1	Region 2	Region 3
495-505	MARITIME MOBILE 5.82C 5.82D	
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	505-510 MARITIME MOBILE 5.79	505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION
	510-525 MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	Aeronautical mobile Land mobile
	525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION	526.5-535 BROADCASTING Mobile 5.88
526.5-1 606.5 BROADCASTING 5.87 5.87A	535-1 605 BROADCASTING	535-1 606.5 BROADCASTING
	1 605-1 625 FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92	1 605-1 625 BROADCASTING 5.89 5.90
	1 625-1 635 RADIOLOCATION 5.93	1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90
1 635-1 800 FIXED MARITIME MOBILE 5.90 LAND MOBILE 5.92 5.96	1 705-1 800 FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION	1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION 5.91

5.82A (SUP - WRC-12)**5.82B** (SUP - WRC-12)

5.82C The frequency band 495-505 kHz is used for the international NAVDAT system as described in the most recent version of Recommendation ITU-R M.2010. NAVDAT transmitting stations are limited to coast stations. (WRC-19)

5.82D When establishing coast stations in the NAVDAT system on the frequencies 500 kHz and 4 226 kHz, the conditions for the use of the frequencies 500 kHz and 4 226 kHz are prescribed in Articles 31 and 52. Administrations are strongly recommended to coordinate the NAVDAT systems operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution 364 (WRC-23)). (WRC-23)

5.83 (SUP - WRC-07)

5.84 The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in Articles 31 and 52. (WRC-07)

5.85 Not used.

5.86 In Region 2, in the band 525-535 kHz the carrier power of broadcasting stations shall not exceed 1 kW during the day and 250 W at night.

5.87 *Additional allocation:* in Angola, Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia and Niger, the frequency band 526.5-535 kHz is also allocated to the mobile service on a secondary basis. (WRC-19)

5.87A *Additional allocation:* in Uzbekistan, the band 526.5-1 606.5 kHz is also allocated to the radionavigation service on a primary basis. Such use is subject to agreement obtained under No. 9.21 with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-97)

5.88 *Additional allocation:* in China, the band 526.5-535 kHz is also allocated to the aeronautical radionavigation service on a secondary basis.

5.89 In Region 2, the use of the band 1 605-1 705 kHz by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

The examination of frequency assignments to stations of the fixed and mobile services in the band 1 625-1 705 kHz shall take account of the allotments appearing in the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

5.90 In the band 1 605-1 705 kHz, in cases where a broadcasting station of Region 2 is concerned, the service area of the maritime mobile stations in Region 1 shall be limited to that provided by ground-wave propagation.

5.91 *Additional allocation:* in the Philippines and Sri Lanka, the band 1 606.5-1 705 kHz is also allocated to the broadcasting service on a secondary basis. (WRC-97)

5.92 Some countries of Region 1 use radiodetermination systems in the bands 1 606.5-1 625 kHz, 1 635-1 800 kHz, 1 850-2 160 kHz, 2 194-2 300 kHz, 2 502-2 850 kHz and 3 500-3 800 kHz, subject to agreement obtained under No. 9.21. The radiated mean power of these stations shall not exceed 50 W.

5.93 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Tajikistan, Chad, Turkmenistan and Ukraine, the frequency bands 1 625-1 635 kHz, 1 800-1 810 kHz and 2 160-2 170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under No. 9.21. (WRC-15)

5.94 and **5.95** Not used.

5.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Croatia, Denmark, Estonia, the Russian Federation, Finland, Georgia, Hungary, Ireland, Iceland, Israel, Kazakhstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the frequency bands 1 715-1 800 kHz and 1 850-2 000 kHz. However, when allocating the frequency bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W. (WRC-15)

1 800-2 194 kHz

Allocation to services		
Region 1	Region 2	Region 3
1 800-1 810 RADIOLOCATION 5.93	1 800-1 850 AMATEUR	1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation
1 810-1 850 AMATEUR 5.98 5.99 5.100		
1 850-2 000 FIXED MOBILE except aeronautical mobile 5.92 5.96 5.103	1 850-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION 5.102	1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation 5.97
2 000-2 025 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103	2 000-2 065 FIXED MOBILE	
2 025-2 045 FIXED MOBILE except aeronautical mobile (R) Meteorological aids 5.104 5.92 5.103		
2 045-2 160 FIXED MARITIME MOBILE LAND MOBILE 5.92	2 065-2 107 MARITIME MOBILE 5.105 5.106	
2 160-2 170 RADIOLOCATION 5.93 5.107	2 107-2 170 FIXED MOBILE	
2 170-2 173.5	MARITIME MOBILE	
2 173.5-2 190.5	MOBILE (distress and calling) 5.108 5.109 5.110 5.111	
2 190.5-2 194	MARITIME MOBILE	

5.97 In Region 3, the Loran system operates either on 1 850 kHz or 1 950 kHz, the bands occupied being 1 825-1 875 kHz and 1 925-1 975 kHz respectively. Other services to which the band 1 800-2 000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1 850 kHz or 1 950 kHz.

5.98 *Alternative allocation:* in Armenia, Azerbaijan, Belarus, Belgium, Cameroon, Congo (Rep. of the), Denmark, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, the Syrian Arab Republic, Türkiye, Kyrgyzstan, Somalia, Tajikistan, Tunisia and Turkmenistan, the frequency band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-23)

5.99 *Additional allocation:* in Saudi Arabia, Austria, Egypt, Iraq, Libya, Uzbekistan, Romania, Slovakia, Slovenia, Chad, and Togo, the frequency band 1 810-1 830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-23)

5.100 In Region 1, the authorization to use the band 1 810-1 830 kHz by the amateur service in countries situated totally or partially north of 40° N shall be given only after consultation with the countries mentioned in Nos. **5.98** and **5.99** to define the necessary steps to be taken to prevent harmful interference between amateur stations and stations of other services operating in accordance with Nos. **5.98** and **5.99**.

5.101 (SUP - WRC-12)

5.102 *Alternative allocation:* in Bolivia, Chile, Paraguay and Peru, the frequency band 1 850-2 000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis. (WRC-15)

5.103 In Region 1, in making assignments to stations in the fixed and mobile services in the bands 1 850-2 045 kHz, 2 194-2 498 kHz, 2 502-2 625 kHz and 2 650-2 850 kHz, administrations should bear in mind the special requirements of the maritime mobile service.

5.104 In Region 1, the use of the band 2 025-2 045 kHz by the meteorological aids service is limited to oceanographic buoy stations.

5.105 In Region 2, except in Greenland, coast stations and ship stations using radiotelephony in the band 2 065-2 107 kHz shall be limited to class J3E emissions and to a peak envelope power not exceeding 1 kW. Preferably, the following carrier frequencies should be used: 2 065.0 kHz, 2 079.0 kHz, 2 082.5 kHz, 2 086.0 kHz, 2 093.0 kHz, 2 096.5 kHz, 2 100.0 kHz and 2 103.5 kHz. In Argentina and Uruguay, the carrier frequencies 2 068.5 kHz and 2 075.5 kHz are also used for this purpose, while the frequencies within the band 2 072-2 075.5 kHz are used as provided in No. **52.165**.

5.106 In Regions 2 and 3, provided no harmful interference is caused to the maritime mobile service, the frequencies between 2 065 kHz and 2 107 kHz may be used by stations of the fixed service communicating only within national borders and whose mean power does not exceed 50 W. In notifying the frequencies, the attention of the Bureau should be drawn to these provisions.

5.107 *Additional allocation:* in Saudi Arabia, Eritrea, Eswatini, Ethiopia, Iraq, Libya and Somalia, the frequency band 2 160-2 170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W. (WRC-19)

5.108 The carrier frequency 2 182 kHz is an international distress and calling frequency for radiotelephony. The conditions for the use of the band 2 173.5-2 190.5 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.109 The frequencies 2 187.5 kHz, 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12 577 kHz and 16 804.5 kHz are international distress frequencies for digital selective calling. The conditions for the use of these frequencies are prescribed in Article **31**.

5.110 The frequencies 2 174.5 kHz, 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz are used for the automatic connection system (ACS), as described in the most recent version of Recommendation ITU-R M.541. (WRC-23)

5.111 The carrier frequencies 2 182 kHz, 3 023 kHz, 5 680 kHz, 8 364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article **31**.

The same applies to the frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz, but in each of these cases emissions must be confined in a band of ± 3 kHz about the frequency. (WRC-07)

2 194-3 230 kHz

Allocation to services		
Region 1	Region 2	Region 3
2 194-2 300 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103	2 194-2 300 FIXED MOBILE 5.112	
2 300-2 498 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.103	2 300-2 495 FIXED MOBILE BROADCASTING 5.113	
2 498-2 501 STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)		2 495-2 501 STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)
2 501-2 502	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
2 502-2 625 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103 5.114	2 502-2 505 STANDARD FREQUENCY AND TIME SIGNAL	
2 625-2 650 MARITIME MOBILE MARITIME RADIONAVIGATION 5.92	2 505-2 850 FIXED MOBILE	
2 650-2 850 FIXED MOBILE except aeronautical mobile (R) 5.92 5.103		
2 850-3 025	AERONAUTICAL MOBILE (R) 5.111 5.115	
3 025-3 155	AERONAUTICAL MOBILE (OR)	
3 155-3 200	FIXED MOBILE except aeronautical mobile (R) 5.116 5.117	
3 200-3 230	FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116	

5.112 *Alternative allocation:* in Sri Lanka, the frequency band 2 194-2 300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.113 For the conditions for the use of the bands 2 300-2 495 kHz (2 498 kHz in Region 1), 3 200-3 400 kHz, 4 750-4 995 kHz and 5 005-5 060 kHz by the broadcasting service, see Nos. **5.16** to **5.20**, **5.21** and **23.3** to **23.10**.

5.114 *Alternative allocation:* in Iraq, the frequency band 2 502-2 625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.115 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz may also be used, in accordance with Article **31**, by stations of the maritime mobile service engaged in coordinated search and rescue operations. (WRC-07)

5.116 Administrations are urged to authorize the use of the band 3 155-3 195 kHz to provide a common worldwide channel for low power wireless hearing aids. Additional channels for these devices may be assigned by administrations in the bands between 3 155 kHz and 3 400 kHz to suit local needs.

It should be noted that frequencies in the range 3 000 kHz to 4 000 kHz are suitable for hearing aid devices which are designed to operate over short distances within the induction field.

5.117 *Alternative allocation:* in Liberia, Sri Lanka and Togo, the frequency band 3 155-3 200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-23)

3 230-5 003 kHz

Allocation to services		
Region 1	Region 2	Region 3
3 230-3 400	FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118	
3 400-3 500	AERONAUTICAL MOBILE (R)	
3 500-3 800 AMATEUR FIXED MOBILE except aeronautical mobile 5.92	3 500-3 750 AMATEUR 5.119	3 500-3 900 AMATEUR FIXED MOBILE
3 800-3 900 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	3 750-4 000 AMATEUR FIXED MOBILE except aeronautical mobile (R)	
3 900-3 950 AERONAUTICAL MOBILE (OR) 5.123		3 900-3 950 AERONAUTICAL MOBILE BROADCASTING
3 950-4 000 FIXED BROADCASTING	5.122 5.125	3 950-4 000 FIXED BROADCASTING 5.126
4 000-4 063	FIXED MARITIME MOBILE 5.127 5.126	
4 063-4 438	MARITIME MOBILE 5.79A 5.82D 5.109 5.110 5.130 5.131 5.132 5.128	
4 438-4 488 FIXED MOBILE except aeronautical mobile (R) Radiolocation 5.132A 5.132B	4 438-4 488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A	4 438-4 488 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A
4 488-4 650 FIXED MOBILE except aeronautical mobile (R)		4 488-4 650 FIXED MOBILE except aeronautical mobile
4 650-4 700	AERONAUTICAL MOBILE (R)	
4 700-4 750	AERONAUTICAL MOBILE (OR)	
4 750-4 850 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 5.113	4 750-4 850 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	4 750-4 850 FIXED BROADCASTING 5.113 Land mobile
4 850-4 995	FIXED LAND MOBILE BROADCASTING 5.113	
4 995-5 003	STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)	

5.118 *Additional allocation:* in the United States, Mexico and Peru, the frequency band 3 230-3 400 kHz is also allocated to the radiolocation service on a secondary basis. (WRC-19)

5.119 *Additional allocation:* in Peru, the frequency band 3 500-3 750 kHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.120 (SUP - WRC-2000)

5.121 Not used.

5.122 *Alternative allocation:* in Bolivia, Chile, Ecuador, Paraguay and Peru, the frequency band 3 750-4 000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-15)

5.123 *Additional allocation:* in Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe, the frequency band 3 900-3 950 kHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-19)

5.124 (SUP - WRC-2000)

5.125 *Additional allocation:* in Greenland, the band 3 950-4 000 kHz is also allocated to the broadcasting service on a primary basis. The power of the broadcasting stations operating in this band shall not exceed that necessary for a national service and shall in no case exceed 5 kW.

5.126 In Region 3, the stations of those services to which the band 3 995-4 005 kHz is allocated may transmit standard frequency and time signals.

5.127 The use of the band 4 000-4 063 kHz by the maritime mobile service is limited to ship stations using radiotelephony (see No. **52.220** and Appendix **17**).

5.128 Frequencies in the frequency bands 4 063-4 123 kHz and 4 130-4 438 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W, on condition that harmful interference is not caused to the maritime mobile service. In addition, in Afghanistan, Argentina, Armenia, Belarus, Botswana, Burkina Faso, the Central African Rep., China, the Russian Federation, Georgia, India, Kazakhstan, Mali, Niger, Pakistan, Kyrgyzstan, Tajikistan, Chad, Turkmenistan and Ukraine, in the frequency bands 4 063-4 123 kHz, 4 130-4 133 kHz and 4 408-4 438 kHz, stations in the fixed service, with a mean power not exceeding 1 kW, can be operated on condition that they are situated at least 600 km from the coast and that harmful interference is not caused to the maritime mobile service. (WRC-19)

5.129 (SUP - WRC-07)

5.130 The conditions for the use of the carrier frequencies 4 125 kHz and 6 215 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.131 The frequency 4 209.5 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing techniques. (WRC-97)

5.132 The frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz are the international frequencies for the transmission of maritime safety information (MSI) (see Appendices **15** and **17**). (WRC-23)

5.132A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution **612 (Rev.WRC-12)**. (WRC-12)

5.132B *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency band 4 438-4 488 kHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. (WRC-19)

5 003-7 000 kHz

Allocation to services		
Region 1	Region 2	Region 3
5 003-5 005	STANDARD FREQUENCY AND TIME SIGNAL Space research	
5 005-5 060	FIXED BROADCASTING 5.113	
5 060-5 250	FIXED Mobile except aeronautical mobile 5.133	
5 250-5 275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A 5.133A	5 250-5 275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	5 250-5 275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A
5 275-5 351.5	FIXED MOBILE except aeronautical mobile	
5 351.5-5 366.5	FIXED MOBILE except aeronautical mobile Amateur 5.133B	
5 366.5-5 450	FIXED MOBILE except aeronautical mobile	
5 450-5 480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	5 450-5 480 AERONAUTICAL MOBILE (R)	5 450-5 480 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE
5 480-5 680	AERONAUTICAL MOBILE (R) 5.111 5.115	
5 680-5 730	AERONAUTICAL MOBILE (OR) 5.111 5.115	
5 730-5 900 FIXED LAND MOBILE	5 730-5 900 FIXED MOBILE except aeronautical mobile (R)	5 730-5 900 FIXED Mobile except aeronautical mobile (R)
5 900-5 950	BROADCASTING 5.134 5.136	
5 950-6 200	BROADCASTING	
6 200-6 525	MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137A 5.137	
6 525-6 685	AERONAUTICAL MOBILE (R)	
6 685-6 765	AERONAUTICAL MOBILE (OR)	
6 765-7 000	FIXED MOBILE except aeronautical mobile (R) 5.138	

5.133 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Niger, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 5 130-5 250 kHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33). (WRC-12)

5.133A *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency bands 5 250-5 275 kHz and 26 200-26 350 kHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.133B Stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.). However, in Region 2 in Mexico, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 20 W (e.i.r.p.). In the following Region 2 countries: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Ecuador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, as well as the overseas countries and territories within the Kingdom of the Netherlands in Region 2, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 25 W (e.i.r.p.). (WRC-19)

5.134 The use of the frequency bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz by the broadcasting service is subject to the application of the procedure of Article 12. Administrations are encouraged to use these frequency bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev.WRC-19). (WRC-19)

5.135 (SUP - WRC-97)

5.136 *Additional allocation:* frequencies in the band 5 900-5 950 kHz may be used by stations in the following services, communicating only within the boundary of the country in which they are located: fixed service (in all three Regions), land mobile service (in Region 1), mobile except aeronautical mobile (R) service (in Regions 2 and 3), on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.137 On condition that harmful interference is not caused to the maritime mobile service, the bands 6 200-6 213.5 kHz and 6 220.5-6 525 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W. At the time of notification of these frequencies, the attention of the Bureau will be drawn to the above conditions.

5.137A The frequencies 6 337.5 kHz, 8 443 kHz, 12 663.5 kHz, 16 909.5 kHz and 22 450.5 kHz are the regional frequencies for the transmission of maritime safety information (MSI) by means of the NAVDAT system (see Appendices 15 and 17). (WRC-23)

5.138 The following bands:

6 765-6 795 kHz	(centre frequency 6 780 kHz),
433.05-434.79 MHz	(centre frequency 433.92 MHz) in Region 1 except in the countries mentioned in No. 5.280,
61-61.5 GHz	(centre frequency 61.25 GHz),
122-123 GHz	(centre frequency 122.5 GHz), and
244-246 GHz	(centre frequency 245 GHz)

are designated for industrial, scientific and medical (ISM) applications. The use of these frequency bands for ISM applications shall be subject to special authorization by the administration concerned, in agreement with other administrations whose radiocommunication services might be affected. In applying this provision, administrations shall have due regard to the latest relevant ITU-R Recommendations.

5.138A (SUP - WRC-12)

5.139 (SUP - WRC-12)

7 000-7 450 kHz

Allocation to services		
Region 1	Region 2	Region 3
7 000-7 100	AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A	
7 100-7 200	AMATEUR 5.141A 5.141B	
7 200-7 300 BROADCASTING	7 200-7 300 AMATEUR 5.142	7 200-7 300 BROADCASTING
7 300-7 400	BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D	
7 400-7 450 BROADCASTING 5.143B 5.143C	7 400-7 450 FIXED MOBILE except aeronautical mobile (R)	7 400-7 450 BROADCASTING 5.143A 5.143C

5.140 *Additional allocation:* in Angola, Iraq, Somalia and Togo, the frequency band 7 000-7 050 kHz is also allocated to the fixed service on a primary basis. (WRC-15)

5.141 *Alternative allocation:* in Egypt, Eritrea, Ethiopia, Guinea, Libya, Madagascar and Niger, the band 7 000-7 050 kHz is allocated to the fixed service on a primary basis. (WRC-12)

5.141A *Additional allocation:* in Uzbekistan and Kyrgyzstan, the bands 7 000-7 100 kHz and 7 100-7 200 kHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-03)

5.141B *Additional allocation:* in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Guinea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, Libya, Mali, Morocco, Mauritania, Niger, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sudan, South Sudan, Tunisia, Viet Nam and Yemen, the frequency band 7 100-7 200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC-19)

5.141C (SUP - WRC-12)

5.142 The use of the band 7 200-7 300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. (WRC-12)

5.143 *Additional allocation:* frequencies in the band 7 300-7 350 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.143A In Region 3, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed service on a primary basis and land mobile service on a secondary basis, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-12)

5.143B In Region 1, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located on condition that harmful interference is not caused to the broadcasting service. The total radiated power of each station shall not exceed 24 dBW. (WRC-12)

5.143C *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), Jordan, Kuwait, Libya, Morocco, Mauritania, Niger, Oman, Qatar, the Syrian Arab Republic, Sudan, South Sudan, Tunisia and Yemen, the bands 7 350-7 400 kHz and 7 400-7 450 kHz are also allocated to the fixed service on a primary basis. (WRC-12)

5.143D In Region 2, frequencies in the band 7 350-7 400 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-12)

7 450-13 360 kHz

Allocation to services		
Region 1	Region 2	Region 3
7 450-8 100	FIXED MOBILE except aeronautical mobile (R) 5.144	
8 100-8 195	FIXED MARITIME MOBILE	
8 195-8 815	MARITIME MOBILE 5.109 5.110 5.132 5.137A 5.145 5.111	
8 815-8 965	AERONAUTICAL MOBILE (R)	
8 965-9 040	AERONAUTICAL MOBILE (OR)	
9 040-9 305 FIXED	9 040-9 400 FIXED	9 040-9 305 FIXED
9 305-9 355 FIXED Radiolocation 5.145A 5.145B		9 305-9 355 FIXED Radiolocation 5.145A
9 355-9 400 FIXED		9 355-9 400 FIXED
9 400-9 500	BROADCASTING 5.134 5.146	
9 500-9 900	BROADCASTING 5.147	
9 900-9 995	FIXED	
9 995-10 003	STANDARD FREQUENCY AND TIME SIGNAL (10 000 kHz) 5.111	
10 003-10 005	STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	
10 005-10 100	AERONAUTICAL MOBILE (R) 5.111	
10 100-10 150	FIXED Amateur	
10 150-11 175	FIXED Mobile except aeronautical mobile (R)	
11 175-11 275	AERONAUTICAL MOBILE (OR)	
11 275-11 400	AERONAUTICAL MOBILE (R)	
11 400-11 600	FIXED	
11 600-11 650	BROADCASTING 5.134 5.146	
11 650-12 050	BROADCASTING 5.147	
12 050-12 100	BROADCASTING 5.134 5.146	
12 100-12 230	FIXED	
12 230-13 200	MARITIME MOBILE 5.109 5.110 5.132 5.137A 5.145	
13 200-13 260	AERONAUTICAL MOBILE (OR)	
13 260-13 360	AERONAUTICAL MOBILE (R)	

5.143E (SUP - WRC-12)

5.144 In Region 3, the stations of those services to which the band 7 995-8 005 kHz is allocated may transmit standard frequency and time signals.

5.145 The conditions for the use of the carrier frequencies 8 291 kHz, 12 290 kHz and 16 420 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.145A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed service. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution **612** (Rev.WRC-12). (WRC-12)

5.145B *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency bands 9 305-9 355 kHz and 16 100-16 200 kHz are allocated to the fixed service on a primary basis. (WRC-19)

5.146 *Additional allocation:* frequencies in the bands 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.147 On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 9 775-9 900 kHz, 11 650-11 700 kHz and 11 975-12 050 kHz may be used by stations in the fixed service communicating only within the boundary of the country in which they are located, each station using a total radiated power not exceeding 24 dBW.

5.148 (SUP - WRC-97)

13 360-18 030 kHz

Allocation to services		
Region 1	Region 2	Region 3
13 360-13 410	FIXED RADIO ASTRONOMY 5.149	
13 410-13 450	FIXED Mobile except aeronautical mobile (R)	
13 450-13 550	13 450-13 550 FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A 5.149A	Radiolocation 5.132A
13 550-13 570	FIXED Mobile except aeronautical mobile (R) 5.150	
13 570-13 600	BROADCASTING 5.134 5.151	
13 600-13 800	BROADCASTING	
13 800-13 870	BROADCASTING 5.134 5.151	
13 870-14 000	FIXED Mobile except aeronautical mobile (R)	
14 000-14 250	AMATEUR AMATEUR-SATELLITE	
14 250-14 350	AMATEUR 5.152	
14 350-14 990	FIXED Mobile except aeronautical mobile (R)	
14 990-15 005	STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz) 5.111	
15 005-15 010	STANDARD FREQUENCY AND TIME SIGNAL Space research	
15 010-15 100	AERONAUTICAL MOBILE (OR)	
15 100-15 600	BROADCASTING	
15 600-15 800	BROADCASTING 5.134 5.146	
15 800-16 100	FIXED 5.153	
16 100-16 200	16 100-16 200 FIXED RADIOLOCATION 5.145A 5.145B	16 100-16 200 FIXED Radiolocation 5.145A
16 200-16 360	FIXED	
16 360-17 410	MARITIME MOBILE 5.109 5.110 5.132 5.137A 5.145	
17 410-17 480	FIXED	
17 480-17 550	BROADCASTING 5.134 5.146	
17 550-17 900	BROADCASTING	
17 900-17 970	AERONAUTICAL MOBILE (R)	
17 970-18 030	AERONAUTICAL MOBILE (OR)	

5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,	4 950-4 990 MHz,	102-109.5 GHz,
25 550-25 670 kHz,	4 990-5 000 MHz,	111.8-114.25 GHz,
37.5-38.25 MHz,	6 650-6 675.2 MHz,	128.33-128.59 GHz,
73-74.6 MHz in Regions 1 and 3,	10.6-10.68 GHz,	129.23-129.49 GHz,
150.05-153 MHz in Region 1,	14.47-14.5 GHz,	130-134 GHz,
322-328.6 MHz,	22.01-22.21 GHz,	136-148.5 GHz,
406.1-410 MHz,	22.21-22.5 GHz,	151.5-158.5 GHz,
608-614 MHz in Regions 1 and 3,	22.81-22.86 GHz,	168.59-168.93 GHz,
1 330-1 400 MHz,	23.07-23.12 GHz,	171.11-171.45 GHz,
1 610.6-1 613.8 MHz,	31.2-31.3 GHz,	172.31-172.65 GHz,
1 660-1 670 MHz,	31.5-31.8 GHz in Regions 1 and 3,	173.52-173.85 GHz,
1 718.8-1 722.2 MHz,	36.43-36.5 GHz,	195.75-196.15 GHz,
2 655-2 690 MHz,	42.5-43.5 GHz,	209-226 GHz,
3 260-3 267 MHz,	48.94-49.04 GHz,	241-250 GHz,
3 332-3 339 MHz,	76-86 GHz,	252-275 GHz
3 345.8-3 352.5 MHz,	92-94 GHz,	
4 825-4 835 MHz,	94.1-100 GHz,	

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29). (WRC-07)

5.149A *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency band 13 450-13 550 kHz is allocated to the fixed service on a primary basis and to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC-19)

5.150 The following bands:

13 553-13 567 kHz	(centre frequency 13 560 kHz),
26 957-27 283 kHz	(centre frequency 27 120 kHz),
40.66-40.70 MHz	(centre frequency 40.68 MHz),
902-928 MHz	in Region 2 (centre frequency 915 MHz),
2 400-2 500 MHz	(centre frequency 2 450 MHz),
5 725-5 875 MHz	(centre frequency 5 800 MHz), and
24-24.25 GHz	(centre frequency 24.125 GHz)

are also designated for industrial, scientific and medical (ISM) applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications. ISM equipment operating in these bands is subject to the provisions of No. 15.13.

5.151 *Additional allocation:* frequencies in the bands 13 570-13 600 kHz and 13 800-13 870 kHz may be used by stations in the fixed service and in the mobile except aeronautical mobile (R) service, communicating only within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies in these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.152 *Additional allocation:* in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14 250-14 350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW. (WRC-03)

5.153 In Region 3, the stations of those services to which the band 15 995-16 005 kHz is allocated may transmit standard frequency and time signals.

18 030-23 350 kHz

Allocation to services		
Region 1	Region 2	Region 3
18 030-18 052	FIXED	
18 052-18 068	FIXED Space research	
18 068-18 168	AMATEUR AMATEUR-SATELLITE 5.154	
18 168-18 780	FIXED Mobile except aeronautical mobile	
18 780-18 900	MARITIME MOBILE	
18 900-19 020	BROADCASTING 5.134 5.146	
19 020-19 680	FIXED	
19 680-19 800	MARITIME MOBILE 5.132	
19 800-19 990	FIXED	
19 990-19 995	STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	
19 995-20 010	STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz) 5.111	
20 010-21 000	FIXED Mobile	
21 000-21 450	AMATEUR AMATEUR-SATELLITE	
21 450-21 850	BROADCASTING	
21 850-21 870	FIXED 5.155A 5.155	
21 870-21 924	FIXED 5.155B	
21 924-22 000	AERONAUTICAL MOBILE (R)	
22 000-22 855	MARITIME MOBILE 5.132 5.137A 5.156	
22 855-23 000	FIXED 5.156	
23 000-23 200	FIXED Mobile except aeronautical mobile (R) 5.156	
23 200-23 350	FIXED 5.156A AERONAUTICAL MOBILE (OR)	

5.154 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 18 068-18 168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW. (WRC-03)

5.155 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the frequency band 21 850-21 870 kHz is also allocated to the aeronautical mobile (R) service on a primary basis. (WRC-23)

5.155A In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the use of the frequency band 21 850-21 870 kHz by the fixed service is limited to provision of services related to aircraft flight safety. (WRC-23)

5.155B The band 21 870-21 924 kHz is used by the fixed service for provision of services related to aircraft flight safety.

5.156 *Additional allocation:* in Nigeria, the band 22 720-23 200 kHz is also allocated to the meteorological aids service (radiosondes) on a primary basis.

5.156A The use of the band 23 200-23 350 kHz by the fixed service is limited to provision of services related to aircraft flight safety.

23 350-27 500 kHz

Allocation to services		
Region 1	Region 2	Region 3
23 350-24 000	FIXED MOBILE except aeronautical mobile 5.157	
24 000-24 450	FIXED LAND MOBILE	
24 450-24 600 FIXED LAND MOBILE Radiolocation 5.132A 5.158	24 450-24 650 FIXED LAND MOBILE RADIOLOCATION 5.132A	24 450-24 600 FIXED LAND MOBILE Radiolocation 5.132A
24 600-24 890 FIXED LAND MOBILE	24 650-24 890 FIXED LAND MOBILE	24 600-24 890 FIXED LAND MOBILE
24 890-24 990	AMATEUR AMATEUR-SATELLITE	
24 990-25 005	STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)	
25 005-25 010	STANDARD FREQUENCY AND TIME SIGNAL Space research	
25 010-25 070	FIXED MOBILE except aeronautical mobile	
25 070-25 210	MARITIME MOBILE	
25 210-25 550	FIXED MOBILE except aeronautical mobile	
25 550-25 670	RADIO ASTRONOMY 5.149	
25 670-26 100	BROADCASTING	
26 100-26 175	MARITIME MOBILE 5.132	
26 175-26 200	FIXED MOBILE except aeronautical mobile	
26 200-26 350 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A 5.133A	26 200-26 420 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	26 200-26 350 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A
26 350-27 500 FIXED MOBILE except aeronautical mobile 5.150	26 420-27 500 FIXED MOBILE except aeronautical mobile 5.150	26 350-27 500 FIXED MOBILE except aeronautical mobile 5.150

5.157 The use of the band 23 350-24 000 kHz by the maritime mobile service is limited to inter-ship radiotelegraphy.

5.158 *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency band 24 450-24 600 kHz is allocated to the fixed and land mobile services on a primary basis. (WRC-19)

27.5-40.98 MHz

Allocation to services		
Region 1	Region 2	Region 3
27.5-28	METEOROLOGICAL AIDS FIXED MOBILE	
28-29.7	AMATEUR AMATEUR-SATELLITE	
29.7-30.005	FIXED MOBILE	
30.005-30.01	SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH	
30.01-37.5	FIXED MOBILE	
37.5-38.25	FIXED MOBILE Radio astronomy 5.149	
38.25-39 FIXED MOBILE	38.25-39.986 FIXED MOBILE	38.25-39.5 FIXED MOBILE
39-39.5 FIXED MOBILE Radiolocation 5.132A 5.159		
39.5-39.986 FIXED MOBILE		39.5-39.986 FIXED MOBILE RADIOLOCATION 5.132A
39.986-40 FIXED MOBILE Space research		39.986-40 FIXED MOBILE RADIOLOCATION 5.132A Space research
40-40.02 FIXED MOBILE Earth exploration-satellite (active) 5.159A Space research		40-40.02 FIXED MOBILE Earth exploration-satellite (active) 5.159A Space research
40.02-40.98	FIXED MOBILE Earth exploration-satellite (active) 5.159A 5.150	

5.159 *Alternative allocation:* in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency band 39-39.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-19)

5.159A The use of the frequency band 40-50 MHz by the Earth exploration-satellite service (active) shall be in accordance with the geographical area restrictions and the operational and technical conditions defined in Resolution **677 (WRC-23)**. The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. **5.29** and **5.30**. (WRC-23)

40.98-47 MHz

Allocation to services		
Region 1	Region 2	Region 3
40.98-41.015	FIXED MOBILE Earth exploration-satellite (active) 5.159A Space research 5.160 5.161	
41.015-42	FIXED MOBILE Earth exploration-satellite (active) 5.159A 5.160 5.161 5.161A	
42-42.5 FIXED MOBILE Earth exploration-satellite (active) 5.159A Radiolocation 5.132A 5.160 5.161B	42-42.5 FIXED MOBILE Earth exploration-satellite (active) 5.159A 5.161	
42.5-44	FIXED MOBILE Earth exploration-satellite (active) 5.159A 5.160 5.161 5.161A	
44-47	FIXED MOBILE Earth exploration-satellite (active) 5.159A 5.162 5.162A	

5.160 *Additional allocation:* in Botswana, Burundi, Dem. Rep. of the Congo and Rwanda, the band 41-44 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-12)

5.161 *Additional allocation:* in Iran (Islamic Republic of) and Japan, the band 41-44 MHz is also allocated to the radiolocation service on a secondary basis.

5.161A *Additional allocation:* in Korea (Rep. of), the United States and Mexico, the frequency bands 41.015-41.665 MHz and 43.35-44 MHz are also allocated to the radiolocation service on a primary basis. Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution 612 (Rev.WRC-12). (WRC-19)

5.161B *Alternative allocation:* in Albania, Germany, Armenia, Austria, Belarus, Belgium, Bosnia and Herzegovina, Cyprus, Vatican, Croatia, Denmark, Spain, Estonia, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malta, Moldova, Monaco, Montenegro, Norway, Uzbekistan, Netherlands, Portugal, Türkiye, Kyrgyzstan, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Slovenia, Sweden, Switzerland and Ukraine, the frequency band 42-42.5 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-23)

5.162 *Additional allocation:* in Australia, the band 44-47 MHz is also allocated to the broadcasting service on a primary basis. (WRC-12)

5.162A *Additional allocation:* in Germany, Australia, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Korea (Rep. of), Denmark, Spain, Estonia, the Russian Federation, Finland, France, Indonesia, Ireland, Iceland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, the Dem. People's Rep. of Korea, the Czech Rep., the United Kingdom, Serbia, Slovenia, Sweden and Switzerland, the frequency band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (Rev.WRC-23). (WRC-23)

47-75.2 MHz

Allocation to services		
Region 1	Region 2	Region 3
47-50 BROADCASTING Earth exploration-satellite (active) 5.159A 5.162A 5.163 5.164 5.165	47-50 FIXED MOBILE Earth exploration-satellite (active) 5.159A	47-50 FIXED MOBILE BROADCASTING Earth exploration-satellite (active) 5.159A 5.162A
50-52 BROADCASTING Amateur 5.166B 5.166C 5.166D 5.166E 5.169B 5.162A 5.164 5.165 5.166A 5.169 5.169A	50-54 AMATEUR 5.162A 5.167 5.167A 5.168 5.170	
52-68 BROADCASTING 5.162A 5.163 5.164 5.165 5.169 5.169A 5.169B 5.171	54-68 BROADCASTING Fixed Mobile 5.172	54-68 FIXED MOBILE BROADCASTING 5.162A
68-74.8 FIXED MOBILE except aeronautical mobile 5.149 5.175 5.177 5.179	68-72 BROADCASTING Fixed Mobile 5.173 72-73 FIXED MOBILE 73-74.6 RADIO ASTRONOMY 5.178 74.6-74.8 FIXED MOBILE	68-74.8 FIXED MOBILE
		5.149 5.176 5.179
74.8-75.2	AERONAUTICAL RADIONAVIGATION 5.180 5.181	

5.163 *Additional allocation:* in Armenia, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency bands 47-48.5 MHz and 56.5-58 MHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-19)

5.164 *Additional allocation:* in Albania, Algeria, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Croatia, Denmark, Spain, Estonia, Eswatini, Finland, France, Gabon, Greece, Hungary, Ireland, Israel, Italy, Jordan, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Türkiye, Slovakia, Czech Rep., Romania, the United Kingdom, Serbia, Slovenia, Sweden, Switzerland, Chad, Togo and Tunisia, the frequency band 47-68 MHz, in South Africa the frequency band 47-50 MHz, and in Latvia the frequency bands 48.5-56.5 MHz and 58-68 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each frequency band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations of countries other than those mentioned in connection with the frequency band. (WRC-23)

5.165 *Additional allocation:* in Angola, Cameroon, Congo (Rep. of the), Egypt, Madagascar, Mozambique, Niger, Somalia, Sudan, South Sudan, Tanzania and Chad, the frequency band 47-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.166 (SUP - WRC-15)

5.166A *Different category of service:* in Austria, Cyprus, the Vatican, Croatia, Denmark, Spain, Finland, Hungary, Latvia, the Netherlands, the Czech Republic, the United Kingdom, Slovakia and Slovenia, the frequency band 50.0-50.5 MHz is allocated to the amateur service on a primary basis. Stations in the amateur service in these countries shall not cause harmful interference to, or claim protection from, stations of the broadcasting, fixed and mobile services operating in accordance with the Radio Regulations in the frequency band 50.0-50.5 MHz in the countries not listed in this provision. For a station of these services, the protection criteria in No. **5.169B** shall also apply. In Region 1, with the exception of those countries listed in No. **5.169**, wind profiler radars operating in the radiolocation service under No. **5.162A** are authorized to operate on the basis of equality with stations in the amateur service in the frequency band 50.0-50.5 MHz. (WRC-19)

5.166B In Region 1, stations in the amateur service operating on a secondary basis shall not cause harmful interference to, or claim protection from, stations of the broadcasting service. The field strength generated by an amateur station in Region 1 in the frequency band 50-52 MHz shall not exceed a calculated value of +6 dB(μ V/m) at a height of 10 m above ground for more than 10% of time along the border of a country with operational analogue broadcasting stations in Region 1 and of neighbouring countries with broadcasting stations in Region 3 listed in Nos. **5.167** and **5.168**. (WRC-19)

5.166C In Region 1, stations in the amateur service in the frequency band 50-52 MHz, with the exception of those countries listed in No. **5.169**, shall not cause harmful interference to, or claim protection from, wind profiler radars operating in the radiolocation service under No. **5.162A**. (WRC-19)

5.166D *Different category of service:* in Lebanon, the frequency band 50-52 MHz is allocated to the amateur service on a primary basis. Stations in the amateur service in Lebanon shall not cause harmful interference to, or claim protection from, stations of the broadcasting, fixed and mobile services operating in accordance with the Radio Regulations in the frequency band 50-52 MHz in the countries not listed in this provision. (WRC-19)

5.166E In the Russian Federation, only the frequency band 50.080-50.280 MHz is allocated to the amateur service on a secondary basis. The protection criteria for the other services in the countries not listed in this provision are specified in Nos. **5.166B** and **5.169B**. (WRC-19)

5.167 *Alternative allocation:* in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan and Singapore, the frequency band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

5.167A *Additional allocation:* in Indonesia and Thailand, the frequency band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

5.168 *Additional allocation:* in Australia, China and the Dem. People's Rep. of Korea, the band 50-54 MHz is also allocated to the broadcasting service on a primary basis.

5.169 *Alternative allocation:* in Botswana, Eswatini, Lesotho, Malawi, Namibia, Rwanda, South Africa, Zambia and Zimbabwe, the frequency band 50-54 MHz is allocated to the amateur service on a primary basis. In Senegal, the frequency band 50-51 MHz is allocated to the amateur service on a primary basis. (WRC-19)

5.169A *Alternative allocation:* in the following countries in Region 1: Angola, Saudi Arabia, Bahrain, Burkina Faso, Burundi, the United Arab Emirates, Gambia, Jordan, Kenya, Kuwait, Mauritius, Mozambique, Oman, Uganda, Qatar, South Sudan and Tanzania, the frequency band 50-54 MHz is allocated to the amateur service on a primary basis. In Guinea-Bissau, the frequency band 50.0-50.5 MHz is allocated to the amateur service on a primary basis. In Djibouti, the frequency band 50-52 MHz is allocated to the amateur service on a primary basis. With the exception of those countries listed in No. **5.169**, stations in the amateur service operating in Region 1 under this footnote, in all or part of the frequency band 50-54 MHz, shall not cause harmful interference to, or claim protection from, stations of other services operating in accordance with the Radio Regulations in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Israel, Libya, Palestine*, the Syrian Arab Republic, the Dem. People's Republic of Korea, Sudan and Tunisia. The field strength generated by an amateur station in the frequency band 50-54 MHz shall not exceed a value of +6 dB(μ V/m) at a height of 10 m above ground for more than 10% of time along the borders of listed countries requiring protection. (WRC-19)

5.169B Except countries listed under No. **5.169**, stations in the amateur service used in Region 1, in all or part of the 50-54 MHz frequency band, shall not cause harmful interference to, or claim protection from, stations of other services used in accordance with the Radio Regulations in Algeria, Armenia, Azerbaijan, Belarus, Egypt, Russian Federation, Iran (Islamic Republic of), Iraq, Kazakhstan, Kyrgyzstan, Libya, Uzbekistan, Palestine*, the Syrian Arab Republic, Sudan, Tunisia and Ukraine. The field strength generated by an amateur station in the frequency band 50-54 MHz shall not exceed a value of +6 dB(μ V/m) at a height of 10 m above ground for more than 10% of time along the borders of the countries listed in this provision. (WRC-19)

5.170 *Additional allocation:* in New Zealand, the frequency band 51-54 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.171 *Additional allocation:* in Botswana, Eswatini, Lesotho, Malawi, Mali, Namibia, Dem. Rep. of the Congo, Rwanda, South Africa, Zambia and Zimbabwe, the frequency band 54-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.172 *Different category of service:* in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 54-68 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**). (WRC-15)

5.173 *Different category of service:* in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 68-72 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**). (WRC-15)

5.174 (SUP - WRC-07)

5.175 *Alternative allocation:* in Armenia, Belarus, the Russian Federation, Kazakhstan, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting service on a primary basis. In Latvia and Lithuania, the frequency bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting and mobile, except aeronautical mobile, services on a primary basis. In Mongolia, the frequency band 76-87.5 MHz is allocated to the broadcasting service on a primary basis; the stations of the broadcasting service shall not cause harmful interference to, or claim protection from, existing or planned fixed and mobile stations in the neighbouring countries. The services to which these frequency bands are allocated in other countries and the broadcasting service in the countries listed above are subject to agreements with the neighbouring countries concerned. (WRC-23)

5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68-74 MHz is also allocated to the broadcasting service on a primary basis. (WRC-07)

5.177 *Additional allocation:* in Armenia, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 73-74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-23)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.178 *Additional allocation:* in Colombia, Cuba, El Salvador, Guatemala, Guyana, Honduras and Nicaragua, the band 73-74.6 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-12)

5.179 *Additional allocation:* in Armenia, Azerbaijan, Belarus, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Mongolia, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 74.6-74.8 MHz and 75.2-75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only. (WRC-12)

5.180 The frequency 75 MHz is assigned to marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guardband to stations of other services which, because of their power or geographical position, might cause harmful interference or otherwise place a constraint on marker beacons.

Every effort should be made to improve further the characteristics of airborne receivers and to limit the power of transmitting stations close to the limits 74.8 MHz and 75.2 MHz.

5.181 *Additional allocation:* in Egypt, Israel and the Syrian Arab Republic, the band 74.8-75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **9.21**. (WRC-03)

75.2-137.175 MHz

Allocation to services		
Region 1	Region 2	Region 3
75.2-87.5 FIXED MOBILE except aeronautical mobile 5.175 5.179 5.187	75.2-75.4 FIXED MOBILE 5.179	
	75.4-76 FIXED MOBILE	75.4-87 FIXED MOBILE
	76-88 BROADCASTING Fixed Mobile	5.182 5.183 5.188
87.5-100 BROADCASTING 5.190	5.185	87-100 FIXED MOBILE BROADCASTING
100-108	BROADCASTING 5.192 5.194	
108-117.975	AERONAUTICAL RADIONAVIGATION 5.197 5.197A	
117.975-137	AERONAUTICAL MOBILE (R) AERONAUTICAL MOBILE-SATELLITE (R) 5.198A 5.198B 5.111 5.200 5.201 5.202	
137-137.025	SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 5.204 5.205 5.207	
137.025-137.175	SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 Mobile-satellite (space-to-Earth) 5.208 5.208A 5.208B 5.209 5.204 5.205 5.207	

5.182 *Additional allocation:* in Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis. (WRC-23)

5.183 *Additional allocation:* in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76-87 MHz is also allocated to the broadcasting service on a primary basis.

5.184 (SUP - WRC-07)

5.185 *Different category of service:* in the United States, the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**). (WRC-23)

5.186 (SUP - WRC-97)

5.187 *Alternative allocation:* in Albania, the band 81-87.5 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions contained in the Final Acts of the Special Regional Conference (Geneva, 1960).

5.188 *Additional allocation:* in Australia, the band 85-87 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service in Australia is subject to special agreements between the administrations concerned.

5.189 Not used.

5.190 *Additional allocation:* in Monaco, the band 87.5-88 MHz is also allocated to the land mobile service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-97)

5.191 Not used.

5.192 *Additional allocation:* in China and Korea (Rep. of), the band 100-108 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-97)

5.193 Not used.

5.194 *Additional allocation:* in Kyrgyzstan, Somalia and Turkmenistan, the frequency band 104-108 MHz is also allocated to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC-19)

5.195 and 5.196 Not used.

5.197 *Additional allocation:* in the Syrian Arab Republic, the band 108-111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under No. 9.21. (WRC-12)

5.197A *Additional allocation:* the frequency band 108-111.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution 413 (Rev.WRC-23). The use of the frequency band 108-112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. (WRC-23)

5.198 (SUP - WRC-07)

5.198A The use of the frequency band 117.975-137 MHz by the aeronautical mobile-satellite (R) service is subject to coordination under No. 9.11A. No. 9.16 does not apply. Such use shall be limited to non-geostationary-satellite systems operated in accordance with international aeronautical standards. Resolution 406 (WRC-23) applies. (WRC-23)

5.198B The use of the frequency band 117.975-137 MHz by the aeronautical mobile (R) service shall have priority over use by the aeronautical mobile-satellite (R) service. (WRC-23)

5.199 (SUP - WRC-07)

5.200 In the frequency band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article 31 for distress and safety purposes with stations of the aeronautical mobile service and the aeronautical mobile-satellite service. (WRC-23)

5.201 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Egypt, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Mali, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Qatar, Kyrgyzstan, Romania, Senegal, Somalia, Tajikistan and Turkmenistan, the frequency band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-23)

5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Mali, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Senegal, Tajikistan and Turkmenistan, the frequency band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-23)

5.203 (SUP - WRC-07)

5.203A (SUP - WRC-07)

5.203B (SUP - WRC-07)

5.203C The use of the space operation service (space-to-Earth) with non-geostationary satellite short-duration mission systems in the frequency band 137-138 MHz is subject to Resolution **660** (WRC-19). Resolution **32** (WRC-19)* applies. These systems shall not cause harmful interference to, or claim protection from, the existing services to which the frequency band is allocated on a primary basis. (WRC-19)

5.204 *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Singapore, Thailand and Yemen, the frequency band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. **5.33**). (WRC-19)

5.205 *Different category of service:* in Israel and Jordan, the allocation of the band 137-138 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**).

5.206 *Different category of service:* in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, the Russian Federation, Finland, France, Georgia, Greece, Kazakhstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Syrian Arab Republic, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 137-138 MHz to the aeronautical mobile (OR) service is on a primary basis (see No. **5.33**). (WRC-2000)

5.207 *Additional allocation:* in Australia, the band 137-144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.

5.208 The use of the band 137-138 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-97)

5.208A In making assignments to space stations in the mobile-satellite service in the frequency bands 137-138 MHz, 387-390 MHz and 400.15-401 MHz and in the maritime mobile-satellite service (space-to-Earth) in the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the frequency bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions as shown in the most recent version of Recommendation ITU-R RA.769. (WRC-19)

* Note by the Secretariat: This Resolution was revised by WRC-23.

5.208B* In the frequency bands:

137-138 MHz,
157.1875-157.3375 MHz,
161.7875-161.9375 MHz,
387-390 MHz,
400.15-401 MHz,
1 452-1 492 MHz,
1 525-1 610 MHz,
1 613.8-1 626.5 MHz,
2 655-2 690 MHz,
21.4-22 GHz,

Resolution **739 (Rev.WRC-19)** applies. (WRC-19)

5.209 The use of the bands 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, 400.15-401 MHz, 454-456 MHz and 459-460 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems. (WRC-97)

5.209A The use of the frequency band 137.175-137.825 MHz by non-geostationary-satellite systems in the space operation service identified as short-duration mission in accordance with Appendix 4 is not subject to No. **9.11A**. (WRC-19)

* This provision was previously numbered as No. **5.347A**. It was renumbered to preserve the sequential order.

137.175-148 MHz

Allocation to services		
Region 1	Region 2	Region 3
137.175-137.825	SPACE OPERATION (space-to-Earth) 5.203C 5.209A METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 5.204 5.205 5.207	
137.825-138	SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.206 Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.205 5.207	
138-143.6 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	138-143.6 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	138-143.6 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213
143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) 5.211 5.212 5.214	143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213
143.65-144 AERONAUTICAL MOBILE (OR) 5.210 5.211 5.212 5.214	143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	143.65-144 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213
144-146	AMATEUR AMATEUR-SATELLITE 5.216	
146-148 FIXED MOBILE except aeronautical mobile (R)	146-148 AMATEUR 5.217	146-148 AMATEUR FIXED MOBILE 5.217

5.210 *Additional allocation:* in Italy and the United Kingdom, the frequency bands 138-143.6 MHz and 143.65-144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis. (WRC-23)

5.211 *Additional allocation:* in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Denmark, the United Arab Emirates, Spain, Finland, Greece, Guinea, Ireland, Israel, Kenya, Kuwait, Lebanon, Liechtenstein, Luxembourg, North Macedonia, Mali, Malta, Montenegro, Norway, the Netherlands, Qatar, Türkiye, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sweden, Switzerland, Tanzania and Tunisia, the frequency band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC-23)

5.212 *Alternative allocation:* in Angola, Botswana, Cameroon, the Central African Rep., Congo (Rep. of the), Eswatini, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Lesotho, Liberia, Libya, Malawi, Mozambique, Namibia, Niger, Oman, Uganda, Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Chad, Togo, Zambia and Zimbabwe, the frequency band 138-144 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-19)

5.213 *Additional allocation:* in China, the band 138-144 MHz is also allocated to the radiolocation service on a primary basis.

5.214 *Additional allocation:* in Eritrea, Ethiopia, Kenya, North Macedonia, Montenegro, Serbia, Somalia, Sudan, South Sudan and Tanzania, the frequency band 138-144 MHz is also allocated to the fixed service on a primary basis. (WRC-19)

5.215 Not used.

5.216 *Additional allocation:* in China, the band 144-146 MHz is also allocated to the aeronautical mobile (OR) service on a secondary basis.

5.217 *Alternative allocation:* in Afghanistan, Bangladesh, Cuba, Guyana and India, the band 146-148 MHz is allocated to the fixed and mobile services on a primary basis.

148-156.8375 MHz

Allocation to services		
Region 1	Region 2	Region 3
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.218A 5.219 5.221	148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.218A 5.219 5.221	
149.9-150.05	MOBILE-SATELLITE (Earth-to-space) 5.209 5.220	
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	150.05-154 FIXED MOBILE	
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological aids	5.225	
154-156.4875 FIXED MOBILE except aeronautical mobile (R) 5.225A 5.226	154-156.4875 FIXED MOBILE 5.226	154-156.4875 FIXED MOBILE 5.225A 5.226
156.4875-156.5625	MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227	
156.5625-156.7625 FIXED MOBILE except aeronautical mobile (R) 5.226	156.5625-156.7625 FIXED MOBILE 5.226	
156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.7625-156.7875 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.111 5.226 5.228	156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228
156.7875-156.8125	MARITIME MOBILE (distress and calling) 5.111 5.226	
156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	156.8125-156.8375 MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.111 5.226 5.228	156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228

5.218 *Additional allocation:* the band 148-149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. The bandwidth of any individual transmission shall not exceed ± 25 kHz.

5.218A The frequency band 148-149.9 MHz in the space operation service (Earth-to-space) may be used by non-geostationary-satellite systems with short-duration missions. Non-geostationary-satellite systems in the space operation service used for a short-duration mission in accordance with Resolution **32 (WRC-19)*** of the Radio Regulations are not subject to agreement under No. **9.21**. At the stage of coordination, the provisions of Nos. **9.17** and **9.18** also apply. In the frequency band 148-149.9 MHz, non-geostationary-satellite systems with short-duration missions shall not cause unacceptable interference to, or claim protection from, existing primary services within this frequency band, or impose additional constraints on the space operation and mobile-satellite services. In addition, earth stations in non-geostationary-satellite systems in the space operation service with short-duration missions in the frequency band 148-149.9 MHz shall ensure that the power flux-density does not exceed -149 dB(W/(m 2 · 4 kHz)) for more than 1% of time at the border of the territory of the following countries: Armenia, Azerbaijan, Belarus, China, Korea (Rep. of), Cuba, Russian Federation, India, Iran (Islamic Republic of), Japan, Kazakhstan, Malaysia, Uzbekistan, Kyrgyzstan, Thailand and Viet Nam. In case this power flux-density limit is exceeded, agreement under No. **9.21** is required to be obtained from countries mentioned in this footnote. (WRC-19)

5.219 The use of the frequency band 148-149.9 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the frequency band 148-149.9 MHz. The use of the frequency band 148-149.9 MHz by non-geostationary-satellite systems in the space operation service identified as short-duration mission is not subject to No. **9.11A**. (WRC-19)

5.220 The use of the frequency bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-15)

5.221 Stations of the mobile-satellite service in the frequency band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Djibouti, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Eswatini, Ethiopia, the Russian Federation, Finland, France, Gabon, Georgia, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Lesotho, Latvia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Türkiye, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Somalia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Tanzania, Chad, Togo, Tonga, Trinidad and Tobago, Tunisia, Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC-23)

5.222 (SUP - WRC-15)

5.223 (SUP - WRC-15)

5.224 (SUP - WRC-97)

5.224A (SUP - WRC-15)

5.224B (SUP - WRC-15)

5.225 *Additional allocation:* in Australia and India, the band 150.05-153 MHz is also allocated to the radio astronomy service on a primary basis.

* Note by the Secretariat: This Resolution was revised by WRC-23.

5.225A *Additional allocation:* in Algeria, Armenia, Azerbaijan, Belarus, China, the Russian Federation, France, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and Viet Nam, the frequency band 154-156 MHz is also allocated to the radiolocation service on a primary basis. The usage of the frequency band 154-156 MHz by the radiolocation service shall be limited to space-object detection systems operating from terrestrial locations. The operation of stations in the radiolocation service in the frequency band 154-156 MHz shall be subject to agreement obtained under No. 9.21. For the identification of potentially affected administrations in Region 1, the instantaneous field-strength value of 12 dB(μ V/m) for 10% of the time produced at 10 m above ground level in the 25 kHz reference frequency band at the border of the territory of any other administration shall be used. For the identification of potentially affected administrations in Region 3, the interference-to-noise ratio (I/N) value of -6 dB ($N = -161 \text{ dBW}/4 \text{ kHz}$), or -10 dB for applications with greater protection requirements, such as public protection and disaster relief (PPDR ($N = -161 \text{ dBW}/4 \text{ kHz}$)), for 1% of the time produced at 60 m above ground level at the border of the territory of any other administration shall be used. In the frequency bands 156.7625-156.8375 MHz, 156.5125-156.5375 MHz, 161.9625-161.9875 MHz, 162.0125-162.0375 MHz, out-of-band e.i.r.p. of space surveillance radars shall not exceed -16 dBW. Frequency assignments to the radiolocation service under this allocation in Ukraine shall not be used without the agreement of Moldova. (WRC-12)

5.226 The frequency 156.525 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service using digital selective calling (DSC). The conditions for the use of this frequency and the band 156.4875-156.5625 MHz are contained in Articles 31 and 52, and in Appendix 18.

The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. The conditions for the use of this frequency and the band 156.7625-156.8375 MHz are contained in Article 31 and Appendix 18.

In the bands 156-156.4875 MHz, 156.5625-156.7625 MHz, 156.8375-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by the administration (see Articles 31 and 52, and Appendix 18).

Any use of frequencies in these bands by stations of other services to which they are allocated should be avoided in areas where such use might cause harmful interference to the maritime mobile VHF radiocommunication service.

However, the frequencies 156.8 MHz and 156.525 MHz and the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreement between interested and affected administrations and taking into account current frequency usage and existing agreements. (WRC-07)

5.227 *Additional allocation:* the bands 156.4875-156.5125 MHz and 156.5375-156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis. The use of these bands by the fixed and land mobile services shall not cause harmful interference to nor claim protection from the maritime mobile VHF radiocommunication service. (WRC-07)

5.227A (SUP - WRC-12)

5.228 The use of the frequency bands 156.7625-156.7875 MHz and 156.8125-156.8375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system (AIS) emissions of long-range AIS broadcast messages (Message 27, see the most recent version of Recommendation ITU-R M.1371). With the exception of AIS emissions, emissions in these frequency bands by systems operating in the maritime mobile service for communications shall not exceed 1 W. (WRC-12)

156.8375-161.9375 MHz

Allocation to services		
Region 1	Region 2	Region 3
156.8375-157.1875 FIXED MOBILE except aeronautical mobile 5.226	156.8375-157.1875 FIXED MOBILE 5.226	
157.1875-157.3375 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	157.1875-157.3375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	
157.3375-161.7875 FIXED MOBILE except aeronautical mobile 5.226	157.3375-161.7875 FIXED MOBILE 5.226	
161.7875-161.9375 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	161.7875-161.9375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	

5.228AB The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz by the maritime mobile-satellite service (Earth-to-space) is limited to non-geostationary-satellite systems operating in accordance with Appendix 18. (WRC-19)

5.228AC The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz by the maritime mobile-satellite service (space-to-Earth) is limited to non-geostationary-satellite systems operating in accordance with Appendix 18. Such use is subject to agreement obtained under No. 9.21 with respect to the terrestrial services in Azerbaijan, Belarus, China, Korea (Rep. of), Cuba, the Russian Federation, the Syrian Arab Republic, the Dem. People's Rep. of Korea, South Africa and Viet Nam. (WRC-19)

161.9375-223 MHz

Allocation to services		
Region 1	Region 2	Region 3
161.9375-161.9625 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	161.9375-161.9625 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	
161.9625-161.9875 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B	161.9625-161.9875 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D	161.9625-161.9875 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226
161.9875-162.0125 FIXED MOBILE except aeronautical mobile Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	161.9875-162.0125 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	
162.0125-162.0375 FIXED MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.228F 5.226 5.228A 5.228B	162.0125-162.0375 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELLITE (Earth-to-space) 5.228C 5.228D	162.0125-162.0375 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226
162.0375-174 FIXED MOBILE except aeronautical mobile 5.226	162.0375-174 FIXED MOBILE 5.226 5.230 5.231	
174-223 BROADCASTING 5.235 5.237 5.243	174-216 BROADCASTING Fixed Mobile 216-220 FIXED MARITIME MOBILE Radiolocation 5.241 5.242	174-223 FIXED MOBILE BROADCASTING 5.233 5.238 5.240 5.245

5.228A The frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz may be used by aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC-12)

5.228AA The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix 18. (WRC-15)

5.228B The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the fixed and land mobile services shall not cause harmful interference to, or claim protection from, the maritime mobile service. (WRC-12)

5.228C The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the maritime mobile service and the mobile-satellite (Earth-to-space) service is limited to the automatic identification system (AIS), including AIS search and rescue transmitters (AIS-SART) and satellite emergency position indicating radio beacons with AIS (EPIRB-AIS). The use of these frequency bands by the aeronautical mobile (OR) service is limited to AIS emissions from search and rescue aircraft operations. The AIS, AIS-SART and EPIRB-AIS operations in these frequency bands shall not constrain the development and use of the fixed and mobile services operating in the adjacent frequency bands. (WRC-23)

5.228D The frequency bands 161.9625-161.9875 MHz (AIS 1) and 162.0125-162.0375 MHz (AIS 2) may continue to be used by the fixed and mobile services on a primary basis until 1 January 2025, at which time this allocation shall no longer be valid. Administrations are encouraged to make all practicable efforts to discontinue the use of these bands by the fixed and mobile services prior to the transition date. During this transition period, the maritime mobile service in these frequency bands has priority over the fixed, land mobile and aeronautical mobile services. (WRC-12)

5.228E The use of the automatic identification system in the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the aeronautical mobile (OR) service is limited to aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC-12)

5.228F The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system emissions from stations operating in the maritime mobile service. (WRC-12)

5.229 (SUP - WRC-23)

5.230 *Additional allocation:* in China, the band 163-167 MHz is also allocated to the space operation service (space-to-Earth) on a primary basis, subject to agreement obtained under No. 9.21.

5.231 *Additional allocation:* in Afghanistan and China, the band 167-174 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service into this band shall be subject to agreement with the neighbouring countries in Region 3 whose services are likely to be affected. (WRC-12)

5.232 (SUP - WRC-15)

5.233 *Additional allocation:* in China, the band 174-184 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis, subject to agreement obtained under No. 9.21. These services shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations.

5.234 (SUP - WRC-15)

5.235 *Additional allocation:* in Germany, Austria, Belgium, Denmark, Spain, Finland, France, Israel, Italy, Liechtenstein, Malta, Monaco, Norway, the Netherlands, the United Kingdom, Sweden and Switzerland, the band 174-223 MHz is also allocated to the land mobile service on a primary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, broadcasting stations, existing or planned, in countries other than those listed in this footnote.

5.236 Not used.

5.237 *Additional allocation:* in Congo (Rep. of the), Egypt, Eritrea, Ethiopia, Gambia, Guinea, Libya, Mali, Sierra Leone, Somalia and Chad, the band 174-223 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-12)

5.238 *Additional allocation:* in Bangladesh, India, Pakistan and the Philippines, the band 200-216 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.239 Not used.

5.240 *Additional allocation:* in China and India, the band 216-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.241 In Region 2, no new stations in the radiolocation service may be authorized in the band 216-225 MHz. Stations authorized prior to 1 January 1990 may continue to operate on a secondary basis.

5.242 *Additional allocation:* in Canada and Mexico, the frequency band 216-220 MHz is also allocated to the land mobile service on a primary basis. (WRC-19)

5.243 *Additional allocation:* in Somalia, the band 216-225 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to not causing harmful interference to existing or planned broadcasting services in other countries.

5.244 (SUP - WRC-97)

5.245 *Additional allocation:* in Japan, the band 222-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

220-335.4 MHz

Allocation to services		
Region 1	Region 2	Region 3
223-230 BROADCASTING Fixed Mobile 5.243 5.246 5.247	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241 225-235 FIXED MOBILE	223-230 FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION Radiolocation 5.250
230-235 FIXED MOBILE 5.247 5.251 5.252		230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 5.250
235-267	FIXED MOBILE 5.111 5.252 5.254 5.256 5.256A	
267-272	FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257	
272-273	SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254	
273-312	FIXED MOBILE 5.254	
312-315	FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255	
315-322	FIXED MOBILE 5.254	
322-328.6	FIXED MOBILE RADIO ASTRONOMY 5.149	
328.6-335.4	AERONAUTICAL RADIONAVIGATION 5.258 5.259	

5.246 *Alternative allocation:* in Spain, France, Israel and Monaco, the band 223-230 MHz is allocated to the broadcasting and land mobile services on a primary basis (see No. 5.33) on the basis that, in the preparation of frequency plans, the broadcasting service shall have prior choice of frequencies; and allocated to the fixed and mobile, except land mobile, services on a secondary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations in Morocco and Algeria.

5.247 *Additional allocation:* in Saudi Arabia, Bahrain, the United Arab Emirates, Jordan, Oman, Qatar and Syrian Arab Republic, the band 223-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.248 and **5.249** Not used.

5.250 *Additional allocation:* in China, the band 225-235 MHz is also allocated to the radio astronomy service on a secondary basis.

5.251 *Additional allocation:* in Nigeria, the band 230-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to agreement obtained under No. 9.21.

5.252 *Alternative allocation:* in Botswana, Eswatini, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe, the frequency bands 230-238 MHz and 246-254 MHz are allocated to the broadcasting service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-19)

5.253 Not used.

5.254 The bands 235-322 MHz and 335.4-399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under No. 9.21, on condition that stations in this service do not cause harmful interference to those of other services operating or planned to be operated in accordance with the Table of Frequency Allocations except for the additional allocation made in footnote No. 5.256A. (WRC-03)

5.255 The bands 312-315 MHz (Earth-to-space) and 387-390 MHz (space-to-Earth) in the mobile-satellite service may also be used by non-geostationary-satellite systems. Such use is subject to coordination under No. 9.11A.

5.256 The frequency 243 MHz is the frequency in this band for use by survival craft stations and equipment used for survival purposes. (WRC-07)

5.256A *Additional allocation:* in China, the Russian Federation and Kazakhstan, the frequency band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, or claim protection from, or constrain the use and development of, the mobile service systems and mobile-satellite service systems operating in the frequency band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC-15)

5.257 The band 267-272 MHz may be used by administrations for space telemetry in their countries on a primary basis, subject to agreement obtained under No. 9.21.

5.258 The use of the band 328.6-335.4 MHz by the aeronautical radionavigation service is limited to Instrument Landing Systems (glide path).

5.259 *Additional allocation:* in Egypt and the Syrian Arab Republic, the band 328.6-335.4 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. 9.21. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. 9.21. (WRC-12)

335.4-410 MHz

Allocation to services		
Region 1	Region 2	Region 3
335.4-387	FIXED MOBILE 5.254	
387-390	FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	
390-399.9	FIXED MOBILE 5.254	
399.9-400.05	MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 5.260A 5.260B	
400.05-400.15	STANDARD FREQUENCY AND TIME SIGNAL- SATELLITE (400.1 MHz) 5.261 5.262	
400.15-401	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.262 5.264	
401-402	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	
402-403	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	
403-406	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265	
406-406.1	MOBILE-SATELLITE (Earth-to-space) 5.265 5.266 5.267	
406.1-410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265	

5.260A In the frequency band 399.9-400.05 MHz, the maximum e.i.r.p. of any emission of earth stations in the mobile-satellite service shall not exceed 5 dBW in any 4 kHz band and the maximum e.i.r.p. of each earth station in the mobile-satellite service shall not exceed 5 dBW in the whole 399.9-400.05 MHz frequency band. Until 22 November 2022, this limit shall not apply to satellite systems for which complete notification information has been received by the Radiocommunication Bureau by 22 November 2019 and that have been brought into use by that date. After 22 November 2022, these limits shall apply to all systems within the mobile-satellite service operating in this frequency band.

In the frequency band 399.99-400.02 MHz, the e.i.r.p. limits as specified above shall apply after 22 November 2022 to all systems within the mobile-satellite service. Administrations are requested that their mobile-satellite service satellite links in the 399.99-400.02 MHz frequency band comply with the e.i.r.p. limits as specified above, after 22 November 2019. (WRC-19)

5.260B In the frequency band 400.02-400.05 MHz, the provisions of No. 5.260A are not applicable for telecommand uplinks within the mobile-satellite service. (WRC-19)

5.261 Emissions shall be confined in a band of \pm 25 kHz about the standard frequency 400.1 MHz.

5.262 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Botswana, Colombia, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Singapore, Somalia, Tajikistan, Chad, Turkmenistan and Ukraine, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-12)

5.263 The band 400.15-401 MHz is also allocated to the space research service in the space-to-space direction for communications with manned space vehicles. In this application, the space research service will not be regarded as a safety service.

5.264 The use of the band 400.15-401 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. The power flux-density limit indicated in Annex 1 of Appendix 5 shall apply until such time as a competent world radiocommunication conference revises it.

5.264A In the frequency band 401-403 MHz, the maximum e.i.r.p. of any emission of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 22 dBW in any 4 kHz band for geostationary-satellite systems and non-geostationary-satellite systems with an orbit of apogee equal or greater than 35 786 km.

The maximum e.i.r.p. of any emission of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 7 dBW in any 4 kHz band for non-geostationary-satellite systems with an orbit of apogee lower than 35 786 km.

The maximum e.i.r.p. of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 22 dBW for geostationary-satellite systems and non-geostationary-satellite systems with an orbit of apogee equal or greater than 35 786 km in the whole 401-403 MHz frequency band. The maximum e.i.r.p. of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 7 dBW for non-geostationary-satellite systems with an orbit of apogee lower than 35 786 km in the whole 401-403 MHz frequency band.

Until 22 November 2029, these limits shall not apply to satellite systems for which complete notification information has been received by the Radiocommunication Bureau by 22 November 2019 and that have been brought into use by that date. After 22 November 2029, these limits shall apply to all systems within the meteorological-satellite service and the Earth exploration-satellite service operating in this frequency band. (WRC-19)

5.264B Non-geostationary-satellite systems in the meteorological-satellite service and the Earth exploration-satellite service for which complete notification information has been received by the Radiocommunication Bureau no later than 28 April 2007 are exempt from provisions of No. 5.264A and may continue to operate in the frequency band 401.898-402.522 MHz on a primary basis without exceeding a maximum e.i.r.p. level of 12 dBW. (WRC-23)

5.265 In the frequency band 403-410 MHz, Resolution 205 (Rev.WRC-19) applies. (WRC-19)

5.266 The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (see also Article 31). (WRC-07)

5.267 Any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited.

410-460 MHz

Allocation to services		
Region 1	Region 2	Region 3
410-420	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268	
420-430	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271	
430-432 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277	430-432 RADIOLOCATION Amateur 5.278 5.271 5.276 5.279	
432-438 AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.276 5.277 5.280 5.281 5.282	432-438 RADIOLOCATION Amateur 5.278 Earth exploration-satellite (active) 5.279A 5.271 5.276 5.279 5.281 5.282	
438-440 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277 5.283	438-440 RADIOLOCATION Amateur 5.278 5.271 5.276 5.279	
440-450	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.285 5.270 5.271 5.284 5.286	
450-455	FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E	
455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E
456-459	FIXED MOBILE 5.286AA 5.287 5.288 5.271	
459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E

5.268 Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from transmitting stations of the space research service (space-to-space) in the frequency band 410-420 MHz shall not exceed $-153 \text{ dB(W/m}^2\text{)}$ for $0^\circ \leq \delta \leq 5^\circ$, $-153 + 0.077(\delta - 5) \text{ dB(W/m}^2\text{)}$ for $5^\circ \leq \delta \leq 70^\circ$ and $-148 \text{ dB(W/m}^2\text{)}$ for $70^\circ \leq \delta \leq 90^\circ$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. In this frequency band, stations of the space research service (space-to-space) shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. No. 4.10 does not apply. (WRC-15)

5.269 *Different category of service:* in Australia, Brazil, the United States, India, Japan and the United Kingdom, the allocation of the frequency bands 420-430 MHz and 440-450 MHz to the radiolocation service is on a primary basis (see No. 5.33). (WRC-23)

5.270 *Additional allocation:* in Australia, the United States, Jamaica and the Philippines, the bands 420-430 MHz and 440-450 MHz are also allocated to the amateur service on a secondary basis.

5.271 *Additional allocation:* in Belarus, China, India, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis. (WRC-07)

5.272 (SUP - WRC-12)

5.273 (SUP - WRC-12)

5.274 *Alternative allocation:* in Denmark, Norway, Sweden and Chad, the bands 430-432 MHz and 438-440 MHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-12)

5.275 *Additional allocation:* in Croatia, Estonia, Finland, Libya, North Macedonia, Montenegro and Serbia, the frequency bands 430-432 MHz and 438-440 MHz are also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.276 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Djibouti, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Jordan, Kenya, Kuwait, Libya, Malaysia, Niger, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Türkiye, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Switzerland, Thailand, Togo and Yemen, the frequency band 430-440 MHz is also allocated to the fixed service on a primary basis and the frequency bands 430-435 MHz and 438-440 MHz are also allocated, except in Ecuador, to the mobile, except aeronautical mobile, service on a primary basis. (WRC-23)

5.277 *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Uzbekistan, Poland, the Dem. Rep. of the Congo, Kyrgyzstan, Slovakia, Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the frequency band 430-440 MHz is also allocated to the fixed service on a primary basis. (WRC-19)

5.278 *Different category of service:* in Argentina, Brazil, Colombia, Costa Rica, Cuba, Guyana, Honduras, Panama, Paraguay, Uruguay and Venezuela, the allocation of the frequency band 430-440 MHz to the amateur service is on a primary basis (see No. 5.33). (WRC-19)

5.279 *Additional allocation:* in Mexico, the frequency bands 430-435 MHz and 438-440 MHz are also allocated on a primary basis to the mobile, except aeronautical mobile, service, and on a secondary basis to the fixed service, subject to agreement obtained under No. 9.21. (WRC-19)

5.279A The use of the frequency band 432-438 MHz by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R RS.1260-2. Additionally, the Earth exploration-satellite service (active) in the frequency band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China. The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. 5.29 and 5.30. (WRC-19)

5.280 In Germany, Austria, Bosnia and Herzegovina, Croatia, Liechtenstein, North Macedonia, Montenegro, Portugal, Serbia, Slovenia and Switzerland, the frequency band 433.05-434.79 MHz (centre frequency 433.92 MHz) is designated for industrial, scientific and medical (ISM) applications. Radiocommunication services of these countries operating within this frequency band must accept harmful interference which may be caused by these applications. ISM equipment operating in this frequency band is subject to the provisions of No. 15.13. (WRC-19)

5.281 *Additional allocation:* in the French overseas departments and communities in Region 2 and India, the band 433.75-434.25 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis. In France and in Brazil, the band is allocated to the same service on a secondary basis.

5.282 In the bands 435-438 MHz, 1 260-1 270 MHz, 2 400-2 450 MHz, 3 400-3 410 MHz (in Regions 2 and 3 only) and 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No. 5.43). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. 25.11. The use of the bands 1 260-1 270 MHz and 5 650-5 670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

5.283 *Additional allocation:* in Austria, the band 438-440 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.

5.284 *Additional allocation:* in Canada, the band 440-450 MHz is also allocated to the amateur service on a secondary basis.

5.285 *Different category of service:* in Canada, the allocation of the band 440-450 MHz to the radiolocation service is on a primary basis (see No. 5.33).

5.286 The band 449.75-450.25 MHz may be used for the space operation service (Earth-to-space) and the space research service (Earth-to-space), subject to agreement obtained under No. 9.21.

5.286A The use of the bands 454-456 MHz and 459-460 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. (WRC-97)

5.286AA The frequency band 450-470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) - see Resolution 224 (Rev.WRC-19)*. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.286B The use of the band 454-455 MHz in the countries listed in No. 5.286D, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. 5.286E, by stations in the mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286C The use of the band 454-455 MHz in the countries listed in No. 5.286D, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. 5.286E, by stations in the mobile-satellite service, shall not constrain the development and use of the fixed and mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286D *Additional allocation:* in Canada, the United States and Panama, the band 454-455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis. (WRC-07)

5.286E *Additional allocation:* in Cabo Verde, Nepal and Nigeria, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-23)

5.287 Use of the frequency bands 457.5125-457.5875 MHz and 467.5125-467.5875 MHz by the maritime mobile service is limited to on-board communication stations. The characteristics of the equipment and the channelling arrangement shall be in accordance with Recommendation ITU-R M.1174-4. The use of these frequency bands in territorial waters is subject to the national regulations of the administration concerned. (WRC-19)

5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-4. (WRC-19)

* Note by the Secretariat: This Resolution was revised by WRC-23.

460-890 MHz

Allocation to services		
Region 1	Region 2	Region 3
460-470	FIXED MOBILE 5.286AA 5.287 5.288 Meteorological-satellite (space-to-Earth) 5.290 5.289	
470-694 BROADCASTING	470-512 BROADCASTING Fixed Mobile 5.292 5.293 5.295	470-585 FIXED MOBILE 5.296A BROADCASTING 5.291 5.298
	512-608 BROADCASTING 5.295 5.297	585-610 FIXED MOBILE 5.296A BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	610-890 FIXED MOBILE 5.296A 5.313A 5.314A 5.317A BROADCASTING
5.149 5.291A 5.294 5.295A 5.296 5.300 5.304 5.306 5.307A 5.307B 5.312	614-698 BROADCASTING Fixed 5.309 Mobile 5.308 5.293 5.308A	
694-790 MOBILE except aeronautical mobile 5.312A 5.312B 5.317A BROADCASTING 5.300 5.312	698-806 MOBILE 5.312B 5.317A BROADCASTING Fixed 5.309	
790-862 FIXED MOBILE except aeronautical mobile 5.312B 5.316B 5.317A BROADCASTING 5.312 5.319	806-890 FIXED MOBILE 5.312B 5.317A BROADCASTING 5.293	
862-890 FIXED MOBILE except aeronautical mobile 5.312B 5.317A BROADCASTING 5.322 5.319 5.323	5.317 5.318	5.149 5.305 5.306 5.307 5.320

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460-470 MHz and 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table.

5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-12)

5.291 *Additional allocation:* in China, the band 470-485 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis subject to agreement obtained under No. 9.21 and subject to not causing harmful interference to existing and planned broadcasting stations.

5.291A *Additional allocation:* in Germany, Austria, Denmark, Estonia, Liechtenstein, Serbia and Switzerland, the frequency band 470-494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution 217 (Rev.WRC-23). (WRC-23)

5.292 *Different category of service:* in Argentina, Uruguay and Venezuela, the allocation of the frequency band 470-512 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-15)

5.293 *Different category of service:* in Canada, Chile, Cuba, the United States, Guyana and Panama, the allocation of the frequency bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In the Bahamas, Barbados, Canada, Chile, Cuba, the United States, Guyana, Jamaica, Mexico and Panama, the allocation of the frequency bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. In Argentina and Ecuador, the allocation of the frequency band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-23)

5.294 *Additional allocation:* in Saudi Arabia, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, Libya, Palestine*, the Syrian Arab Republic, Chad and Yemen, the frequency band 470-582 MHz is also allocated to the fixed service on a secondary basis. (WRC-23)

5.295 In the Bahamas, Barbados, Canada, the United States and Mexico, the frequency band 470-608 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-19)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. (WRC-19)

5.295A *Additional allocation:* in Albania, Germany, Andorra, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Cyprus, Vatican, Croatia, Denmark, Estonia, Finland, France, Georgia, Greece, Hungary, Ireland, Iceland, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malta, Moldova, Monaco, Montenegro, Norway, Uzbekistan, Kingdom of the Netherlands, Poland, Portugal, Türkiye, Slovakia, the Czech Republic, Romania, the United Kingdom, San Marino, Serbia, Slovenia, Sweden, Switzerland and Ukraine, the frequency band 470-694 MHz is allocated to the mobile, except aeronautical mobile, service on a secondary basis, subject to agreement obtained under No. 9.21. For the protection of the broadcasting service, stations in the mobile service shall not create a field strength for more than 1% of the time at the highest of the clutter height or 10 m above ground level at the border of the territory of any other administration that exceeds the field strength value as calculated using § 4.1.3.2 of Annex 2 to the GE06 Agreement with regard to allowance for multiple interference, Table A.1.10 and the methodology given in the GE06 Agreement. These limits may be exceeded on the territory of any country whose administration has so agreed. This allocation shall in no way adversely affect the broadcast development or undermine new entries of the broadcasting service to the GE06 Plan. (WRC-23)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

** Note by the Secretariat: This Resolution was revised by WRC-23.

5.296 *Additional allocation:* in Albania, Algeria, Germany, Angola, Saudi Arabia, Austria, Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Burundi, Cameroon, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Djibouti, Egypt, United Arab Emirates, Spain, Estonia, Eswatini, Finland, France, Gabon, Gambia, Georgia, Ghana, Hungary, Iraq, Ireland, Iceland, Israel, Italy, Jordan, Kenya, Kuwait, Lesotho, Latvia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malawi, Mali, Malta, Morocco, Mauritius, Mauritania, Moldova, Monaco, Mozambique, Namibia, Niger, Nigeria, Norway, Oman, Uganda, Palestine*, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Türkiye, Slovakia, the Czech Republic, Romania, the United Kingdom, Rwanda, San Marino, Senegal, Serbia, Sudan, South Africa, Sweden, Switzerland, Tanzania, Chad, Togo, Tunisia, Ukraine, Zambia and Zimbabwe, the frequency band 470-694 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting and programme-making. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC-23)

5.296A In Micronesia, the Solomon Islands, Tuvalu and Vanuatu, the frequency band 470-698 MHz, or portions thereof, and in Bangladesh, Lao P.D.R., Maldives, New Zealand and Viet Nam, the frequency band 610-698 MHz, or portions thereof, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-23). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The mobile allocation in this frequency band shall not be used for IMT systems unless subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. (WRC-23)

5.297 *Additional allocation:* in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana and Jamaica, the frequency band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under No. 9.21. In the Bahamas, Barbados and Mexico, the frequency band 512-608 MHz is also allocated to the mobile service on a primary basis, subject to agreement obtained under No. 9.21. In Mexico, the frequency band 512-608 MHz is also allocated on a secondary basis to the fixed service (see No. 5.32). (WRC-19)

5.298 *Additional allocation:* in India, the band 549.75-550.25 MHz is also allocated to the space operation service (space-to-Earth) on a secondary basis.

5.299 Not used.

5.300 *Additional allocation:* in Saudi Arabia, Cameroon, Egypt, the United Arab Emirates, Iraq, Israel, Jordan, Libya, Oman, Palestine*, Qatar, the Syrian Arab Republic and Sudan, the frequency band 582-790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-23)

5.301 Not used.

5.302 (SUP - WRC-12)

5.303 Not used.

5.304 *Additional allocation:* in the African Broadcasting Area (see Nos. 5.10 to 5.13), the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.305 *Additional allocation:* in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.306 *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. 5.10 to 5.13), and in Region 3, except in China and India, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis. (WRC-23)

5.307 *Additional allocation:* in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.307A *Additional allocation:* in Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, Iraq, Jordan, Kuwait, Oman, Palestine*, Qatar and the Syrian Arab Republic, the frequency band 614-694 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis and identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-23) subject to the agreement obtained under No. 9.21. Stations in the mobile service shall not create a field strength for more than 1% of the time at the highest of the clutter height or 10 m above ground level at the border of the territory of any other administration that exceeds the field strength value as calculated using § 4.1.3.2 of Annex 2 to the GE06 Agreement with regard to allowance for multiple interference, Table A.1.10 and the methodology given in the GE06 Agreement. Stations in the mobile service of the countries listed in this footnote shall not cause harmful interference to, or claim protection from the existing and future broadcasting stations of the neighbouring countries operating in accordance with the GE06 Plan. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations and shall in no way adversely affect the development of the existing and future broadcasting service in accordance with the GE06 Agreement. For countries party to the GE06 Agreement, the use of stations in the mobile service is also subject to the successful application of the procedures of that Agreement. This allocation does not establish priority in the Radio Regulations and shall allow the implementation and development of the broadcasting service in accordance with the GE06 Agreement. The countries listed in this footnote and located in the African Broadcasting Area should ensure protection of the radio astronomy service within the frequency band 606-614 MHz, as allocated in No. 5.304, consistent with the most recent version of Recommendation ITU-R RA.769. The countries listed in this footnote, which are neighbouring to the countries listed in No. 5.312, should ensure the protection of the aeronautical radionavigation service in the frequency band 645-862 MHz. (WRC-23)

5.307B *Additional allocation:* in Gambia, Mauritania, Namibia, Nigeria, Senegal, Somalia, Tanzania and Chad, the frequency band 614-694 MHz is allocated to the mobile service on a secondary basis. For the protection of the broadcasting service, stations in the mobile service shall not create a field strength for more than 1% of the time at the highest of the clutter height or 10 m above ground level at the border of the territory of any other administration that exceeds the field strength value as calculated using § 4.1.3.2 of Annex 2 to the GE06 Agreement with regard to allowance for multiple interference, Table A.1.10 and the methodology given in the GE06 Agreement. This allocation shall in no way adversely affect the broadcast development or undermine new entries of the broadcasting service to the GE06 Plan. Additional measures shall be used by administrations implementing stations in the mobile services to protect stations in the broadcasting service of neighbouring administrations such as a distance limitation from the border of a neighbouring country. (WRC-23)

5.308 *Different category of service:* in Belize, Colombia, El Salvador and Guatemala, the frequency band 614-698 MHz is allocated to the mobile service on a primary basis. Stations of the mobile service within the frequency band are subject to agreement obtained under No. 9.21. (WRC-23)

5.308A In the Bahamas, Barbados, Belize, Canada, Colombia, El Salvador, the United States, Guatemala, Jamaica and Mexico, the frequency band 614-698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC-23). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. 5.43 and 5.43A apply. (WRC-23)

5.309 *Different category of service:* in El Salvador, the allocation of the frequency band 614-806 MHz to the fixed service is on a primary basis (see No. 5.33), subject to agreement obtained under No. 9.21. (WRC-15)

5.310 (SUP - WRC-97)

5.311 (SUP - WRC-07)

5.311A (SUP - WRC-19)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.312 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 645-862 MHz, and in Bulgaria the frequency bands 726-753 MHz, 778-811 MHz and 822-852 MHz, are also allocated to the aeronautical radionavigation service on a primary basis. (WRC-23)

5.312A In Region 1, the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service is subject to the provisions of Resolution **760 (Rev.WRC-23)**. See also Resolution **224 (Rev.WRC-23)**. (WRC-23)

5.312B The frequency band 698-960 MHz, or portions thereof, in Region 2, and the frequency band 694-960 MHz, or portions thereof, in Region 1, are identified for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **213 (WRC-23)** shall apply. HIBS shall not claim protection from existing primary services. No. **5.43A** does not apply, see *resolves 2* of Resolution **213 (WRC-23)**. Such use of HIBS in the frequency bands 694-728 MHz, 830-835 MHz and 805.3-806.9 MHz is limited to reception by HIBS. (WRC-23)

5.313 (SUP - WRC-97)

5.313A The frequency band, or portions of the frequency band 698-790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, the Philippines, the Dem. People's Rep. of Korea, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.313B (SUP - WRC-15)

5.314 (SUP - WRC-15)

5.314A The frequency band 698-960 MHz, or portions thereof, in Australia, Maldives, Micronesia, Papua New Guinea, Tonga and Vanuatu, and the frequency bands 703-733 MHz, 758-788 MHz, 890-915 MHz and 935-960 MHz, or portions thereof, in China, India, Indonesia, Japan, Korea (Rep. of), Malaysia, the Philippines and Thailand are identified for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **213 (WRC-23)** shall apply. HIBS shall not claim protection from existing primary services. No. **5.43A** does not apply, see *resolves 2* of Resolution **213 (WRC-23)**. Such use of HIBS in the frequency bands 698-728 MHz and 830-835 MHz is limited to reception by HIBS. (WRC-23)

5.315 (SUP - WRC-15)

5.316 (SUP - WRC-15)

5.316A (SUP - WRC-15)

5.316B In Region 1, the allocation to the mobile, except aeronautical mobile, service in the frequency band 790-862 MHz is subject to agreement obtained under No. **9.21** with respect to the aeronautical radionavigation service in countries mentioned in No. **5.312**. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolutions **224 (Rev.WRC-23)** and **749 (Rev.WRC-23)** shall apply, as appropriate. (WRC-23)

5.317 *Additional allocation:* in Region 2 (except Brazil, the United States and Mexico), the frequency band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is intended for operation within national boundaries. (WRC-15)

5.317A The parts of the frequency band 698-960 MHz in Region 2 and the frequency bands 694-790 MHz in Region 1 and 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224** (Rev.WRC-23), **760** (Rev.WRC-23) and **749** (Rev.WRC-23), where applicable. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-23)

5.318 *Additional allocation:* in Canada, the United States and Mexico, the bands 849-851 MHz and 894-896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849-851 MHz is limited to transmissions from aeronautical stations and the use of the band 894-896 MHz is limited to transmissions from aircraft stations.

5.319 *Additional allocation:* in Belarus, the Russian Federation and Ukraine, the bands 806-840 MHz (Earth-to-space) and 856-890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.

5.320 *Additional allocation:* in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.

5.321 (SUP - WRC-07)

5.322 In Region 1, in the frequency band 862-960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. **5.10** to **5.13**) excluding Algeria, Burundi, Djibouti, Egypt, Spain, Lesotho, Libya, Morocco, Malawi, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under No. **9.21**. (WRC-23)

5.323 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the frequency band 862-960 MHz, in Bulgaria the frequency bands 862-880 MHz and 915-925 MHz, and in Romania the frequency bands 862-880 MHz and 915-925 MHz, are also allocated to the aeronautical radionavigation service on a primary basis. Such use is subject to agreement obtained under No. **9.21** with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-19)

890-1 300 MHz

Allocation to services		
Region 1	Region 2	Region 3
890-942 FIXED MOBILE except aeronautical mobile 5.312B 5.317A BROADCASTING 5.322 Radiolocation 5.323	890-902 FIXED MOBILE except aeronautical mobile 5.312B 5.317A Radiolocation 5.325 5.318	890-942 FIXED MOBILE 5.314A 5.317A BROADCASTING Radiolocation 5.327
	902-928 FIXED Amateur Mobile except aeronautical mobile 5.312B 5.325A 5.326 Radiolocation 5.325 5.150	
	928-942 FIXED MOBILE except aeronautical mobile 5.312B 5.317A Radiolocation 5.325	
942-960 FIXED MOBILE except aeronautical mobile 5.312B 5.317A BROADCASTING 5.322 5.323	942-960 FIXED MOBILE 5.312B 5.317A	942-960 FIXED MOBILE 5.314A 5.317A BROADCASTING 5.320
960-1 164	AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 5.328AA	
1 164-1 215	AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A	
1 215-1 240	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332	
1 240-1 300	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.332A 5.335 5.335A	

5.324 Not used.

5.325 *Different category of service:* in the United States, the allocation of the band 890-942 MHz to the radiolocation service is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.

5.325A *Different category of service:* in Argentina, Brazil, Costa Rica, Cuba, Dominican Republic, El Salvador, Ecuador, the French overseas departments and communities in Region 2, Guatemala, Paraguay, Uruguay and Venezuela, the frequency band 902-928 MHz is allocated to the land mobile service on a primary basis. In Mexico, the frequency band 902-928 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. In Colombia, the frequency band 902-915 MHz is allocated to the land mobile service on a primary basis. (WRC-23)

5.326 *Different category of service:* in Chile, the band 903-905 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21**.

5.327 *Different category of service:* in Australia, the allocation of the band 915-928 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.327A The use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **417 (Rev.WRC-15)**. (WRC-15)

5.328 The use of the band 960-1 215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. (WRC-2000)

5.328A Stations in the radionavigation-satellite service in the band 1 164-1 215 MHz shall operate in accordance with the provisions of Resolution **609 (Rev.WRC-07)** and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1 215 MHz. No. **5.43A** does not apply. The provisions of No. **21.18** shall apply. (WRC-07)

5.328AA The frequency band 1 087.7-1 092.3 MHz is also allocated to the aeronautical mobile-satellite (R) service (Earth-to-space) on a primary basis, limited to the space station reception of Automatic Dependent Surveillance-Broadcast (ADS-B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution **425 (Rev.WRC-19)** shall apply. (WRC-19)

5.328B The use of the bands 1 164-1 300 MHz, 1 559-1 610 MHz and 5 010-5 030 MHz by systems and networks in the radionavigation-satellite service for which complete coordination or notification information, as appropriate, is received by the Radiocommunication Bureau after 1 January 2005 is subject to the application of the provisions of Nos. **9.12**, **9.12A** and **9.13**. Resolution **610 (WRC-03)*** shall also apply; however, in the case of radionavigation-satellite service (space-to-space) networks and systems, Resolution **610 (WRC-03)*** shall only apply to transmitting space stations. In accordance with No. **5.329A**, for systems and networks in the radionavigation-satellite service (space-to-space) in the bands 1 215-1 300 MHz and 1 559-1 610 MHz, the provisions of Nos. **9.7**, **9.12**, **9.12A** and **9.13** shall only apply with respect to other systems and networks in the radionavigation-satellite service (space-to-space). (WRC-07)

5.329 Use of the radionavigation-satellite service in the frequency band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. **5.331**. Furthermore, the use of the radionavigation-satellite service in the frequency band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. **5.43** shall not apply in respect of the radiolocation service. Resolution **608 (Rev.WRC-19)** shall apply. (WRC-09)

5.329A Use of systems in the radionavigation-satellite service (space-to-space) operating in the bands 1 215-1 300 MHz and 1 559-1 610 MHz is not intended to provide safety service applications, and shall not impose any additional constraints on radionavigation-satellite service (space-to-Earth) systems or on other services operating in accordance with the Table of Frequency Allocations. (WRC-07)

* Note by the Secretariat: This Resolution was revised by WRC-19.

5.330 *Additional allocation:* in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan, Palestine*, the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 1 215-1 300 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-23)

5.331 *Additional allocation:* in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Djibouti, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, Pakistan, Palestine*, the Kingdom of the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Türkiye, Dem. People's Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, South Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Venezuela and Viet Nam, the frequency band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the frequency band 1 240-1 300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service. (WRC-23)

5.332 In the band 1 215-1 260 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, the radionavigation-satellite service and other services allocated on a primary basis. (WRC-2000)

5.332A Administrations authorizing operation of the amateur and amateur-satellite services in the frequency band 1 240-1 300 MHz, or portions thereof, shall ensure that the amateur and amateur-satellite services do not cause harmful interference to radionavigation-satellite service (space-to-Earth) receivers in accordance with No. 5.29 (see the most recent version of Recommendation ITU-R M.2164). The authorizing administration, upon receipt of a report of harmful interference caused by a station of the amateur or amateur-satellite services, shall take all necessary steps to rapidly eliminate such interference. (WRC-23)

5.333 (SUP - WRC-97)

5.334 *Additional allocation:* in Canada and the United States, the band 1 350-1 370 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)

5.335 In Canada and the United States in the band 1 240-1 300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause interference to, claim protection from, or otherwise impose constraints on operation or development of the aeronautical radionavigation service. (WRC-97)

5.335A In the band 1 260-1 300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service and other services allocated by footnotes on a primary basis. (WRC-2000)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

1 300-1 525 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 300-1 350	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.149 5.337A	
1 350-1 400 FIXED MOBILE RADIOLOCATION 5.149 5.338 5.338A 5.339	1 350-1 400 RADIOLOCATION 5.338A 5.149 5.334 5.339	
1 400-1 427	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
1 427-1 429	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341A 5.341B 5.341C 5.338A 5.341	
1 429-1 452 FIXED MOBILE except aeronautical mobile 5.341A 5.338A 5.341 5.342	1 429-1 452 FIXED MOBILE 5.341B 5.341C 5.343 5.338A 5.341	
1 452-1 492 FIXED MOBILE except aeronautical mobile 5.346 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.342 5.345	1 452-1 492 FIXED MOBILE 5.341B 5.343 5.346A BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.344 5.345	
1 492-1 518 FIXED MOBILE except aeronautical mobile 5.341A 5.341 5.342	1 492-1 518 FIXED MOBILE 5.341B 5.343 5.341 5.344	1 492-1 518 FIXED MOBILE 5.341C 5.341
1 518-1 525 FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.342	1 518-1 525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344	1 518-1 525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341

5.336 Not used.

5.337 The use of the bands 1 300-1 350 MHz, 2 700-2 900 MHz and 9 000-9 200 MHz by the aeronautical radionavigation service is restricted to ground-based radars and to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

5.337A The use of the band 1 300-1 350 MHz by earth stations in the radionavigation-satellite service and by stations in the radiolocation service shall not cause harmful interference to, nor constrain the operation and development of, the aeronautical-radionavigation service. (WRC-2000)

5.338 In Kyrgyzstan, Slovakia and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1 350-1 400 MHz. (WRC-12)

5.338A In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 24.25-27.5 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.4 GHz, 52.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution **750** (Rev.WRC-19) applies. (WRC-19)

5.339 The bands 1 370-1 400 MHz, 2 640-2 655 MHz, 4 950-4 990 MHz and 15.20-15.35 GHz are also allocated to the space research (passive) and Earth exploration-satellite (passive) services on a secondary basis.

5.339A (SUP - WRC-07)

5.340 All emissions are prohibited in the following bands:

- 1 400-1 427 MHz,
- 2 690-2 700 MHz, except those provided for by No. **5.422**,
- 10.68-10.7 GHz, except those provided for by No. **5.483**,
- 15.35-15.4 GHz, except those provided for by No. **5.511**,
- 23.6-24 GHz,
- 31.3-31.5 GHz,
- 31.5-31.8 GHz, in Region 2,
- 48.94-49.04 GHz, from airborne stations
- 50.2-50.4 GHz²,
- 52.6-54.25 GHz,
- 86-92 GHz,
- 100-102 GHz,
- 109.5-111.8 GHz,
- 114.25-116 GHz,
- 148.5-151.5 GHz,
- 164-167 GHz,
- 182-185 GHz,
- 190-191.8 GHz,
- 200-209 GHz,
- 226-231.5 GHz,
- 250-252 GHz. (WRC-03)

5.341 In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

² **5.340.1** The allocation to the Earth exploration-satellite service (passive) and the space research service (passive) in the band 50.2-50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary allocated services in those bands. (WRC-97)

5.341A In Region 1, the frequency bands 1 427-1 452 MHz and 1 492-1 518 MHz are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15)*. This identification does not preclude the use of these frequency bands by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. (WRC-15)

5.341B In Region 2, the frequency band 1 427-1 518 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15)*. This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.341C The frequency bands 1 427-1 452 MHz and 1 492-1 518 MHz are identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15)*. The use of these frequency bands by the above administrations for the implementation of IMT in the frequency bands 1 429-1 452 MHz and 1 492-1 518 MHz is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of these frequency bands by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.342 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Uzbekistan, Kyrgyzstan and Ukraine, the frequency band 1 429-1 535 MHz is also allocated to the aeronautical mobile service on a primary basis, exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the frequency band 1 452-1 492 MHz is subject to agreement between the administrations concerned. (WRC-15)

5.343 In Region 2, the use of the band 1 435-1 535 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

5.344 *Alternative allocation:* in the United States, the band 1 452-1 525 MHz is allocated to the fixed and mobile services on a primary basis (see also No. 5.343).

5.345 Use of the frequency band 1 452-1 492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-19). (WRC-19)

5.346 In Algeria, Angola, Saudi Arabia, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo (Rep. of), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Eswatini, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Kenya, Kuwait, Lesotho, Lebanon, Liberia, Madagascar, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Palestine **, Qatar, Dem. Rep. of the Congo, Rwanda, Senegal, Seychelles, Somalia, Sudan, South Sudan, South Africa, Tanzania, Chad, Togo, Tunisia, Zambia, and Zimbabwe, the frequency band 1 452-1 492 MHz is identified for use by administrations listed above wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-23). This identification does not preclude the use of this frequency band by any other application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained under No. 9.21 with respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. See also Resolution 761 (Rev.WRC-19). (WRC-23)

5.346A The frequency band 1 452-1 492 MHz is identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-19)*** and Resolution 761 (Rev.WRC-19). The use of this frequency band by the above administrations for the implementation of IMT is subject to agreement obtained under No. 9.21 from countries using stations of the aeronautical mobile service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

* Note by the Secretariat: This Resolution was revised by WRC-19 and WRC-23.

** The use by Palestine of the allocation to the mobile service in the frequency band 1 452-1 492 MHz identified for IMT is noted, pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

*** Note by the Secretariat: This Resolution was revised by WRC-23.

5.347 (SUP - WRC-07)

5.347A* (SUP - WRC-07)

5.348 The use of the band 1 518-1 525 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. **5.43A** does not apply. (WRC-03)

5.348A In the band 1 518-1 525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. **9.11A** for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be $-150 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of Appendix 5. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. **5.43A** does not apply. (WRC-03)

5.348B In the band 1 518-1 525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. **5.343** and **5.344**) and in the countries listed in No. **5.342**. No. **5.43A** does not apply. (WRC-03)

5.348C (SUP - WRC-07)

* Note by the Secretariat: This provision has been modified by WRC-07, and subsequently renumbered No. **5.208B** in order to preserve the sequential order.

1 525-1 610 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 525-1 530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	1 525-1 530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Fixed Mobile 5.343	1 525-1 530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.349
1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile 5.341 5.342 5.351 5.354	1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343	
1 535-1 559	MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A	
1 559-1 610	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341	

5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Cameroon, Djibouti, Egypt, Iran (Islamic Republic of), Iraq, Israel, Kuwait, Lebanon, North Macedonia, Morocco, Qatar, Syrian Arab Republic, Kyrgyzstan, Turkmenistan and Yemen, the allocation of the frequency band 1 525-1 530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-23)

5.350 *Additional allocation:* in Kyrgyzstan and Turkmenistan, the frequency band 1 525-1 530 MHz is also allocated to the aeronautical mobile service on a primary basis. (WRC-19)

5.351 The bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz shall not be used for feeder links of any service. In exceptional circumstances, however, an earth station at a specified fixed point in any of the mobile-satellite services may be authorized by an administration to communicate via space stations using these bands.

5.351A For the use of the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 520 MHz and 2 670-2 690 MHz by the mobile-satellite service, see Resolutions **212** (Rev.WRC-23) and **225** (Rev.WRC-23). (WRC-23)

5.352 (SUP - WRC-97)

5.352A In the frequency band 1 525-1 530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Viet Nam and Yemen notified prior to 1 April 1998. (WRC-19)

5.353 (SUP - WRC-97)

5.353A In applying the procedures of Section II of Article 9 to the mobile-satellite service in the frequency bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the global maritime distress and safety system (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. The provisions of Resolution 222 (Rev.WRC-23) shall apply. (WRC-23)

5.354 The use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite services is subject to coordination under No. **9.11A**.

5.355 *Additional allocation:* in Bahrain, Bangladesh, Congo (Rep. of the), Djibouti, Egypt, Eritrea, Iraq, Israel, Kuwait, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the bands 1 540-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a secondary basis. (WRC-12)

5.356 The use of the band 1 544-1 545 MHz by the mobile-satellite service (space-to-Earth) is limited to distress and safety communications (see Article 31).

5.357 Transmissions in the band 1 545-1 555 MHz from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links.

5.357A In applying the procedures of Section II of Article 9 to the mobile-satellite service in the frequency bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article 44. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44 shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. The provisions of Resolution 222 (Rev.WRC-23) shall apply. (WRC-23)

5.358 (SUP - WRC-97)

5.359 *Additional allocation:* in Germany, Saudi Arabia, Armenia, Azerbaijan, Belarus, Cameroon, the Russian Federation, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kuwait, Lithuania, Mauritania, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Tunisia and Turkmenistan, the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these frequency bands. (WRC-23)

5.360 to 5.362 (SUP - WRC-97)

5.362A In the United States, in the bands 1 555-1 559 MHz and 1 656.5-1 660.5 MHz, the aeronautical mobile-satellite (R) service shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article 44. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (WRC-97)

5.362B (SUP - WRC-15)

5.362C (SUP - WRC-15)

5.363 (SUP - WRC-07)

1 610-1 660 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.372
1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.371 5.372	1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.369 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.372
1 613.8-1 621.35 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372 5.372A	1 613.8-1 621.35 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372 5.372A	1 613.8-1 621.35 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.369 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.372 5.372A
1 621.35-1 626.5 MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	1 621.35-1 626.5 MARITIME MOBILE- SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	1 621.35-1 626.5 MARITIME MOBILE- SATELLITE (space-to- Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) Radiodetermination-satellite (Earth-to-space) 5.369 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.372
1 626.5-1 660	MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376	

5.364 The use of the band 1 610-1 626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. A mobile earth station operating in either of the services in this band shall not produce a peak e.i.r.p. density in excess of $-15 \text{ dB}(W/4 \text{ kHz})$ in the part of the band used by systems operating in accordance with the provisions of No. **5.366** (to which No. **4.10** applies), unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, the mean e.i.r.p. density of a mobile earth station shall not exceed $-3 \text{ dB}(W/4 \text{ kHz})$. Stations of the mobile-satellite service shall not claim protection from stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. **5.366** and stations in the fixed service operating in accordance with the provisions of No. **5.359**. Administrations responsible for the coordination of mobile-satellite networks shall make all practicable efforts to ensure protection of stations operating in accordance with the provisions of No. **5.366**.

5.365 The use of the band 1 613.8-1 626.5 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**.

5.366 The band 1 610-1 626.5 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. Such satellite use is subject to agreement obtained under No. **9.21**.

5.367 *Additional allocation:* The frequency band 1 610-1 626.5 MHz is also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-12)

5.368 The provisions of No. **4.10** do not apply with respect to the radiodetermination-satellite and mobile-satellite services in the frequency band 1 610-1 626.5 MHz. However, No. **4.10** applies in the frequency band 1 610-1 626.5 MHz with respect to the aeronautical radionavigation-satellite service when operating in accordance with No. **5.366**, the aeronautical mobile-satellite (R) service when operating in accordance with No. **5.367**, and in the frequency bands 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz (Earth-to-space) (see *resolves* 5 of Resolution **365** (WRC-23)) and 1 621.35-1 626.5 MHz with respect to the maritime mobile-satellite service when used for the global maritime distress and safety system (GMDSS). In applying the procedure of Section II of Article **9**, the provisions of No. **4.10** do not apply for the frequency bands 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz (Earth-to-space) (see *resolves* 5 of Resolution **365** (WRC-23)) and 2 483.59-2 499.91 MHz (space-to-Earth) for the maritime mobile-satellite service when used for the GMDSS with satellite networks or systems for which complete coordination information has been received by the Radiocommunication Bureau before 20 November 2023. Resolution **365** (WRC-23) applies. (WRC-23)

5.369 *Different category of service:* in Angola, Australia, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, South Sudan, Togo and Zambia, the allocation of the band 1 610-1 626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21** from countries not listed in this provision. (WRC-12)

5.370 *Different category of service:* in Venezuela, the allocation to the radiodetermination-satellite service in the band 1 610-1 626.5 MHz (Earth-to-space) is on a secondary basis.

5.371 *Additional allocation:* in Region 1, the band 1 610-1 626.5 MHz (Earth-to-space) is also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under No. **9.21**. (WRC-12)

5.372 Harmful interference shall not be caused to stations of the radio astronomy service using the frequency band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. **29.13** applies). The equivalent power flux-density (epfd) produced in the frequency band 1 610.6-1 613.8 MHz by all space stations of a non-geostationary-satellite system in the mobile-satellite service (space-to-Earth) operating in frequency band 1 613.8-1 626.5 MHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, using the methodology given in Recommendation ITU-R M.1583-1, and the radio astronomy antenna pattern described in Recommendation ITU-R RA.1631-0. (WRC-19)

5.372A The maritime mobile-satellite service in the frequency bands 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz (Earth-to-space) (see *resolves* 5 of Resolution **365** (WRC-23)) and 2 483.59-2 499.91 MHz (space-to-Earth) when they are used for the global maritime distress and safety system (GMDSS) is limited to the geostationary-satellite networks identified in Resolution **365** (WRC-23) and their associated earth stations located within a service area from 75°E to 135°E longitude and from 10°N to 55°N latitude. Resolution **365** (WRC-23) applies. (WRC-23)

5.373 Maritime mobile earth stations receiving in the frequency band 1 621.35-1 626.5 MHz shall not impose additional constraints on earth stations operating in the maritime mobile-satellite service or maritime earth stations of the radiodetermination-satellite service operating in accordance with the Radio Regulations in the frequency band 1 610-1 621.35 MHz or on earth stations operating in the maritime mobile-satellite service operating in accordance with the Radio Regulations in the frequency band 1 626.5-1 660.5 MHz, unless otherwise agreed between the notifying administrations. (WRC-19)

5.373A Maritime mobile earth stations receiving in the frequency band 1 621.35-1 626.5 MHz shall not impose constraints on the assignments of earth stations of the mobile-satellite service (Earth-to-space) and the radiodetermination-satellite service (Earth-to-space) in the frequency band 1 621.35-1 626.5 MHz in networks for which complete coordination information has been received by the Radiocommunication Bureau before 28 October 2019. (WRC-19)

5.374 Mobile earth stations in the mobile-satellite service operating in the bands 1 631.5-1 634.5 MHz and 1 656.5-1 660 MHz shall not cause harmful interference to stations in the fixed service operating in the countries listed in No. **5.359**. (WRC-97)

5.375 The use of the frequency band 1 645.5-1 646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress, urgency and safety communications (see Article **31**). (WRC-23)

5.376 Transmissions in the band 1 646.5-1 656.5 MHz from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

1 660-1 710 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 660-1 660.5	MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A	
1 660.5-1 668	RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	
1 668-1 668.4	MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	
1 668.4-1 670	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E	
1 670-1 675	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.379E 5.380A	
1 675-1 690	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	
1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile 5.289 5.341 5.382	1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth)	
1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341	1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	

5.376A Mobile earth stations operating in the band 1 660-1 660.5 MHz shall not cause harmful interference to stations in the radio astronomy service. (WRC-97)

5.377 (SUP - WRC-03)

5.378 Not used.

5.379 *Additional allocation:* in Bangladesh, India, Indonesia, Nigeria and Pakistan, the band 1 660.5-1 668.4 MHz is also allocated to the meteorological aids service on a secondary basis.

5.379A Administrations are urged to give all practicable protection in the band 1 660.5-1 668.4 MHz for future research in radio astronomy, particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1 664.4-1 668.4 MHz as soon as practicable.

5.379B The use of the frequency band 1 668-1 675 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-23)

5.379C In order to protect the radio astronomy service in the band 1 668-1 670 MHz, the aggregate power flux-density values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed $-181 \text{ dB(W/m}^2\text{)}$ in 10 MHz and $-194 \text{ dB(W/m}^2\text{)}$ in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2 000 s. (WRC-03)

5.379D For sharing of the frequency band 1 668.4-1 675 MHz between the mobile-satellite service and the fixed and mobile services, Resolution **744 (Rev.WRC-23)** shall apply. (WRC-23)

5.379E In the band 1 668.4-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1 668.4-1 675 MHz, administrations are urged not to implement new systems in the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable. (WRC-03)

5.380 (SUP - WRC-07)

5.380A In the band 1 670-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to, nor constrain the development of, existing earth stations in the meteorological-satellite service notified before 1 January 2004. Any new assignment to these earth stations in this band shall also be protected from harmful interference from stations in the mobile-satellite service. (WRC-07)

5.381 *Additional allocation:* in Afghanistan, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1 690-1 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis, and in the Dem. People's Rep. of Korea the frequency band 1 690-1 700 MHz is also allocated to the fixed service on a primary basis (see No. **5.33**) and to the mobile, except aeronautical mobile, service on a secondary basis. (WRC-23)

5.382 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, North Macedonia, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Turkmenistan, Ukraine and Yemen, the allocation of the frequency band 1 690-1 700 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**). (WRC-23)

5.383 Not used.

5.384 *Additional allocation:* in India, Indonesia and Japan, the band 1 700-1 710 MHz is also allocated to the space research service (space-to-Earth) on a primary basis. (WRC-97)

1 710-2 170 MHz

Allocation to services		
Region 1	Region 2	Region 3
1 710-1 930	FIXED MOBILE 5.384A 5.388 5.388A 5.149 5.341 5.385 5.386 5.387	
1 930-1 970 FIXED MOBILE 5.388 5.388A	1 930-1 970 FIXED MOBILE 5.388 5.388A Mobile-satellite (Earth-to-space)	1 930-1 970 FIXED MOBILE 5.388 5.388A
1 970-1 980	FIXED MOBILE 5.388 5.388A	
1 980-2 010	FIXED MOBILE 5.388 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.389A 5.389B 5.389F	
2 010-2 025 FIXED MOBILE 5.388 5.388A	2 010-2 025 FIXED MOBILE 5.388 MOBILE-SATELLITE (Earth-to-space) 5.389C 5.389E	2 010-2 025 FIXED MOBILE 5.388 5.388A
2 025-2 110	SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392	
2 110-2 120	FIXED MOBILE 5.388 5.388A SPACE RESEARCH (deep space) (Earth-to-space)	
2 120-2 160 FIXED MOBILE 5.388 5.388A	2 120-2 160 FIXED MOBILE 5.388 5.388A Mobile-satellite (space-to-Earth)	2 120-2 160 FIXED MOBILE 5.388 5.388A
2 160-2 170 FIXED MOBILE 5.388 5.388A	2 160-2 170 FIXED MOBILE 5.388 MOBILE-SATELLITE (space-to-Earth) 5.389C 5.389E	2 160-2 170 FIXED MOBILE 5.388 5.388A

5.384A The frequency bands 1 710-1 885 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz, or portions thereof, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution 223 (Rev.WRC-15)*. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.385 *Additional allocation:* the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations. (WRC-2000)

5.386 *Additional allocation:* the frequency band 1 750-1 850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2 (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. 9.21, having particular regard to troposcatter systems. (WRC-15)

5.387 *Additional allocation:* in Belarus, Georgia, Kyrgyzstan, Romania, Tajikistan and Turkmenistan, the frequency band 1 770-1 790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under No. 9.21. (WRC-23)

5.388 The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution 212 (Rev.WRC-23) (see also Resolution 223 (Rev.WRC-23)). (WRC-23)

5.388A The frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and the frequency bands 1 710-1 980 MHz and 2 110-2 160 MHz in Region 2 are identified for the use by high altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution 221 (Rev.WRC-23) shall apply. HIBS shall not claim protection from existing primary services. No. 5.43A does not apply. Such use of HIBS in the frequency bands 1 710-1 785 MHz in Regions 1 and 2, and 1 710-1 815 MHz in Region 3 is limited to reception by HIBS, and in the frequency band 2 110-2 170 MHz is limited to transmission from HIBS. (WRC-23)

5.388B (SUP - WRC-23)

5.389 Not used.

5.389A The use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (Rev.WRC-23). (WRC-23)

5.389B The use of the frequency band 1 980-1 990 MHz by the mobile-satellite service shall not cause harmful interference to or constrain the development of the fixed and mobile services in Argentina, Brazil, Canada, Chile, Ecuador, the United States, Honduras, Jamaica, Mexico, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela. (WRC-19)

5.389C The use of the frequency bands 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 by the mobile-satellite service is subject to coordination under No. 9.11A and to the provisions of Resolution 716 (Rev.WRC-23). (WRC-23)

5.389D (SUP - WRC-03)

* Note by the Secretariat: This Resolution was revised by WRC-19 and WRC-23.

5.389E The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite service in Region 2 shall not cause harmful interference to or constrain the development of the fixed and mobile services in Regions 1 and 3.

5.389F In Algeria, Cabo Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services brought into use prior to 1 January 2005, nor hamper the development of those services, nor shall the former service request protection from the latter services. (WRC-23)

5.390 (SUP - WRC-07)

5.391 In making assignments to the mobile service in the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154-0, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-15)

5.392 Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2 025-2 110 MHz and 2 200-2 290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space-to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites.

5.392A (SUP - WRC-07)

2 170-2 520 MHz

Allocation to services		
Region 1	Region 2	Region 3
2 170-2 200	FIXED MOBILE 5.388 MOBILE-SATELLITE (space-to-Earth) 5.351A 5.389A 5.389F	
2 200-2 290	SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392	
2 290-2 300	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	
2 300-2 450 FIXED MOBILE 5.384A Amateur Radiolocation 5.150 5.282 5.395	2 300-2 450 FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394	
2 450-2 483.5 FIXED MOBILE Radiolocation 5.150	2 450-2 483.5 FIXED MOBILE RADIOLOCATION 5.150	
2 483.5-2 500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIODETERMINATION- SATELLITE (space-to-Earth) 5.398 Radiolocation 5.398A 5.150 5.368 5.372A 5.399 5.401 5.402	2 483.5-2 500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION- SATELLITE (space-to-Earth) 5.398 5.150 5.368 5.372A 5.402	2 483.5-2 500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION- SATELLITE (space-to-Earth) 5.398 5.150 5.368 5.372A 5.401 5.402
2 500-2 520 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A 5.412	2 500-2 520 FIXED 5.410 FIXED-SATELLITE (space-to- Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A	2 500-2 520 FIXED 5.410 FIXED-SATELLITE (space-to- Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A MOBILE-SATELLITE (space-to- Earth) 5.351A 5.407 5.414 5.414A 5.404

5.393 *Additional allocation:* in Canada, the United States and India, the frequency band 2 310-2 360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-19), with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. Complementary terrestrial sound broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use. (WRC-19)

5.394 In the United States, the use of the frequency band 2 360-2 395 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the frequency band 2 360-2 400 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. (WRC-23)

5.395 In France and Türkiye, the use of the band 2 310-2 360 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service. (WRC-23)

5.396 (SUP - WRC-19)

5.397 (SUP - WRC-12)

5.398 In respect of the radiodetermination-satellite service in the band 2 483.5-2 500 MHz, the provisions of No. 4.10 do not apply.

5.398A *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Ukraine, the band 2 483.5-2 500 MHz is allocated on a primary basis to the radiolocation service. The radiolocation stations in these countries shall not cause harmful interference to, or claim protection from, stations of the fixed, mobile and mobile-satellite services operating in accordance with the Radio Regulations in the frequency band 2 483.5-2 500 MHz. (WRC-12)

5.399 Except for cases referred to in No. 5.401, stations of the radiodetermination-satellite service operating in the frequency band 2 483.5-2 500 MHz for which notification information is received by the Bureau after 17 February 2012, and the service area of which includes Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Ukraine, shall not cause harmful interference to, and shall not claim protection from stations of the radiolocation service operating in these countries in accordance with No. 5.398A. (WRC-12)

5.400 (SUP - WRC-12)

5.401 In Angola, Australia, Bangladesh, China, Eritrea, Eswatini, Ethiopia, India, Lebanon, Liberia, Libya, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, Dem. Rep. of the Congo, Sudan, Togo and Zambia, the frequency band 2 483.5-2 500 MHz was already allocated on a primary basis to the radiodetermination-satellite service before WRC-12, subject to agreement obtained under No. 9.21 from countries not listed in this provision. Systems in the radiodetermination-satellite service for which complete coordination information has been received by the Radiocommunication Bureau before 18 February 2012 will retain their regulatory status, as of the date of receipt of the coordination request information. (WRC-19)

5.402 The use of the band 2 483.5-2 500 MHz by the mobile-satellite and the radiodetermination-satellite services is subject to the coordination under No. 9.11A. Administrations are urged to take all practicable steps to prevent harmful interference to the radio astronomy service from emissions in the 2 483.5-2 500 MHz band, especially those caused by second-harmonic radiation that would fall into the 4 990-5 000 MHz band allocated to the radio astronomy service worldwide.

5.403 Subject to agreement obtained under No. 9.21, the band 2 520-2 535 MHz may also be used for the mobile-satellite (space-to-Earth), except aeronautical mobile-satellite, service for operation limited to within national boundaries. The provisions of No. 9.11A apply. (WRC-07)

5.404 *Additional allocation:* in India and Iran (Islamic Republic of), the band 2 500-2 516.5 MHz may also be used for the radiodetermination-satellite service (space-to-Earth) for operation limited to within national boundaries, subject to agreement obtained under No. 9.21.

5.405 (SUP - WRC-12)

5.406 Not used.

5.407 In the band 2 500-2 520 MHz, the power flux-density at the surface of the Earth from space stations operating in the mobile-satellite (space-to-Earth) service shall not exceed $-152 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz})}$ in Argentina, unless otherwise agreed by the administrations concerned.

5.408 (SUP - WRC-2000)

5.409 (SUP - WRC-07)

5.409A The frequency band 2 500-2 690 MHz in Regions 1 and 2, and the frequency band 2 500-2 655 MHz in Region 3 are identified for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **218** (WRC-23) shall apply. HIBS shall not claim protection from existing primary services. No. **5.43A** does not apply. Such use of HIBS in the frequency bands 2 500-2 510 MHz in Regions 1 and 2, and 2 500-2 535 MHz in Region 3 is limited to reception by HIBS. (WRC-23)

5.410 The band 2 500-2 690 MHz may be used for tropospheric scatter systems in Region 1, subject to agreement obtained under No. **9.21**. No. **9.21** does not apply to tropospheric scatter links situated entirely outside Region 1. Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in this band. When planning new tropospheric scatter radio-relay links in this band, all possible measures shall be taken to avoid directing the antennas of these links towards the geostationary-satellite orbit. (WRC-12)

5.411 (SUP - WRC-07)

5.412 *Alternative allocation:* in Kyrgyzstan and Turkmenistan, the band 2 500-2 690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-12)

5.413 In the design of systems in the broadcasting-satellite service in the bands between 2 520 MHz and 2 670 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690-2 700 MHz. (WRC-23)

5.414 The allocation of the frequency band 2 500-2 520 MHz to the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**. (WRC-07)

5.414A In Japan and India, the use of the bands 2 500-2 520 MHz and 2 520-2 535 MHz, under No. **5.403**, by a satellite network in the mobile-satellite service (space-to-Earth) is limited to operation within national boundaries and subject to the application of No. **9.11A**. The following pfd values shall be used as a threshold for coordination under No. **9.11A**, for all conditions and for all methods of modulation, in an area of 1 000 km around the territory of the administration notifying the mobile-satellite service network:

$$-136 \text{ dB(W/(m}^2 \cdot \text{MHz})) \quad \text{for } 0^\circ \leq \theta \leq 5^\circ$$

$$-136 + 0.55 (\theta - 5) \text{ dB(W/(m}^2 \cdot \text{MHz})) \quad \text{for } 5^\circ < \theta \leq 25^\circ$$

$$-125 \text{ dB(W/(m}^2 \cdot \text{MHz})) \quad \text{for } 25^\circ < \theta \leq 90^\circ$$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. Outside this area Table **21-4** of Article **21** shall apply. Furthermore, the coordination thresholds in Table 5-2 of Annex 1 to Appendix 5 of the Radio Regulations (Edition of 2004), in conjunction with the applicable provisions of Articles **9** and **11** associated with No. **9.11A**, shall apply to systems for which complete notification information has been received by the Radiocommunication Bureau by 14 November 2007 and that have been brought into use by that date. (WRC-07)

5.415 The use of the bands 2 500-2 690 MHz in Region 2 and 2 500-2 535 MHz and 2 655-2 690 MHz in Region 3 by the fixed-satellite service is limited to national and regional systems, subject to agreement obtained under No. **9.21**, giving particular attention to the broadcasting-satellite service in Region 1. (WRC-07)

5.415A *Additional allocation:* in India and Japan, subject to agreement obtained under No. **9.21**, the band 2 520-2 535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries. (WRC-23)

2 520-2 700 MHz

Allocation to services		
Region 1	Region 2	Region 3
2 520-2 655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.412 5.418B 5.418C	2 520-2 655 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418B 5.418C	2 520-2 535 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.414A 5.415A 2 535-2 655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C
2 655-2 670 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	2 655-2 670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.409A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B	2 655-2 670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.420
2 670-2 690 FIXED 5.410 MOBILE except aeronautical mobile 5.384A 5.409A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412	2 670-2 690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A 5.409A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	2 670-2 690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149
2 690-2 700	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.422	

5.416 The use of the band 2 520-2 670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. 9.21. The provisions of No. 9.19 shall be applied by administrations in this band in their bilateral and multilateral negotiations. (WRC-07)

5.417 (SUP - WRC-2000)

5.417A (SUP - WRC-15)

5.417B (SUP - WRC-15)

5.417C (SUP - WRC-15)

5.417D (SUP - WRC-15)

5.418 *Additional allocation:* in India, the frequency band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution 528 (Rev.WRC-19). The provisions of No. 5.416 and Table 21-4 of Article 21 do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution 539 (Rev.WRC-19). Geostationary broadcasting-satellite service (sound) systems for which complete Appendix 4 coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the frequency band 2 630-2 655 MHz, and for which complete Appendix 4 coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

$$\begin{aligned} -130 \text{ dB(W/(m}^2 \cdot \text{MHz})) & \quad \text{for } 0^\circ \leq \theta \leq 5^\circ \\ -130 + 0.4(0 - 5) \text{ dB(W/(m}^2 \cdot \text{MHz})) & \quad \text{for } 5^\circ < \theta \leq 25^\circ \\ -122 \text{ dB(W/(m}^2 \cdot \text{MHz})) & \quad \text{for } 25^\circ < \theta \leq 90^\circ \end{aligned}$$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of $-122 \text{ dB(W/(m}^2 \cdot \text{MHz}))$ shall be used as a threshold for coordination under No. 9.11 in an area of 1 500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 5.416 for systems for which complete Appendix 4 coordination information has been received after 1 June 2005. (WRC-19)

5.418A In certain Region 3 countries listed in No. 5.418, use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12A, in respect of geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received after 2 June 2000, and No. 22.2 does not apply. No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, is considered to have been received before 3 June 2000. (WRC-03)

5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418, for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. 9.12. (WRC-03)

5.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix 4 coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 5.418 and No. 22.2 does not apply. (WRC-03)

5.419 The use of the frequency band 2 670-2 690 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-23)

5.420 The band 2 655-2 670 MHz may also be used for the mobile-satellite (Earth-to-space), except aeronautical mobile-satellite, service for operation limited to within national boundaries, subject to agreement obtained under No. **9.21**. The coordination under No. **9.11A** applies. (WRC-07)

5.420A (SUP - WRC-07)

5.421 (SUP - WRC-03)

5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Mongolia, Montenegro, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and Yemen, the band 2 690-2 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-12)

2 700-3 600 MHz

Allocation to services		
Region 1	Region 2	Region 3
2 700-2 900	AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424	
2 900-3 100	RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427	
3 100-3 300	RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428	
3 300-3 400 RADIOLOCATION 5.149 5.429 5.429A 5.429B 5.430	3 300-3 400 MOBILE except aeronautical mobile 5.429G RADIOLOCATION Amateur Fixed 5.149 5.429C 5.429D	3 300-3 400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F
3 400-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A Radiolocation 5.431	3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433 5.282	3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433 5.282 5.432A
	3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B Radiolocation 5.433	3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433

5.423 In the band 2 700-2 900 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service.

5.424 *Additional allocation:* in Canada, the band 2 850-2 900 MHz is also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars.

5.424A In the band 2 900-3 100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service. (WRC-03)

5.425 In the band 2 900-3 100 MHz, the use of the shipborne interrogator-transponder (SIT) system shall be confined to the sub-band 2 930-2 950 MHz.

5.426 The use of the band 2 900-3 100 MHz by the aeronautical radionavigation service is limited to ground-based radars.

5.427 In the bands 2 900-3 100 MHz and 9 300-9 500 MHz, the response from radar transponders shall not be capable of being confused with the response from radar beacons (racons) and shall not cause interference to ship or aeronautical radars in the radionavigation service, having regard, however, to No. 4.9.

5.428 *Additional allocation:* in Kyrgyzstan and Turkmenistan, the frequency band 3 100-3 300 MHz is also allocated to the radionavigation service on a primary basis. (WRC-19)

5.429 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Benin, Brunei Darussalam, Cambodia, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lao P.D.R., Lebanon, Libya, Malaysia, Mongolia, Myanmar, New Zealand, Oman, Uganda, Pakistan, Palestine*, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Thailand, Viet Nam and Yemen, the frequency band 3 300-3 400 MHz is also allocated to the fixed and mobile services on a primary basis. Mongolia, New Zealand and the countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service. (WRC-23)

5.429A *Additional allocation:* in Angola, Botswana, Burkina Faso, Burundi, Cabo Verde, Central African Republic, Comoros, Djibouti, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, Lesotho, Liberia, Madagascar, Malawi, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Palestine*, the Dem. Rep. of the Congo, Rwanda, Sao Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, South Africa, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3 300-3 400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3 300-3 400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-23)

5.429B In the following countries of Region 1: Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Comoros, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritius, Mauritania, Mongolia, Mozambique, Namibia, Niger, Nigeria, Uganda, the Dem. Rep. of the Congo, Rwanda, Sao Tome and Príncipe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, South Sudan, South Africa, Tanzania, Chad, Togo, Zambia and Zimbabwe, the frequency band 3 300-3 400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). The use of this frequency band shall be in accordance with Resolution 223 (Rev.WRC-23). The use of the frequency band 3 300-3 400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-23)

5.429C *Different category of service:* in Argentina, Brazil, Cuba, the Dominican Republic, Guatemala, Mexico, Paraguay and Uruguay, the frequency band 3 300-3 400 MHz is allocated to the fixed service on a primary basis. Stations in the fixed service operating in the frequency band 3 300-3 400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-23)

5.429D In Region 2, the use of the mobile, except aeronautical mobile, service in the frequency band 3 300-3 400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC-23). The use of the frequency band 3 300-3 400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service, and administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to protect operations within the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-23)

5.429E *Additional allocation:* in Papua New Guinea, the frequency band 3 300-3 400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3 300-3 400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-15)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.429F In the following countries in Region 3: Cambodia, India, Indonesia, Lao P.D.R., Pakistan, the Philippines, Singapore and Viet Nam, the use of the frequency band 3 300-3 400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution 223 (Rev.WRC-23). The use of the frequency band 3 300-3 400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service. Before an administration brings into use a base or mobile station of an IMT system in this frequency band, it shall seek agreement under No. 9.21 with neighbouring countries to protect the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-23)

5.429G Stations in the mobile, except aeronautical mobile, service operating in the frequency band 3 300-3 400 MHz in Region 2 shall not cause harmful interference to, or claim protection from, systems operating in the radiolocation service. (WRC-23)

5.430 *Additional allocation:* in Kyrgyzstan and Turkmenistan, the frequency band 3 300-3 400 MHz is also allocated to the radionavigation service on a primary basis. (WRC-19)

5.430A The allocation of the frequency band 3 400-3 600 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. 9.21. This frequency band is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The provisions of Nos. 9.17 and 9.18 shall also apply in the coordination phase. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band, it shall ensure that the power flux-density (pfд) produced at 3 m above ground does not exceed $-154.5 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz}))$ for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfд limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) and with the assistance of the Bureau if so requested. In case of disagreement, calculation and verification of the pfд shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 400-3 600 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

5.431 *Additional allocation:* in Germany, the frequency band 3 400-3 475 MHz is also allocated to the amateur service on a secondary basis. (WRC-19)

5.431A In Region 2, the allocation of the frequency band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service on a primary basis is subject to agreement obtained under No. 9.21. (WRC-15)

5.431B In Region 2, the frequency band 3 400-3 600 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a base or mobile station of an IMT system, it shall seek agreement under No. 9.21 with other administrations and ensure that the power flux-density (pfд) produced at 3 m above ground does not exceed $-154.5 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz}))$ for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfд limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfд shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service, including IMT systems, in the frequency band 3 400-3 600 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-15)

5.432 *Different category of service:* in Korea (Rep. of), Japan, Pakistan and the Dem. People's Rep. of Korea, the allocation of the frequency band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 5.33). (WRC-19)

5.432A In Korea (Rep. of), Japan, Pakistan and the Dem. People's Rep. of Korea, the frequency band 3 400-3 500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz})$) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-19)

5.432B *Different category of service:* in Australia, Bangladesh, Brunei Darussalam, China, French overseas communities of Region 3, India, Indonesia, Iran (Islamic Republic of), Malaysia, New Zealand, the Philippines, Singapore and Thailand, the frequency band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. 9.21 with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz})$) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-19)

5.433 In Regions 2 and 3, in the band 3 400-3 600 MHz the radiolocation service is allocated on a primary basis. However, all administrations operating radiolocation systems in this band are urged to cease operations by 1985. Thereafter, administrations shall take all practicable steps to protect the fixed-satellite service and coordination requirements shall not be imposed on the fixed-satellite service.

5.433A In Australia, Bangladesh, Brunei Darussalam, China, French overseas communities of Region 3, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, New Zealand, Pakistan, the Philippines, the Dem. People's Rep. of Korea and Singapore, the frequency band 3 500-3 600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz})$) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 500-3 600 MHz shall not claim more protection from space stations than that provided in Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-23)

3 600-4 800 MHz

Allocation to services		
Region 1	Region 2	Region 3
3 600-3 800 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433B 5.434A 5.434B 5.435A	3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435
3 800-4 200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3 700-4 200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.435B	
4 200-4 400	AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440	
4 400-4 500	FIXED MOBILE 5.440A	
4 500-4 800	FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A	

5.433B In Angola, Botswana, Guinea, Lesotho, Malawi and South Sudan, the frequency band 3 600-3 700 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of the frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The conditions of No. **5.434A** shall apply. (WRC-23)

5.434 In Region 2, the frequency band 3 600-3 700 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to ensure the protection of the fixed-satellite service (space-to-Earth). (WRC-23)

5.434A The use of the frequency band 3 600-3 800 MHz by the mobile, except aeronautical mobile, service on a primary basis in Region 1 is subject to agreement obtained under No. **9.21** if the power flux-density (pfd) limit below is exceeded. The provisions of Nos. **9.17** and **9.18** shall also apply in the coordination phase. Before an administration in Region 1 brings into use a station in the mobile service in the frequency band 3 600-3 800 MHz, for the protection of stations in the fixed and fixed-satellite services, it shall ensure that the pfd produced at 3 m above ground does not exceed $-154.5 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz})}$ for more than 20% of the time at the border of the territory of any other administration. Stations in the mobile service operating in the frequency band 3 600-3 800 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations. (WRC-23)

5.434B In Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, Benin, Burkina Faso, Burundi, Cameroon, Central African Rep., Comoros, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Eswatini, Gabon, Gambia, Ghana, Guinea, Iraq, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Liberia, Libya, Madagascar, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Uzbekistan, Palestine*, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, South Africa, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, the frequency band 3 600-3 800 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of the frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The conditions of No. **5.434A** shall apply. (WRC-23)

5.435 In Japan, in the band 3 620-3 700 MHz, the radiolocation service is excluded.

5.435A *Different category of service:* In Angola, Botswana, Guinea, Lesotho, Malawi and South Sudan, the frequency band 3 700-3 800 MHz is allocated to the mobile service on a secondary basis. (WRC-23)

5.435B In the Bahamas, Belize, Brazil, Canada, Colombia, Costa Rica, United States, Guatemala, the French overseas departments and communities in Region 2, Greenland, the overseas countries and territories within the Kingdom of the Netherlands in Region 2, Paraguay, Peru, Trinidad and Tobago and Uruguay, the frequency band 3 700-3 800 MHz is identified for use by any of these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Administrations wishing to implement IMT shall obtain the agreement of neighbouring countries to ensure the protection of the fixed-satellite service (space-to-Earth). (WRC-23)

5.436 Use of the frequency band 4 200-4 400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **424** (Rev.WRC-23). (WRC-23)

5.437 Passive sensing in the Earth exploration-satellite and space research services may be authorized in the frequency band 4 200-4 400 MHz on a secondary basis. (WRC-15)

5.438 Use of the frequency band 4 200-4 400 MHz by the aeronautical radiolocation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. (WRC-15)

5.439 *Additional allocation:* in Iran (Islamic Republic of), the band 4 200-4 400 MHz is also allocated to the fixed service on a secondary basis. (WRC-12)

5.440 The standard frequency and time signal-satellite service may be authorized to use the frequency 4 202 MHz for space-to-Earth transmissions and the frequency 6 427 MHz for Earth-to-space transmissions. Such transmissions shall be confined within the limits of ± 2 MHz of these frequencies, subject to agreement obtained under No. **9.21**.

5.440A In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), and in Australia, the band 4 400-4 940 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. **1.83**). Such use shall be in accordance with Resolution **416** (WRC-07) and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this band by other mobile service applications or by other services to which this band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.441 The use of the bands 4 500-4 800 MHz (space-to-Earth), 6 725-7 025 MHz (Earth-to-space) by the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

4 800-5 250 MHz

Allocation to services		
Region 1	Region 2	Region 3
4 800-4 990	FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy 5.443 5.149 5.339	
4 990-5 000	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149	
5 000-5 010	AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space)	
5 010-5 030	AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B	
5 030-5 091	AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIONAVIGATION 5.444	
5 091-5 150	FIXED-SATELLITE (Earth-to-space) 5.444A AERONAUTICAL MOBILE 5.444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION 5.444	
5 150-5 250	FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446 5.446C 5.446D 5.447 5.447B 5.447C	

5.441A In Brazil, Paraguay and Uruguay, the frequency band 4 800-4 900 MHz, or portions thereof, is identified for the implementation of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained with neighbouring countries, and IMT stations shall not claim protection from stations of other applications of the mobile service. Such use shall be in accordance with Resolution 223 (Rev.WRC-19)*. (WRC-19)

* Note by the Secretariat: This Resolution was revised by WRC-23.

5.441B In Angola, Argentina, Armenia, Azerbaijan, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Chile, China, Colombia, Congo (Rep. of the), Côte d'Ivoire, Djibouti, Eswatini, Russian Federation, Gabon, Ghana, Guinea, Iran (Islamic Republic of), Iraq, Kazakhstan, Lao P.D.R., Lesotho, Liberia, Madagascar, Malawi, Mali, Mongolia, Namibia, Niger, Uganda, Uzbekistan, the Dem. Rep. of the Congo, Kyrgyzstan, the Dem. People's Rep. of Korea, South Sudan, South Africa, Chad, Togo, Viet Nam, Zambia and Zimbabwe, the frequency band 4 800-4 990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. 9.21 with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density (pfd) produced by this station does not exceed $-155 \text{ dB(W/m}^2 \cdot 1 \text{ MHz})$ produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. Resolution 223 (Rev.WRC-23) applies. (WRC-23)

5.442 In the frequency bands 4 825-4 835 MHz and 4 950-4 990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), and in Australia, the frequency band 4 825-4 835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution 416 (WRC-07) and shall not cause harmful interference to the fixed service. (WRC-15)

5.443 *Different category of service:* in Argentina, Australia and Canada, the allocation of the bands 4 825-4 835 MHz and 4 950-4 990 MHz to the radio astronomy service is on a primary basis (see No. 5.33).

5.443A (SUP - WRC-03)

5.443AA In the frequency bands 5 000-5 030 MHz and 5 091-5 150 MHz, the aeronautical mobile-satellite (R) service is subject to agreement obtained under No. 9.21. The use of these bands by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC-12)

5.443B In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the frequency band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the frequency band 5 010-5 030 MHz shall not exceed $-124.5 \text{ dB(W/m}^2)$ in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the frequency band 4 990-5 000 MHz, radionavigation-satellite service systems operating in the frequency band 5 010-5 030 MHz shall comply with the limits in the frequency band 4 990-5 000 MHz defined in Resolution 741 (Rev.WRC-15). (WRC-15)

5.443C The use of the frequency band 5 030-5 091 MHz by the aeronautical mobile (R) service is limited to internationally standardized aeronautical systems. Unwanted emissions from the aeronautical mobile (R) service in the frequency band 5 030-5 091 MHz shall be limited to protect RNSS system downlinks in the adjacent 5 010-5 030 MHz band. Until such time that an appropriate value is established in a relevant ITU-R Recommendation, the e.i.r.p. density limit of -75 dBW/MHz in the frequency band 5 010-5 030 MHz for any AM(R)S station unwanted emission should be used. (WRC-12)

5.443D In the frequency band 5 030-5 091 MHz, the aeronautical mobile-satellite (R) service is subject to coordination under No. 9.11A. The use of this frequency band by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC-12)

5.444 The frequency band 5 030-5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5 030-5 091 MHz, the requirements of this system shall have priority over other uses of this frequency band. For the use of the frequency band 5 091-5 150 MHz, No. 5.444A and Resolution 114 (Rev.WRC-15) apply. (WRC-15)

5.444A The use of the allocation to the fixed-satellite service (Earth-to-space) in the frequency band 5 091-5 150 MHz is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. 9.11A. The use of the frequency band 5 091-5 150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be subject to application of Resolution 114 (Rev.WRC-15). Moreover, to ensure that the aeronautical radionavigation service is protected from harmful interference, coordination is required for feeder-link earth stations of the non-geostationary satellite systems in the mobile-satellite service which are separated by less than 450 km from the territory of an administration operating ground stations in the aeronautical radionavigation service. (WRC-15)

5.444B The use of the frequency band 5 091-5 150 MHz by the aeronautical mobile service is limited to:

- systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution **748 (Rev.WRC-19)**;
- aeronautical telemetry transmissions from aircraft stations (see No. **1.83**) in accordance with Resolution **418 (Rev.WRC-19)**. (WRC-19)

5.445 Not used.

5.446 *Additional allocation:* in the countries listed in No. **5.369**, the frequency band 5 150-5 216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**. In Region 2 (except in Mexico), the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in No. **5.369** and Bangladesh, the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the frequency bands 1 610-1 626.5 MHz and/or 2 483.5-2 500 MHz. The total power flux-density at the Earth's surface shall in no case exceed $-159 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for all angles of arrival. (WRC-15)

5.446A The use of the frequency bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution **229 (Rev.WRC-23)**. (WRC-23)

5.446B In the band 5 150-5 250 MHz, stations in the mobile service shall not claim protection from earth stations in the fixed-satellite service. No. **5.43A** does not apply to the mobile service with respect to fixed-satellite service earth stations. (WRC-03)

5.446C *Additional allocation:* in Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Iraq, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan, South Sudan and Tunisia), the frequency band 5 150-5 250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations (see No. **1.83**), in accordance with Resolution **418 (Rev.WRC-19)**. These stations shall not claim protection from other stations operating in accordance with Article 5. No. **5.43A** does not apply. (WRC-19)

5.446D *Additional allocation:* in Brazil, the band 5 150-5 250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations (see No. **1.83**), in accordance with Resolution **418 (Rev.WRC-19)**. (WRC-19)

5.447 *Additional allocation:* in Côte d'Ivoire, Egypt, Lebanon, the Syrian Arab Republic and Tunisia, the frequency band 5 150-5 250 MHz is also allocated to the mobile service, on a primary basis, subject to agreement obtained under No. **9.21**. In this case, the provisions of Resolution **229 (Rev.WRC-23)** do not apply. (WRC-23)

5.447A The allocation to the fixed-satellite service (Earth-to-space) in the band 5 150-5 250 MHz is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**.

5.447B *Additional allocation:* the band 5 150-5 216 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. This allocation is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to provisions of No. **9.11A**. The power flux-density at the Earth's surface produced by space stations of the fixed-satellite service operating in the space-to-Earth direction in the band 5 150-5 216 MHz shall in no case exceed $-164 \text{ dB(W/m}^2\text{)}$ in any 4 kHz band for all angles of arrival.

5.447C Administrations responsible for fixed-satellite service networks in the band 5 150-5 250 MHz operated under Nos. **5.447A** and **5.447B** shall coordinate on an equal basis in accordance with No. **9.11A** with administrations responsible for non-geostationary-satellite networks operated under No. **5.446** and brought into use prior to 17 November 1995. Satellite networks operated under No. **5.446** brought into use after 17 November 1995 shall not claim protection from, and shall not cause harmful interference to, stations of the fixed-satellite service operated under Nos. **5.447A** and **5.447B**.

5 250-5 570 MHz

Allocation to services		
Region 1	Region 2	Region 3
5 250-5 255	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.447E 5.448 5.448A	
5 255-5 350	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.447E 5.448 5.448A	
5 350-5 460	EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C	
5 460-5 470	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448B	
5 470-5 570	EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) 5.448B 5.450 5.451	

5.447D The allocation of the band 5 250-5 255 MHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis. (WRC-97)

5.447E *Additional allocation:* The frequency band 5 250-5 350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this frequency band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613-0. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. **5.43A** do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations. (WRC-15)

5.447F In the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). The radiolocation service, the Earth exploration-satellite service (active) and the space research service (active) shall not impose more stringent conditions upon the mobile service than those stipulated in Resolution **229 (Rev.WRC-23)**. (WRC-23)

5.448 *Additional allocation:* in Kyrgyzstan, Romania and Turkmenistan, the frequency band 5 250-5 350 MHz is also allocated to the radionavigation service on a primary basis. (WRC-19)

5.448A The Earth exploration-satellite (active) and space research (active) services in the frequency band 5 250-5 350 MHz shall not claim protection from the radiolocation service. No. **5.43A** does not apply. (WRC-03)

5.448B The Earth exploration-satellite service (active) operating in the band 5 350-5 570 MHz and space research service (active) operating in the band 5 460-5 570 MHz shall not cause harmful interference to the aeronautical radionavigation service in the band 5 350-5 460 MHz, the radionavigation service in the band 5 460-5 470 MHz and the maritime radionavigation service in the band 5 470-5 570 MHz. (WRC-03)

5.448C The space research service (active) operating in the band 5 350-5 460 MHz shall not cause harmful interference to nor claim protection from other services to which this band is allocated. (WRC-03)

5.448D In the frequency band 5 350-5 470 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the aeronautical radionavigation service operating in accordance with No. **5.449**. (WRC-03)

5.449 The use of the band 5 350-5 470 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.

5.450 *Additional allocation:* in Austria, Azerbaijan, Iran (Islamic Republic of), Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5 470-5 650 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-12)

5.450A In the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. The radiodetermination services shall not impose more stringent conditions upon the mobile service than those stipulated in Resolution 229 (Rev.WRC-23). (WRC-23)

5.450B In the frequency band 5 470-5 650 MHz, stations in the radiolocation service, except ground-based radars used for meteorological purposes in the band 5 600-5 650 MHz, shall not cause harmful interference to, nor claim protection from, radar systems in the maritime radionavigation service. (WRC-03)

5.451 *Additional allocation:* in the United Kingdom, the band 5 470-5 850 MHz is also allocated to the land mobile service on a secondary basis. The power limits specified in Nos. **21.2**, **21.3**, **21.4** and **21.5** shall apply in the band 5 725-5 850 MHz.

5 570-6 700 MHz

Allocation to services		
Region 1	Region 2	Region 3
5 570-5 650	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.450 5.451 5.452	
5 650-5 725	MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.454 5.282 5.451 5.453 5.455	
5 725-5 830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455	5 725-5 830 RADIOLOCATION Amateur 5.150 5.453 5.455	
5 830-5 850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455	5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455	
5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150
5 925-6 700	FIXED 5.457 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.457D 5.457E 5.457F 5.149 5.440 5.458	

5.452 Between 5 600 MHz and 5 650 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the maritime radionavigation service.

5.453 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Madagascar, Malaysia, Niger, Nigeria, Oman, Uganda, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sri Lanka, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the frequency band 5 650-5 850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of Resolution 229 (**Rev.WRC-23**) do not apply. In addition, in Afghanistan, Angola, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Dem. Rep. of the Congo, Fiji, Ghana, Kiribati, Lesotho, Malawi, Maldives, Mauritius, Micronesia, Mongolia, Mozambique, Myanmar, Namibia, Nauru, New Zealand, Papua New Guinea, Rwanda, Solomon Islands, South Sudan, South Africa, Tonga, Vanuatu, Zambia and Zimbabwe, the frequency band 5 725-5 850 MHz is allocated to the fixed service on a primary basis, and stations operating in the fixed service shall not cause harmful interference to and shall not claim protection from other primary services in the frequency band. (**WRC-23**)

5.454 *Different category of service:* in Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5 670-5 725 MHz to the space research service is on a primary basis (see No. **5.33**). (**WRC-12**)

5.455 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Uzbekistan, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 5 670-5 850 MHz is also allocated to the fixed service on a primary basis. (**WRC-19**)

5.456 (**SUP - WRC-15**)

5.457 In Australia, Burkina Faso, Côte d'Ivoire, Mali and Nigeria, the allocation to the fixed service in the bands 6 440-6 520 MHz (HAPS-to-ground direction) and 6 560-6 640 MHz (ground-to-HAPS direction) may also be used by gateway links for high-altitude platform stations (HAPS) within the territory of these countries. Such use is limited to operation in HAPS gateway links and shall not cause harmful interference to, and shall not claim protection from, existing services, and shall be in compliance with Resolution 150 (**WRC-12**). Existing services shall not be constrained in future development by HAPS gateway links. The use of HAPS gateway links in these bands requires explicit agreement with other administrations whose territories are located within 1 000 kilometres from the border of an administration intending to use the HAPS gateway links. (**WRC-12**)

5.457A In the frequency bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution 902 (**Rev.WRC-23**). In the frequency band 5 925-6 425 MHz, earth stations located on board vessels and communicating with space stations of the fixed-satellite service may employ transmit antennas with minimum diameter of 1.2 m and operate without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognized by the coastal State. All other provisions of Resolution 902 (**Rev.WRC-23**) shall apply. (**WRC-23**)

5.457B In the frequency bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may operate with the characteristics and under the conditions contained in Resolution 902 (**Rev.WRC-23**) in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Jordan, Kuwait, Libya, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, in the maritime mobile-satellite service on a secondary basis. Such use shall be in accordance with Resolution 902 (**Rev.WRC-23**). (**WRC-23**)

5.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), the frequency band 5 925-6 700 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. **1.83**). Such use shall be in accordance with Resolution 416 (**WRC-07**) and shall not cause harmful interference to, or claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this frequency band by other mobile service applications or by other services to which this frequency band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (**WRC-15**)

5.457D In Cambodia, Lao P.D.R. and the Maldives, the frequency band 6 425-7 025 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution 220 (**WRC-23**) applies. (**WRC-23**)

5.457E The frequency bands 6 425-7 125 MHz in Region 1 and 7 025-7 125 MHz in Region 3 are identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **220** (WRC-23) applies.

The frequency bands are also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). (WRC-23)

5.457F In Brazil and Mexico, the frequency band 6 425-7 125 MHz is identified for the terrestrial component of International Mobile Telecommunications (IMT). The use of this frequency band for the implementation of IMT is subject to seeking agreement under No. **9.21** with neighbouring countries. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **220** (WRC-23) applies.

The frequency band is also used for the implementation of wireless access systems (WAS), including radio local area networks (RLANs). (WRC-23)

5.458 In the band 6 425-7 075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7 075-7 250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6 425-7 075 MHz and 7 075-7 250 MHz.

6 700-7 250 MHz

Allocation to services		
Region 1	Region 2	Region 3
6 700-7 075	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) MOBILE 5.457D 5.457E 5.457F 5.458 5.458A 5.458B	5.441
7 075-7 145	FIXED MOBILE 5.457E 5.457F 5.458 5.459	
7 145-7 190	FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459	
7 190-7 235	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458 5.459	
7 235-7 250	EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE 5.458	

5.458A In making assignments in the band 6 700-7 075 MHz to space stations of the fixed-satellite service, administrations are urged to take all practicable steps to protect spectral line observations of the radio astronomy service in the band 6 650-6 675.2 MHz from harmful interference from unwanted emissions.

5.458B The space-to-Earth allocation to the fixed-satellite service in the band 6 700-7 075 MHz is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service and is subject to coordination under No. **9.11A**. The use of the band 6 700-7 075 MHz (space-to-Earth) by feeder links for non-geostationary satellite systems in the mobile-satellite service is not subject to No. **22.2**.

5.458C (SUP - WRC-15)

5.459 *Additional allocation:* in the Russian Federation, the frequency bands 7 100-7 155 MHz and 7 190-7 235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. In the frequency band 7 190-7 235 MHz, with respect to the Earth exploration-satellite service (Earth-to-space), No. **9.21** does not apply. (WRC-15)

5.460 No emissions from space research service (Earth-to-space) systems intended for deep space shall be effected in the frequency band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. **5.43A** does not apply. (WRC-15)

5.460A The use of the frequency band 7 190-7 250 MHz (Earth-to-space) by the Earth exploration-satellite service shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 250 MHz shall not claim protection from existing and future stations in the fixed and mobile services, and No. **5.43A** does not apply. No. **9.17** applies. Additionally, to ensure protection of the existing and future deployment of fixed and mobile services, the location of earth stations supporting spacecraft in the Earth exploration-satellite service in non-geostationary orbits or geostationary orbit shall maintain a separation distance of at least 10 km and 50 km, respectively, from the respective border(s) of neighbouring countries, unless a shorter distance is otherwise agreed between the corresponding administrations. (WRC-15)

5.460B Space stations on the geostationary orbit operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the space research service, and No. **5.43A** does not apply. (WRC-15)

7 250-8 500 MHz

Allocation to services		
Region 1	Region 2	Region 3
7 250-7 300	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461	
7 300-7 375	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461	
7 375-7 450	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
7 450-7 550	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A 5.461AC	
7 550-7 750	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461AC	
7 750-7 900	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	
7 900-8 025	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	
8 025-8 175	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
8 175-8 215	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
8 215-8 400	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	
8 400-8 500	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465 5.466	

5.461 *Additional allocation:* the frequency bands 7 250-7 375 MHz (space-to-Earth) and 7 900-8 025 MHz (Earth-to-space) are also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. 9.21, with the exception that No. 9.21 shall not apply to the geostationary-satellite networks in the mobile-satellite service for which complete coordination information is received by the Bureau as of 1 January 2025 with respect to non-geostationary-satellite systems for which complete coordination or notification information, according to the case, is received by the Bureau as of 1 January 2025. Non-geostationary-satellite systems for which complete coordination or notification information, according to the case, is received by the Bureau as of 1 January 2025 shall not cause unacceptable interference to and shall not claim protection from geostationary-satellite networks in the mobile-satellite service operating in accordance with these Regulations. No. 5.43A does not apply. (WRC-23)

5.461A The use of the band 7 450-7 550 MHz by the meteorological-satellite service (space-to-Earth) is limited to geostationary-satellite systems. (WRC-23)

5.461AA The use of the frequency band 7 375-7 750 MHz by the maritime mobile-satellite service is limited to geostationary-satellite networks. (WRC-15)

5.461AB In the frequency band 7 375-7 750 MHz, earth stations in the maritime mobile-satellite service shall not claim protection from, nor constrain the use and development of, stations in the fixed and mobile, except aeronautical mobile, services. No. 5.43A does not apply. (WRC-15)

5.461AC In the frequency band 7 375-7 750 MHz, non-geostationary-satellite systems operating in the fixed-satellite service for which complete coordination or notification information, according to the case, is received by the Bureau as of 1 January 2025 shall not cause unacceptable interference to and shall not claim protection from geostationary-satellite networks in the maritime mobile-satellite service operating in accordance with these Regulations. No. 5.43A does not apply. (WRC-23)

5.461B The use of the band 7 750-7 900 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-12)

5.462 (SUP - WRC-97)

5.462A In Regions 1 and 3 (except for Japan), in the band 8 025-8 400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following values for angles of arrival (θ), without the consent of the affected administration:

–135 dB(W/m²) in a 1 MHz band for 0 ≤ θ < 5°

–135 + 0.5 (θ – 5) dB(W/m²) in a 1 MHz band for 5 ≤ θ < 25°

–125 dB(W/m²) in a 1 MHz band for 25 ≤ θ ≤ 90° (WRC-12)

5.463 Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)

5.464 (SUP - WRC-97)

5.465 In the space research service, the use of the band 8 400-8 450 MHz is limited to deep space.

5.466 *Different category of service:* in Singapore and Sri Lanka, the allocation of the band 8 400-8 500 MHz to the space research service is on a secondary basis (see No. 5.32). (WRC-12)

8 500-10 000 MHz

Allocation to services		
Region 1	Region 2	Region 3
8 500-8 550	RADIOLOCATION 5.468 5.469	
8 550-8 650	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469 5.469A	
8 650-8 750	RADIOLOCATION 5.468 5.469	
8 750-8 850	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471	
8 850-9 000	RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473	
9 000-9 200	RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 5.471 5.473A	
9 200-9 300	EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473 5.474 5.474D	
9 300-9 500	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION 5.475 SPACE RESEARCH (active) 5.427 5.474 5.475A 5.475B 5.476A	
9 500-9 800	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A	
9 800-9 900	RADIOLOCATION Earth exploration-satellite (active) Fixed 5.477 Space research (active) 5.478 5.478A 5.478B	
9 900-10 000	EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.477 5.474D 5.478 5.479	

5.467 (SUP - WRC-03)

5.468 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, Chad, Togo, Tunisia and Yemen, the frequency band 8 500-8 750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-19)

5.469 *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Uzbekistan, Poland, Kyrgyzstan, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the frequency band 8 500-8 750 MHz is also allocated to the land mobile and radionavigation services on a primary basis. (WRC-23)

5.469A In the band 8 550-8 650 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, or constrain the use and development of, stations of the radiolocation service. (WRC-97)

5.470 The use of the band 8 750-8 850 MHz by the aeronautical radionavigation service is limited to airborne Doppler navigation aids on a centre frequency of 8 800 MHz.

5.471 *Additional allocation:* in Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), Libya, the Netherlands, Qatar and Sudan, the frequency bands 8 825-8 850 MHz and 9 000-9 200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC-15)

5.472 In the bands 8 850-9 000 MHz and 9 200-9 225 MHz, the maritime radionavigation service is limited to shore-based radars.

5.473 *Additional allocation:* in Armenia, Austria, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the frequency bands 8 850-9 000 MHz and 9 200-9 300 MHz are also allocated to the radionavigation service on a primary basis. (WRC-19)

5.473A In the band 9 000-9 200 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, systems identified in No. 5.337 operating in the aeronautical radionavigation service, or radar systems in the maritime radionavigation service operating in this band on a primary basis in the countries listed in No. 5.471. (WRC-07)

5.474 In the band 9 200-9 500 MHz, search and rescue transponders (SART) may be used, having due regard to the appropriate ITU-R Recommendation (see also Article 31).

5.474A The use of the frequency bands 9 200-9 300 MHz and 9 900-10 400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9 300-9 900 MHz. Such use is subject to agreement to be obtained under No. 9.21 from Algeria, Saudi Arabia, Bahrain, Egypt, Indonesia, Iran (Islamic Republic of), Lebanon and Tunisia. An administration that has not replied under No. 9.52 is considered as not having agreed to the coordination request. In this case, the notifying administration of the satellite system operating in the Earth exploration-satellite service (active) may request the assistance of the Bureau under Sub-Section IID of Article 9. (WRC-15)

5.474B Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2066-0. (WRC-15)

5.474C Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2065-0. (WRC-15)

5.474D Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9 200-9 300 MHz, the radionavigation and radiolocation services in the frequency band 9 900-10 000 MHz and the radiolocation service in the frequency band 10.0-10.4 GHz. (WRC-15)

5.475 The use of the band 9 300-9 500 MHz by the aeronautical radionavigation service is limited to airborne weather radars and ground-based radars. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9 300-9 320 MHz on condition that harmful interference is not caused to the maritime radionavigation service. (WRC-07)

5.475A The use of the band 9 300-9 500 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 300 MHz that cannot be fully accommodated within the 9 500-9 800 MHz band. (WRC-07)

5.475B In the band 9 300-9 500 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the radionavigation service in conformity with the Radio Regulations. Ground-based radars used for meteorological purposes have priority over other radiolocation uses. (WRC-07)

5.476 (SUP - WRC-07)

5.476A In the band 9 300-9 800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC-07)

5.477 *Different category of service:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Trinidad and Tobago, and Yemen, the allocation of the frequency band 9 800-10 000 MHz to the fixed service is on a primary basis (see No. 5.33). (WRC-15)

5.478 *Additional allocation:* in Azerbaijan, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the frequency band 9 800-10 000 MHz is also allocated to the radionavigation service on a primary basis. (WRC-19)

5.478A The use of the band 9 800-9 900 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 500 MHz that cannot be fully accommodated within the 9 300-9 800 MHz band. (WRC-07)

5.478B In the band 9 800-9 900 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from stations of the fixed service to which this band is allocated on a secondary basis. (WRC-07)

5.479 The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.

10-10.7 GHz

Allocation to services		
Region 1	Region 2	Region 3
10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479	10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Amateur 5.474D 5.479 5.480 5.480A	10-10.4 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479
10.4-10.45 FIXED MOBILE RADIOLOCATION Amateur	10.4-10.45 RADIOLOCATION Amateur 5.480 5.480A	10.4-10.45 FIXED MOBILE RADIOLOCATION Amateur
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481	10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.480A 5.481	10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481
10.5-10.55 FIXED MOBILE Radiolocation	10.5-10.55 FIXED MOBILE RADIOLOCATION	
10.55-10.6	FIXED MOBILE except aeronautical mobile Radiolocation	
10.6-10.68	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A	
10.68-10.7	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483	

5.480 *Additional allocation:* in Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Jamaica, Mexico, Paraguay, the overseas countries and territories within the Kingdom of the Netherlands in Region 2, Peru, Suriname and Uruguay, the frequency band 10-10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Venezuela, the frequency band 10-10.45 GHz is also allocated to the fixed service on a primary basis. (WRC-23)

5.480A In the following countries in Region 2: Brazil, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, Guatemala, Jamaica, Mexico, Paraguay, Peru and Uruguay, the frequency band 10-10.5 GHz is identified for the implementation of the terrestrial component of International Mobile Telecommunications (IMT). The implementation of this identification in Mexico is subject to seeking agreement with the United States under No. 9.21. The use of the frequency band 10-10.5 GHz by IMT stations in the mobile service shall not claim protection from systems in the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution 219 (WRC-23) applies. (WRC-23)

5.481 *Additional allocation:* in Algeria, Germany, Angola, Brazil, China, Colombia, Costa Rica, Côte d'Ivoire, Cuba, Djibouti, the Dominican Republic, Egypt, El Salvador, Ecuador, Spain, Guatemala, Hungary, Jamaica, Japan, Kenya, Morocco, Mexico, Nigeria, Oman, Uzbekistan, Pakistan, Palestine*, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania, Somalia, Suriname, Tunisia and Uruguay, the frequency band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-23)

5.482 In the band 10.6-10.68 GHz, the power delivered to the antenna of stations of the fixed and mobile, except aeronautical mobile, services shall not exceed -3 dBW. This limit may be exceeded, subject to agreement obtained under No. 9.21. However, in Algeria, Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Egypt, United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Moldova, Nigeria, Oman, Uzbekistan, Pakistan, Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Singapore, Tajikistan, Tunisia, Turkmenistan and Viet Nam, this restriction on the fixed and mobile, except aeronautical mobile, services is not applicable. (WRC-07)

5.482A For sharing of the band 10.6-10.68 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile, except aeronautical mobile, services, Resolution 751 (WRC-07) applies. (WRC-07)

5.483 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, China, Colombia, Korea (Rep. of), Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Tajikistan, Turkmenistan and Yemen, the frequency band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-19)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

10.7-11.7 GHz

Allocation to services		
Region 1	Region 2	Region 3
10.7-10.95 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-10.95 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	
10.95-11.2 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.95-11.2 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	
11.2-11.45 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 (Earth-to-space) 5.484 MOBILE except aeronautical mobile	11.2-11.45 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	
11.45-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space) 5.484 MOBILE except aeronautical mobile	11.45-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	

5.484 In Region 1, the use of the band 10.7-11.7 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.

5.484A The use of the frequency bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 13.75-14.5 GHz (Earth-to-space), 17.3-17.7 GHz (space-to-Earth) in Region 2, 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. In Region 2, No. 22.2 shall continue to apply in the frequency band 17.3-17.7 GHz. (WRC-23)

5.484B Resolution 155 (WRC-15)^{*} shall apply. (WRC-15)

* Note by the Secretariat: This Resolution was revised by WRC-19.

11.7-13.4 GHz

Allocation to services		
Region 1	Region 2	Region 3
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 Mobile except aeronautical mobile 5.485	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492
5.487 5.487A	12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 5.485 5.489	5.487 5.487A
	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile BROADCASTING 5.487
12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B (Earth-to-space)	5.487A 5.488 5.490	12.5-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile
5.494 5.495 5.496	12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Space research (deep space) (space-to-Earth)	BROADCASTING-SATELLITE 5.493
12.75-13.25	FIXED FIXED-SATELLITE (Earth-to-space) 5.441 5.496A MOBILE Space research (deep space) (space-to-Earth)	
13.25-13.4	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499	

5.485 In Region 2, in the band 11.7-12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.

5.486 *Different category of service:* in the United States, the allocation of the frequency band 11.7-12.1 GHz to the fixed service is on a secondary basis (see No. **5.32**). (WRC-15)

5.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in Appendix **30**. (WRC-03)

5.487A *Additional allocation:* in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-03)

5.488 The use of the band 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to application of the provisions of No. 9.14 for coordination with stations of terrestrial services in Regions 1, 2 and 3. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix 30. (WRC-03)

5.489 *Additional allocation:* in Peru, the band 12.1-12.2 GHz is also allocated to the fixed service on a primary basis.

5.490 In Region 2, in the band 12.2-12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the broadcasting-satellite Plan for Region 2 contained in Appendix 30.

5.491 (SUP - WRC-03)

5.492 Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix 30 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate. (WRC-2000)

5.493 The broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3 is limited to a power flux-density not exceeding $-111 \text{ dB(W/(m}^2 \cdot 27 \text{ MHz})}$ for all conditions and for all methods of modulation at the edge of the service area. (WRC-97)

5.494 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Madagascar, Mali, Morocco, Mongolia, Nigeria, Oman, Palestine*, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-23)

5.495 *Additional allocation:* in Greece, Monaco, Montenegro, Uganda and Tunisia, the frequency band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-19)

5.496 *Additional allocation:* in Austria, Azerbaijan, Kyrgyzstan and Turkmenistan, the band 12.5-12.75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service on a primary basis. However, stations in these services shall not cause harmful interference to fixed-satellite service earth stations of countries in Region 1 other than those listed in this footnote. Coordination of these earth stations is not required with stations of the fixed and mobile services of the countries listed in this footnote. The power flux-density limit at the Earth's surface given in Table 21-4 of Article 21, for the fixed-satellite service shall apply on the territory of the countries listed in this footnote. (WRC-2000)

5.496A The frequency band 12.75-13.25 GHz (Earth-to-space) may be used by earth stations in motion, limited to earth stations on aircraft and vessels, communicating with geostationary space stations in the fixed-satellite service. Resolution 121 (WRC-23) shall apply. (WRC-23)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference, and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.497 The use of the band 13.25-13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.

5.498 (SUP - WRC-97)

5.498A The Earth exploration-satellite (active) and space research (active) services operating in the band 13.25-13.4 GHz shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service. (WRC-97)

5.499 *Additional allocation:* in Bangladesh and India, the band 13.25-14 GHz is also allocated to the fixed service on a primary basis. In Pakistan, the band 13.25-13.75 GHz is allocated to the fixed service on a primary basis. (WRC-12)

13.4-14 GHz

Allocation to services		
Region 1	Region 2	Region 3
13.4-13.65 EARTH EXPLORATION-SATELLITE (active) FIXED-SATELLITE (space-to-Earth) 5.499A 5.499B RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499E 5.500 5.501 5.501B	13.4-13.65 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B	
13.65-13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B	
13.75-14	FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503	

5.499A The use of the frequency band 13.4-13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement obtained under No. 9.21 with respect to satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015. (WRC-15)

5.499B Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite service (Earth-to-space) allocated on a secondary basis in the frequency band 13.4-13.65 GHz due to the primary allocation to FSS (space-to-Earth). (WRC-15)

5.499C The allocation of the frequency band 13.4-13.65 GHz to the space research service on a primary basis is limited to:

- satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015,
- active spaceborne sensors,
- satellite systems operating in the space research service (space-to-Earth) to relay data from space stations in the geostationary-satellite orbit to associated earth stations.

Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

5.499D In the frequency band 13.4-13.65 GHz, satellite systems in the space research service (space-to-Earth) and/or the space research service (space-to-space) shall not cause harmful interference to, nor claim protection from, stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. (WRC-15)

5.499E In the frequency band 13.4-13.65 GHz, geostationary-satellite networks in the fixed-satellite service (space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations, and No. **5.43A** does not apply. The provisions of No. **22.2** do not apply to the Earth exploration-satellite service (active) with respect to the fixed-satellite service (space-to-Earth) in this frequency band. (WRC-15)

5.500 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Djibouti, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Morocco, Mauritania, Niger, Nigeria, Oman, Qatar, the Syrian Arab Republic, Singapore, Somalia, Sudan, South Sudan, Chad and Tunisia, the frequency band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis. In Pakistan, the frequency band 13.4-13.75 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-23)

5.501 *Additional allocation:* in Hungary, Japan, Kyrgyzstan, Romania and Turkmenistan, the frequency band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis. (WRC-23)

5.501A The allocation of the frequency band 13.65-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

5.501B In the band 13.4-13.75 GHz, the Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service. (WRC-97)

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

- $-115 \text{ dB(W/(m}^2 \cdot 10 \text{ MHz})$) for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;
- $-115 \text{ dB(W/(m}^2 \cdot 10 \text{ MHz})$) for more than 1% of the time produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. (WRC-03)

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

- in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:
 - i) $4.7D + 28 \text{ dB}(W/40 \text{ kHz})$, where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;
 - ii) $49.2 + 20 \log(D/4.5) \text{ dB}(W/40 \text{ kHz})$, where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;
 - iii) 66.2 dB(W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;
 - iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;
- the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in **non**-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions. (WRC-03)

5.503A (SUP - WRC-03)

14-14.5 GHz

Allocation to services		
Region 1	Region 2	Region 3
14-14.25	FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research 5.504A 5.505	
14.25-14.3	FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research 5.504A 5.505 5.508	
14.3-14.4	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A
14.4-14.47	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A	
14.47-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A	

5.504 The use of the band 14-14.3 GHz by the radionavigation service shall be such as to provide sufficient protection to space stations of the fixed-satellite service.

5.504A In the band 14-14.5 GHz, aircraft earth stations in the secondary aeronautical mobile-satellite service may also communicate with space stations in the fixed-satellite service. The provisions of Nos. **5.29**, **5.30** and **5.31** apply. (WRC-03)

5.504B Aircraft earth stations operating in the aeronautical mobile-satellite service in the frequency band 14-14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643-0, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz frequency band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC-15)

5.504C In the frequency band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-15)

5.505 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Viet Nam and Yemen, the frequency band 14-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-19)

5.506 The band 14-14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service. Such use of feeder links is reserved for countries outside Europe.

5.506A In the frequency band 14-14.5 GHz, ship earth stations with an equivalent isotropically radiated power (e.i.r.p.) greater than 21 dBW shall operate under the same conditions as earth stations located on board vessels, as provided in Resolution **902 (Rev.WRC-23)**. This footnote shall not apply to ship earth stations for which the complete Appendix 4 information has been received by the Bureau prior to 5 July 2003. (WRC-23)

5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14-14.5 GHz without the need for prior agreement from Cyprus and Malta, within the minimum distance given in Resolution **902 (Rev.WRC-23)** from these countries. (WRC-23)

5.507 Not used.

5.508 *Additional allocation:* in Germany, Italy, Libya, North Macedonia and the United Kingdom, the frequency band 14.25-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-23)

5.508A In the frequency band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, China, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-23)

5.509 (SUP - WRC-07)

5.509A In the frequency band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-23)

14.5-15.4 GHz

Allocation to services		
Region 1	Region 2	Region 3
14.5-14.75	FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G	
14.75-14.8	FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research 5.509G	14.75-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G
14.8-15.35	FIXED MOBILE SPACE RESEARCH 5.510A 5.339	
15.35-15.4	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511	

5.509B The use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)** by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service is limited to geostationary-satellites. (WRC-15)

5.509C For the use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)** by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service, the fixed-satellite service earth stations shall have a minimum antenna diameter of 6 m and a maximum power spectral density of -44.5 dBW/Hz at the input of the antenna. The earth stations shall be notified at known locations on land. (WRC-15)

5.509D Before an administration brings into use an earth station in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz (in countries listed in Resolution **163 (WRC-15)**) and 14.5-14.8 GHz (in countries listed in Resolution **164 (WRC-15)**), it shall ensure that the power flux-density produced by this earth station does not exceed -151.5 dB(W/(m² · 4 kHz)) produced at all altitudes from 0 m to 19 000 m above sea level at 22 km seaward from all coasts, defined as the low-water mark, as officially recognized by each coastal State. (WRC-15)

5.509E In the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)**, the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. **9.17** does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU-R Recommendations. (WRC-23)

5.509F In the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)**, earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services. (WRC-23)

5.509G The frequency band 14.5-14.8 GHz is also allocated to the space research service on a primary basis. However, such use is limited to the satellite systems operating in the space research service (Earth-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations. Stations in the space research service shall not cause harmful interference to, or claim protection from, stations in the fixed and mobile services and in the fixed-satellite service limited to feeder links for the broadcasting-satellite service and associated space operations functions using the guardbands under Appendix **30A** and feeder links for the broadcasting-satellite service in Region 2. Other uses of this frequency band by the space research service are on a secondary basis. (WRC-15)

5.510 Except for use in accordance with Resolution **163 (WRC-15)** and Resolution **164 (WRC-15)**, the use of the frequency band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe. Uses other than feeder links for the broadcasting-satellite service are not authorized in Regions 1 and 2 in the frequency band 14.75-14.8 GHz. (WRC-15)

5.510A The allocation of the frequency band 14.8-15.35 GHz to the space research service on a primary basis is limited to satellite systems operating in the space-to-space, space-to-Earth and Earth-to-space directions at distances from the Earth of less than 2×10^6 km in accordance with Resolution **678 (WRC-23)**. Other uses of the frequency band by the space research service are on a secondary basis. The use of the frequency band 14.8-15.35 GHz by the space research service (space-to-Earth) (Earth-to-space) is on a secondary basis with respect to the terrestrial services in Algeria, Saudi Arabia, Bahrain, Korea (Rep. of), Egypt, the United Arab Emirates, the United States, India, Iraq, Japan, Kuwait, Libya, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen. (WRC-23)

5.511 *Additional allocation:* in Saudi Arabia, Bahrain, Cameroon, Djibouti, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, Kuwait, Lebanon, Oman, Pakistan, Qatar, the Syrian Arab Republic and Somalia, the frequency band 15.35-15.4 GHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-23)

15.4-17.3 GHz

Allocation to services		
Region 1	Region 2	Region 3
15.4-15.41	RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	
15.41-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION Aeronautical mobile (OR) 5.511G	15.41-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	15.41-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511H
15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION Aeronautical mobile (OR) 5.511G 5.511C	15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C	15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C 5.511H
15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION Aeronautical mobile (OR) 5.511G	15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511H
15.7-16.6	RADIOLOCATION 5.512 5.513	
16.6-17.1	RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512 5.513	
17.1-17.2	RADIOLOCATION 5.512 5.513	
17.2-17.3	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.512 5.513 5.513A	

5.511A Use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **9.11A**. (WRC-15)

5.511B (SUP - WRC-97)

5.511C Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340-0. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. **4.10** applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340-0. (WRC-15)

5.511D (SUP - WRC-15)

5.511E In the frequency band 15.4-15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the aeronautical radionavigation service. (WRC-12)

5.511F In order to protect the radio astronomy service in the frequency band 15.35-15.4 GHz, radiolocation stations operating in the frequency band 15.4-15.7 GHz shall not exceed the power flux-density level of $-156 \text{ dB(W/m}^2\text{)}$ in a 50 MHz bandwidth in the frequency band 15.35-15.4 GHz, at any radio astronomy observatory site for more than 2 per cent of the time. (WRC-12)

5.511G Stations in the aeronautical mobile (OR) service operating in the frequency band 15.41-15.7 GHz shall not cause harmful interference to the radio astronomy service operating in the frequency band 15.35-15.4 GHz. The aggregate power flux-density (pfd) received from stations in the aeronautical mobile (OR) service operating in the frequency band 15.41-15.7 GHz at any radio astronomy station operating in the frequency band 15.35-15.4 GHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, unless specifically agreed by the affected administration(s). (WRC-23)

5.511H *Additional allocation:* in Indonesia, the frequency band 15.41-15.7 GHz is also allocated to the aeronautical mobile (OR) service on a secondary basis. Stations in the aeronautical mobile (OR) service operating in the frequency band 15.41-15.7 GHz shall not cause harmful interference to the radio astronomy service operating in the frequency band 15.35-15.4 GHz. The aggregate power flux-density (pfd) received from stations in the aeronautical mobile (OR) service operating in the frequency band 15.41-15.7 GHz at any radio astronomy station operating in the frequency band 15.35-15.4 GHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, unless specifically agreed by the affected administration(s). (WRC-23)

5.512 *Additional allocation:* in Algeria, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Montenegro, Nepal, Nicaragua, Niger, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.513 *Additional allocation:* in Israel, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. These services shall not claim protection from or cause harmful interference to services operating in accordance with the Table in countries other than those included in No. **5.512**.

5.513A Spaceborne active sensors operating in the band 17.2-17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis. (WRC-97)

17.3-18.4 GHz

Allocation to services		
Region 1	Region 2	Region 3
17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.516A 5.516B Radiolocation 5.514	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 (space-to-Earth) 5.484A 5.515A 5.515B 5.517 BROADCASTING-SATELLITE Radiolocation 5.514 5.515	17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation 5.514
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A 5.517B (Earth-to-space) 5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 5.517A 5.517B (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A 5.517B (Earth-to-space) 5.516 MOBILE
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A 5.517B (Earth-to-space) 5.516 MOBILE 5.519	
18.1-18.4	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A 5.517B (Earth-to-space) 5.520 INTER-SATELLITE 5.521A MOBILE 5.519 5.521	

5.514 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Cameroon, Djibouti, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kuwait, Libya, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Somalia, Sudan and South Sudan, the frequency band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. **21.3** and **21.5** shall apply. (WRC-23)

5.515 In the band 17.3-17.8 GHz, sharing between the fixed-satellite service (Earth-to-space) and the broadcasting-satellite service shall also be in accordance with the provisions of § 1 of Annex 4 of Appendix **30A**.

5.515A In addition to the need to comply with the coordination criteria in Annex 4 to Appendix **30A**, under assumed free-space propagation conditions, the power flux-density of an assignment in the fixed-satellite service (space to-Earth) of a geostationary-satellite network in the frequency band 17.3-17.7 GHz in Region 2 shall not exceed the value of $-98 \text{ dB(W/(m}^2 \cdot 27 \text{ MHz})$ at points in the geostationary-satellite orbit with geocentric orbital separation angles between 152.6° and 162.6° . (WRC-23)

5.515B In the frequency band 17.3-17.7 GHz, the use of the fixed-satellite service (space-to-Earth) by geostationary-satellite space stations in Region 2 shall not cause harmful interference to space station receivers nor claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix 30A in all three Regions, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link. The notifying administration for the fixed-satellite service (space-to-Earth), when submitting Appendix 4 information elements, shall provide a firm, objective, actionable, measurable and enforceable commitment that, in the event of harmful interference being reported to space station receivers in Appendix 30A, it shall take immediate action to eliminate the interference or reduce it to an acceptable level. (WRC-23)

5.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see Article 11. The use of the bands 17.3-18.1 GHz (Earth-to-space) in Regions 1 and 3 and 17.8-18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems in the fixed-satellite service is subject to application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 5.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.516A In the band 17.3-17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 1 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under Appendix 30A, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link. (WRC-03)

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service:

- | | |
|-----------------|-------------------------------------|
| 17.3-17.7 GHz | (space-to-Earth) in Region 1, |
| 18.3-19.3 GHz | (space-to-Earth) in Region 2, |
| 19.7-20.2 GHz | (space-to-Earth) in all Regions, |
| 39.5-40 GHz | (space-to-Earth) in Region 1, |
| 40-40.5 GHz | (space-to-Earth) in all Regions, |
| 40.5-42 GHz | (space-to-Earth) in Region 2, |
| 47.5-47.9 GHz | (space-to-Earth) in Region 1, |
| 48.2-48.54 GHz | (space-to-Earth) in Region 1, |
| 49.44-50.2 GHz | (space-to-Earth) in Region 1, |
| and | |
| 27.5-27.82 GHz | (Earth-to-space) in Region 1, |
| 28.35-28.45 GHz | (Earth-to-space) in Region 2, |
| 28.45-28.94 GHz | (Earth-to-space) in all Regions, |
| 28.94-29.1 GHz | (Earth-to-space) in Region 2 and 3, |
| 29.25-29.46 GHz | (Earth-to-space) in Region 2, |
| 29.46-30 GHz | (Earth-to-space) in all Regions, |
| 48.2-50.2 GHz | (Earth-to-space) in Region 2. |

This identification does not preclude the use of these frequency bands by other fixed-satellite service applications or by other services to which these frequency bands are allocated on a co-primary basis and does not establish priority in these Radio Regulations among users of the frequency bands. Administrations should take this into account when considering regulatory provisions in relation to these frequency bands. See Resolution 143 (Rev.WRC-19). (WRC-19)

5.517 In Region 2, use of the fixed-satellite (space-to-Earth) service in the frequency band 17.3-17.8 GHz shall not cause harmful interference to nor claim protection from assignments in the broadcasting-satellite service operating in conformity with the Radio Regulations. (WRC-23)

5.517A The operation of earth stations in motion communicating with geostationary fixed-satellite service space stations within the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) shall be subject to the application of Resolution **169 (Rev.WRC-23)**. (WRC-23)

5.517B The operation of aeronautical and maritime earth stations in motion communicating with non-geostationary space stations in the fixed-satellite service in the frequency bands 17.7-18.6 GHz, 18.8-19.3 GHz and 19.7-20.2 GHz (space-to-Earth) and 27.5-29.1 GHz and 29.5-30 GHz (Earth-to-space) shall be subject to the application of Resolution **123 (WRC-23)**. (WRC-23)

5.518 (SUP - WRC-07)

5.519 *Additional allocation:* the bands 18-18.3 GHz in Region 2 and 18.1-18.4 GHz in Regions 1 and 3 are also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Their use is limited to geostationary satellites. (WRC-07)

5.520 The use of the band 18.1-18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of geostationary-satellite systems in the broadcasting-satellite service. (WRC-2000)

5.521 *Alternative allocation:* in the United Arab Emirates, the frequency band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. **5.33**). The provisions of No. **5.519** also apply. (WRC-23)

5.521A For use of the frequency bands 18.1-18.6 GHz, 18.8-20.2 GHz and 27.5-30 GHz, or parts thereof, by space stations in the inter-satellite service, Resolution **679 (WRC-23)** shall apply. Such use is limited to space research, space operation and/or Earth exploration-satellite applications, and also transmissions of data originating from industrial and medical activities in space. When using these frequencies, administrations shall ensure that this inter-satellite service is used only for the aforementioned purposes and is not subject to coordination under No. **9.11A**. For use of the frequency bands 18.1-18.6 GHz, 18.8-20.2 GHz, 27.5-29.1 GHz and 29.5-30 GHz by space stations, the allocation is limited to inter-satellite links between non-geostationary satellites or between non-geostationary satellites and geostationary satellites. For use of the frequency band 29.1-29.5 GHz by space stations, the allocation is limited to inter-satellite links between non-geostationary satellites and geostationary satellites. No. **4.10** does not apply. (WRC-23)

18.4-22 GHz

Allocation to services		
Region 1	Region 2	Region 3
18.4-18.6 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A 5.517B INTER-SATELLITE 5.521A MOBILE	
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive)	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive)
18.8-19.3	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.517B 5.523A INTER-SATELLITE 5.521A MOBILE	
19.3-19.7	FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.517A 5.523B 5.523C 5.523D 5.523E INTER-SATELLITE 5.521A 5.523DA MOBILE	
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.517B 5.527A INTER-SATELLITE 5.521A Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.517B 5.527A INTER-SATELLITE 5.521A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.517B 5.527A INTER-SATELLITE 5.521A Mobile-satellite (space-to-Earth) 5.524
20.1-20.2	FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.517B 5.527A INTER-SATELLITE 5.521A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528	
20.2-21.2	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524 5.529A	
21.2-21.4	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)	
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B	21.4-22 FIXED 5.530E MOBILE 5.530A	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B 5.531

5.522 (SUP - WRC-2000)

5.522A The emissions of the fixed service and the fixed-satellite service in the band 18.6-18.8 GHz are limited to the values given in Nos. **21.5A** and **21.16.2**, respectively. (WRC-2000)

5.522B The use of the band 18.6-18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20 000 km. (WRC-2000)

5.522C In the band 18.6-18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC-2000 are not subject to the limits of No. **21.5A**. (WRC-2000)

5.523 (SUP - WRC-2000)

5.523A The use of the bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. **9.11A** and No. **22.2** does not apply. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix 4 notification information is considered as having been received by the Bureau prior to 18 November 1995. (WRC-23)

5.523B The use of the band 19.3-19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **9.11A**, and No. **22.2** does not apply.

5.523C No. **22.2** shall continue to apply in the bands 19.3-19.6 GHz and 29.1-29.4 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix 4 coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

5.523D The use of the band 19.3-19.7 GHz (space-to-Earth) by geostationary fixed-satellite service systems and by feeder links for non-geostationary-satellite systems in the mobile-satellite service is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of No. **22.2**. The use of this band for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. **5.523C** and **5.523E**, is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles 9 (except No. **9.11A**) and 11 procedures, and to the provisions of No. **22.2**. (WRC-97)

5.523DA In order to protect feeder links of non-geostationary networks in the mobile-satellite service in the frequency band 19.3-19.7 GHz, the power flux-density values produced at the surface of the Earth for all angles of arrival by a space station in the inter-satellite service operating in this band in accordance with Resolution **679** (WRC-23) shall not exceed $-140 \text{ dB(W/m}^2\text{)}$ in any 1 MHz within 150 km of any of the above feeder-link earth stations recorded in the Master International Frequency Register. (WRC-23)

5.523E No. **22.2** shall continue to apply in the bands 19.6-19.7 GHz and 29.4-29.5 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix 4 coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997. (WRC-97)

5.524 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Djibouti, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, Palestine*, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Tunisia, the frequency band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the frequency band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the frequency band 19.7-20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter frequency band. (WRC-23)

5.525 In order to facilitate interregional coordination between networks in the mobile-satellite and fixed-satellite services, carriers in the mobile-satellite service that are most susceptible to interference shall, to the extent practicable, be located in the higher parts of the bands 19.7-20.2 GHz and 29.5-30 GHz.

5.526 In the bands 19.7-20.2 GHz and 29.5-30 GHz in Region 2, and in the bands 20.1-20.2 GHz and 29.9-30 GHz in Regions 1 and 3, networks which are both in the fixed-satellite service and in the mobile-satellite service may include links between earth stations at specified or unspecified points or while in motion, through one or more satellites for point-to-point and point-to-multipoint communications.

5.527 In the bands 19.7-20.2 GHz and 29.5-30 GHz, the provisions of No. **4.10** do not apply with respect to the mobile-satellite service.

5.527A The operation of earth stations in motion communicating with the FSS is subject to Resolution **156** (Rev.WRC-23). (WRC-23)

5.528 The allocation to the mobile-satellite service is intended for use by networks which use narrow spot-beam antennas and other advanced technology at the space stations. Administrations operating systems in the mobile-satellite service in the band 19.7-20.1 GHz in Region 2 and in the band 20.1-20.2 GHz shall take all practicable steps to ensure the continued availability of these bands for administrations operating fixed and mobile systems in accordance with the provisions of No. **5.524**.

5.529 The use of the bands 19.7-20.1 GHz and 29.5-29.9 GHz by the mobile-satellite service in Region 2 is limited to satellite networks which are both in the fixed-satellite service and in the mobile-satellite service as described in No. **5.526**.

5.529A In the frequency bands 20.2-21.2 GHz and 30-31 GHz, non-geostationary-satellite systems for which complete coordination or notification information, according to the case, is received by the Bureau as of 1 January 2025 shall not cause unacceptable interference to and shall not claim protection from geostationary-satellite networks in the mobile-satellite service operating in accordance with these Regulations. No. **5.43A** does not apply. (WRC-23)

5.530 (SUP - WRC-12)

5.530A Unless otherwise agreed between the administrations concerned, any station in the fixed or mobile services of an administration shall not produce a power flux-density in excess of $-120.4 \text{ dB(W/(m}^2 \cdot \text{MHz})$ at 3 m above the ground of any point of the territory of any other administration in Regions 1 and 3 for more than 20% of the time. In conducting the calculations, administrations should use the most recent version of Recommendation ITU-R P.452 (see also the most recent version of Recommendation ITU-R BO.1898). (WRC-15)

5.530B In the band 21.4-22 GHz, in order to facilitate the development of the broadcasting-satellite service, administrations in Regions 1 and 3 are encouraged not to deploy stations in the mobile service and are encouraged to limit the deployment of stations in the fixed service to point-to-point links. (WRC-12)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

5.530C (SUP - WRC-15)

5.530D (SUP - WRC-19)

5.530E The allocation to the fixed service in the frequency band 21.4-22 GHz is identified for use in Region 2 by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which it is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation by HAPS is limited to the HAPS-to-ground direction, and shall be in accordance with the provisions of Resolution 165 (Rev.WRC-23). (WRC-23)

5.531 *Additional allocation:* in Japan, the band 21.4-22 GHz is also allocated to the broadcasting service on a primary basis.

22-24.45 GHz

Allocation to services		
Region 1	Region 2	Region 3
22-22.2 FIXED MOBILE except aeronautical mobile (R) 5.531A 5.531B 5.531C 5.531D 5.531F 5.149	22-22.2 FIXED MOBILE except aeronautical mobile 5.149	22-22.2 FIXED MOBILE except aeronautical mobile 5.531E 5.149
22.2-22.21	FIXED MOBILE except aeronautical mobile 5.149	
22.21-22.5	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532	
22.5-22.55	FIXED MOBILE	
22.55-23.15	FIXED INTER-SATELLITE 5.338A MOBILE SPACE RESEARCH (Earth-to-space) 5.532A 5.149	
23.15-23.55	FIXED INTER-SATELLITE 5.338A MOBILE	
23.55-23.6	FIXED MOBILE	
23.6-24	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
24-24.05	AMATEUR AMATEUR-SATELLITE 5.150	
24.05-24.25	RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150	
24.25-24.45 FIXED MOBILE except aeronautical mobile 5.338A 5.532AB	24.25-24.45 FIXED 5.532AA MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION	24.25-24.45 FIXED MOBILE 5.338A 5.532AB RADIONAVIGATION

5.531A The use of the aeronautical mobile (OR) service in the frequency band 22-22.2 GHz is limited to non-safety applications. (WRC-23)

5.531B Aircraft stations in the aeronautical mobile (OR) service operating in the frequency band 22-22.2 GHz are subject to agreement obtained under No. 9.21 with respect to the fixed service and shall not cause harmful interference to, nor claim protection from, the fixed service. The following power flux-density values shall be used as a threshold for coordination under No. 9.21:

-110 dB(W/(m ² · MHz))	for	$0^\circ \leq \theta \leq 12.6^\circ$
2.86 θ – 146 dB(W/(m ² · MHz))	for	$12.6^\circ < \theta \leq 15^\circ$
0.87 θ – 116 dB(W/(m ² · MHz))	for	$15^\circ < \theta \leq 30^\circ$
0.067 θ – 92 dB(W/(m ² · MHz))	for	$30^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees.

This criterion should be applied at the border of the territory of another administration for any aircraft station located at an altitude of up to 15 km above the ground. In conducting the calculations, the most recent version of Recommendation ITU-R P.525 should be used. (WRC-23)

5.531C Stations in the aeronautical mobile (OR) service operating in the frequency band 22-22.2 GHz shall not cause harmful interference to the radio astronomy service operating in the frequency band 22.21-22.5 GHz. The aggregate power flux-density (pfld) received from these stations at any radio astronomy station operating in the frequency band 22.21-22.5 GHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, unless specifically agreed by the affected administration(s). (WRC-23)

5.531D The use of the aeronautical mobile (OR) service in the frequency band 22-22.2 GHz outside national boundaries shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations. (WRC-23)

5.531E *Alternative allocation:* in Brunei Darussalam, Iran (Islamic Republic of), Malaysia, Singapore and Thailand, the frequency band 22-22.2 GHz is allocated to the mobile, except aeronautical mobile (R), service on a primary basis. The use of the service is limited to non-safety applications within national boundaries. The use of the aeronautical mobile (OR) service in the frequency band 22-22.2 GHz shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations. Furthermore, stations in the aeronautical mobile (OR) service operating in the frequency band 22-22.2 GHz shall not cause harmful interference to the radio astronomy service operating in the frequency band 22.21-22.5 GHz in other countries in accordance with the Table of Frequency Allocations. The aggregate power flux-density (pfld) received from these stations at any radio astronomy station operating in the frequency band 22.21-22.5 GHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, unless specifically agreed by the affected administration(s). In order to protect stations of the Earth exploration-satellite service (passive) operating in the frequency band 22.21-22.5 GHz, the unwanted equivalent isotropically radiated power (e.i.r.p.) of stations operating in the aeronautical mobile (OR) service shall not exceed -23 dBW in any 100 MHz band in the frequency band 22.21-22.5 GHz.

Aircraft stations in the aeronautical mobile (OR) service operating in the frequency band 22-22.2 GHz are subject to agreement obtained under No. 9.21 with respect to the fixed service and shall not cause harmful interference to, nor claim protection from, the fixed service. The following pfd values shall be used as a threshold for coordination under No. 9.21:

-110 dB(W/(m ² · MHz))	for	$0^\circ \leq \theta \leq 12.6^\circ$
2.86 θ – 146 dB(W/(m ² · MHz))	for	$12.6^\circ < \theta \leq 15^\circ$
0.87 θ – 116 dB(W/(m ² · MHz))	for	$15^\circ < \theta \leq 30^\circ$
0.067 θ – 92 dB(W/(m ² · MHz))	for	$30^\circ < \theta \leq 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees.

This criterion should be applied at the border of the territory of another administration for any aircraft station located at an altitude of up to 15 km above the ground. In conducting the calculations, the most recent version of Recommendation ITU-R P.525 should be used. (WRC-23)

5.531F In order to protect stations of the Earth exploration-satellite service (passive) operating in the frequency band 22.21-22.5 GHz, the unwanted equivalent isotropically radiated power (e.i.r.p.) of stations operating in the aeronautical mobile (OR) service shall not exceed -23 dBW in any 100 MHz band in the frequency band 22.21-22.5 GHz. (WRC-23)

5.532 The use of the band 22.21-22.5 GHz by the Earth exploration-satellite (passive) and space research (passive) services shall not impose constraints upon the fixed and mobile, except aeronautical mobile, services.

5.532A The location of earth stations in the space research service shall maintain a separation distance of at least 54 km from the respective border(s) of neighbouring countries to protect the existing and future deployment of fixed and mobile services unless a shorter distance is otherwise agreed between the corresponding administrations. Nos. **9.17** and **9.18** do not apply. (WRC-12)

5.532AA The allocation to the fixed service in the frequency band 24.25-25.25 GHz is identified for use in Region 2 by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this frequency band is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation by HAPS is limited to the HAPS-to-ground direction and shall be in accordance with the provisions of Resolution **166 (Rev.WRC-23)**. (WRC-23)

5.532AB The frequency band 24.25-27.5 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **242 (Rev.WRC-23)** applies. (WRC-23)

24.45-24.75 GHz

Allocation to services		
Region 1	Region 2	Region 3
24.45-24.65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB	24.45-24.65 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION 5.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE 5.338A 5.532AB RADIONAVIGATION 5.533
24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB	24.65-24.75 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIOLOCATION-SATELLITE (Earth-to-space)	24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE 5.338A 5.532AB

5.532B Use of the band 24.65-25.25 GHz in Region 1 and the band 24.65-24.75 GHz in Region 3 by the fixed-satellite service (Earth-to-space) is limited to earth stations using a minimum antenna diameter of 4.5 m. (WRC-12)

5.533 The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.

5.534 (SUP - WRC-03)

24.75-29.9 GHz

Allocation to services		
Region 1	Region 2	Region 3
24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B MOBILE except aeronautical mobile 5.338A 5.532AB	24.75-25.25 FIXED 5.532AA FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE except aeronautical mobile 5.338A 5.532AB	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE 5.338A 5.532AB
25.25-25.5	FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB Standard frequency and time signal-satellite (Earth-to-space)	
25.5-27	EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536B FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A	
27-27.5 FIXED INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB	27-27.5 FIXED 5.534A FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE 5.338A 5.532AB	
27.5-28.5	FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B 5.539 INTER-SATELLITE 5.521A MOBILE 5.538 5.540	
28.5-29.1	FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.517B 5.523A 5.539 INTER-SATELLITE 5.521A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	
29.1-29.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A INTER-SATELLITE 5.521A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.517B 5.527A 5.539 INTER-SATELLITE 5.521A Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.517B 5.527A 5.539 INTER-SATELLITE 5.521A MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.517B 5.527A 5.539 INTER-SATELLITE 5.521A Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542

5.534A The allocation to the fixed service in the frequency band 25.25-27.5 GHz is identified in Region 2 for use by high-altitude platform stations (HAPS) in accordance with the provisions of Resolution 166 (Rev.WRC-23). Such use of the fixed-service allocation by HAPS shall be limited to the ground-to-HAPS direction in the frequency band 25.25-27.0 GHz and to the HAPS-to-ground direction in the frequency band 27.0-27.5 GHz. Furthermore, the use of the frequency band 25.5-27.0 GHz by HAPS shall be limited to gateway links. This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this band is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. (WRC-23)

5.535 In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

5.535A The use of the band 29.1-29.5 GHz (Earth-to-space) by the fixed-satellite service is limited to geostationary-satellite systems and feeder links to non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. 9.11A, but not subject to the provisions of No. 22.2, except as indicated in Nos. 5.523C and 5.523E where such use is not subject to the provisions of No. 9.11A and shall continue to be subject to Articles 9 (except No. 9.11A) and 11 procedures, and to the provisions of No. 22.2. (WRC-97)

5.536 Use of the 25.25-27.5 GHz band by the inter-satellite service is limited to space research and Earth exploration-satellite applications, and also transmissions of data originating from industrial and medical activities in space.

5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account the most recent version of Recommendation ITU-R SA.1862. Resolution 242 (Rev.WRC-23) applies. (WRC-23)

5.536B In Algeria, Saudi Arabia, Austria, Bahrain, Belgium, Brazil, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Estonia, Finland, Hungary, India, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Lebanon, Libya, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Türkiye, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Slovenia, Somalia, Sudan, Sweden, Tanzania, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the frequency band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. Resolution 242 (Rev.WRC-23) applies. (WRC-23)

5.536C In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-12)

5.537 Space services using non-geostationary satellites operating in the inter-satellite service in the band 27-27.5 GHz are exempt from the provisions of No. 22.2.

5.537A In Bhutan, Cameroon, China, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the frequency band 27.9-28.2 GHz may also be used by high altitude platform stations (HAPS) within the territory of these countries. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution 145 (Rev.WRC-19). (WRC-19)

5.538 *Additional allocation:* the bands 27.500-27.501 GHz and 29.999-30.000 GHz are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotropically radiated power (e.i.r.p.) of +10 dBW in the direction of adjacent satellites on the geostationary-satellite orbit. (WRC-07)

5.539 The band 27.5-30 GHz may be used by the fixed-satellite service (Earth-to-space) for the provision of feeder links for the broadcasting-satellite service.

5.540 *Additional allocation:* the band 27.501-29.999 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis for beacon transmissions intended for up-link power control.

5.541 In the band 28.5-30 GHz, the earth exploration-satellite service is limited to the transfer of data between stations and not to the primary collection of information by means of active or passive sensors.

5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix 4 coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed by a future competent world radiocommunication conference. Administrations submitting Appendix 4 information for coordination before this date are encouraged to utilize these techniques to the extent practicable. (WRC-2000)

5.542 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Oman, Pakistan, Palestine*, Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Somalia, Sudan, South Sudan, Sri Lanka and Chad, the frequency band 29.5-31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in Nos. 21.3 and 21.5 shall apply. (WRC-23)

* Pursuant to Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and taking into account the Israeli-Palestinian Interim Agreement of 28 September 1995.

29.9-34.2 GHz

Allocation to services		
Region 1	Region 2	Region 3
29.9-30	FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.517B 5.527A 5.539 INTER-SATELLITE 5.521A MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542	
30-31	FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.529A 5.542	
31-31.3	FIXED 5.338A 5.543B MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 5.149	
31.3-31.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
31.5-31.8	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.546
31.8-32	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B 5.548	
32-32.3	FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548	
32.3-33	FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D 5.548	
33-33.4	FIXED 5.547A RADIONAVIGATION 5.547 5.547E	
33.4-34.2	RADIOLOCATION 5.549	

5.543 The band 29.95-30 GHz may be used for space-to-space links in the Earth exploration-satellite service for telemetry, tracking, and control purposes, on a secondary basis.

5.543A (SUP - WRC-19)

5.543B The allocation to the fixed service in the frequency band 31-31.3 GHz is identified for worldwide use by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this frequency band is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation by HAPS shall be in accordance with the provisions of Resolution 167 (Rev.WRC-23). (WRC-23)

5.544 In the band 31-31.3 GHz the power flux-density limits specified in Article 21, Table 21-4 shall apply to the space research service.

5.545 *Different category of service:* in Armenia, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 31-31.3 GHz to the space research service is on a primary basis (see No. 5.33). (WRC-12)

5.546 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Djibouti, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Lebanon, Moldova, Mongolia, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Türkiye, Kyrgyzstan, Romania, the United Kingdom, Somalia, South Africa, Tajikistan and Turkmenistan, the allocation of the frequency band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 5.33). (WRC-23)

5.547 The frequency bands 31.8-33.4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service. Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the frequency bands 39.5-40 GHz and 40.5-42 GHz (see No. 5.516B), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate. (WRC-23)

5.547A Administrations should take practical measures to minimize the potential interference between stations in the fixed service and airborne stations in the radionavigation service in the 31.8-33.4 GHz band, taking into account the operational needs of the airborne radar systems. (WRC-2000)

5.547B *Alternative allocation:* in the United States, the band 31.8-32 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-97)

5.547C *Alternative allocation:* in the United States, the band 32-32.3 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-03)

5.547D *Alternative allocation:* in the United States, the band 32.3-33 GHz is allocated to the inter-satellite and radionavigation services on a primary basis. (WRC-97)

5.547E *Alternative allocation:* in the United States, the band 33-33.4 GHz is allocated to the radionavigation service on a primary basis. (WRC-97)

5.548 In designing systems for the inter-satellite service in the frequency band 32.3-33 GHz, for the radionavigation service in the frequency band 32-33 GHz, and for the space research service (deep space) in the frequency band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation 707 (Rev.WRC-23)). (WRC-23)

5.549 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4-36 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-12)

34.2-40 GHz

Allocation to services		
Region 1	Region 2	Region 3
34.2-34.7	RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549	
34.7-35.2	RADIOLOCATION Space research 5.550 5.549	
35.2-35.5	METEOROLOGICAL AIDS RADIOLOCATION 5.549	
35.5-36	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A	
36-37	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A	
37-37.5	FIXED MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) 5.547	
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) 5.550C 5.550CA MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547	
38-39.5	FIXED 5.550D FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth) 5.547	
39.5-40	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 5.550E	

5.549A In the band 35.5-36.0 GHz, the mean power flux-density at the Earth's surface, generated by any spaceborne sensor in the Earth exploration-satellite service (active) or space research service (active), for any angle greater than 0.8° from the beam centre shall not exceed $-73.3 \text{ dB(W/m}^2\text{)}$ in this band. (WRC-03)

5.550 *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 34.7-35.2 GHz to the space research service is on a primary basis (see No. 5.33). (WRC-12)

5.550A For sharing of the band 36-37 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services, Resolution 752 (WRC-07) shall apply. (WRC-07)

5.550B The frequency band 37-43.5 GHz, or portions thereof, is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Because of the potential deployment of FSS earth stations within the frequency range 37.5-42.5 GHz and high-density applications in the fixed-satellite service in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions and 40.5-42 GHz in Region 2 (see No. 5.516B), administrations should further take into account potential constraints to IMT in these frequency bands, as appropriate. Resolution 243 (Rev.WRC-23) applies. (WRC-23)

5.550C The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to the application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service but not with non-geostationary-satellite systems in other services. Resolution 770 (WRC-19)* shall also apply, and No. 22.2 shall continue to apply. (WRC-19)

5.550CA Non-geostationary-satellite systems in the fixed-satellite service operating with an apogee altitude above 407 km and below 2 000 km in the frequency band 37.5-38 GHz shall not exceed an unwanted emission e.i.r.p. density of $-21 \text{ dB(W/100 MHz)}$ per space station for angles greater than 65.0° from nadir relative to the space station in the fixed-satellite service in the frequency band 36-37 GHz in order to protect the Earth exploration-satellite service (passive) operating in the latter frequency band. (WRC-23)

5.550D The allocation to the fixed service in the frequency band 38-39.5 GHz is identified for worldwide use by administrations wishing to implement high-altitude platform stations (HAPS). In the HAPS-to-ground direction, the HAPS ground station shall not claim protection from stations in the fixed, mobile and fixed-satellite services; and No. 5.43A does not apply. This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this frequency band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. Furthermore, the development of the fixed-satellite, fixed and mobile services shall not be unduly constrained by HAPS. Such use of the fixed-service allocation by HAPS shall be in accordance with the provisions of Resolution 168 (Rev.WRC-23). (WRC-23)

5.550E The use of the frequency bands 39.5-40 GHz and 40-40.5 GHz by non-geostationary-satellite systems in the mobile-satellite service (space-to-Earth) and by non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) is subject to the application of the provisions of No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite and mobile-satellite services but not with non-geostationary-satellite systems in other services. No. 22.2 shall continue to apply for non-geostationary-satellite-systems. (WRC-19)

5.551 (SUP - WRC-97)

5.551A (SUP - WRC-03)

5.551AA (SUP - WRC-03)

* Note by the Secretariat: This Resolution was revised by WRC-23.

40-47.5 GHz

Allocation to services		
Region 1	Region 2	Region 3
40-40.5	EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) 5.550E	
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547
41-42.5	FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547 5.551F 5.551H 5.551I	
42.5-43.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile 5.550B RADIO ASTRONOMY 5.149 5.547	
43.5-47	MOBILE 5.553 5.553A MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
47-47.2	AMATEUR AMATEUR-SATELLITE	
47.2-47.5	FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B 5.552A	

5.551B (SUP - WRC-2000)

5.551C (SUP - WRC-2000)

5.551D (SUP - WRC-2000)

5.551E (SUP - WRC-2000)

5.551F *Different category of service:* in Japan, the allocation of the band 41.5-42.5 GHz to the mobile service is on a primary basis (see No. 5.33). (WRC-97)

5.551G (SUP - WRC-03)

5.551H The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth) or in the broadcasting-satellite service, operating in the frequency band 42-42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

–230 dB(W/m²) in 1 GHz and –246 dB(W/m²) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a single-dish telescope; and

–209 dB(W/m²) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd values shall be evaluated using the methodology given in Recommendation ITU-R S.1586-1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631-0 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θ_{min} of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-23)

5.551I The power flux-density in the band 42.5-43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

–137 dB(W/m²) in 1 GHz and –153 dB(W/m²) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

–116 dB(W/m²) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete Appendix 4 information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution 743 (WRC-03) shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-03)

5.552 The allocation of the spectrum for the fixed-satellite service in the bands 42.5-43.5 GHz and 47.2-50.2 GHz for Earth-to-space transmission is greater than that in the band 37.5-39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites. Administrations are urged to take all practicable steps to reserve the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service operating in the band 40.5-42.5 GHz.

5.552A The allocation to the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz is identified for use by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz by HAPS shall be in accordance with the provisions of Resolution **122 (Rev.WRC-19)**. (WRC-19)

5.553 In the bands 43.5-47 GHz and 66-71 GHz, stations in the land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (see No. **5.43**). (WRC-2000)

5.553A In Algeria, Angola, Bahrain, Belarus, Benin, Botswana, Brazil, Burkina Faso, Cabo Verde, Korea (Rep. of), Côte d'Ivoire, Croatia, Djibouti, Egypt, United Arab Emirates, Estonia, Eswatini, Gabon, Gambia, Ghana, Greece, Guinea, Guinea-Bissau, Hungary, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lesotho, Latvia, Liberia, Lithuania, Madagascar, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Qatar, Senegal, Seychelles, Sierra Leone, Slovenia, Somalia, Sudan, South Africa, Sweden, Tanzania, Togo, Tunisia, Zambia and Zimbabwe, the frequency band 45.5-47 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT), taking into account No. **5.553**. With respect to the aeronautical mobile service and radionavigation service, the use of this frequency band for the implementation of IMT is subject to agreement obtained under No. **9.21** with concerned administrations and shall not cause harmful interference to, or claim protection from these services. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **244 (Rev.WRC-23)** applies. (WRC-23)

5.553B In Region 2 and Algeria, Angola, Saudi Arabia, Australia, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Rep., Comoros, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lesotho, Liberia, Libya, Lithuania, Madagascar, Malaysia, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Singapore, Slovenia, Somalia, Sudan, South Sudan, South Africa, Sweden, Tanzania, Chad, Togo, Tunisia, Zambia and Zimbabwe, the frequency band 47.2-48.2 GHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated, and does not establish any priority in the Radio Regulations. Resolution **243 (Rev.WRC-23)** applies. (WRC-23)

5.554 In the bands 43.5-47 GHz, 66-71 GHz, 95-100 GHz, 123-130 GHz, 191.8-200 GHz and 252-265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service. (WRC-2000)

47.5-51.4 GHz

Allocation to services		
Region 1	Region 2	Region 3
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (space-to-Earth) 5.516B 5.554A MOBILE 5.553B	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B	
47.9-48.2	FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B 5.552A	
48.2-48.54 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.516B 5.550C 5.552 MOBILE	
48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.149 5.340 5.555		
49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C 5.552 (space-to-Earth) 5.516B 5.554A 5.555B MOBILE		5.149 5.340 5.555
50.2-50.4	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	
50.4-51.4	FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C MOBILE Mobile-satellite (Earth-to-space)	

5.554A The use of the bands 47.5-47.9 GHz, 48.2-48.54 GHz and 49.44-50.2 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary satellites. (WRC-03)

5.555 *Additional allocation:* the band 48.94-49.04 GHz is also allocated to the radio astronomy service on a primary basis. (WRC-2000)

5.555A (SUP - WRC-03)

5.555B The power flux-density in the band 48.94-49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed –151.8 dB(W/m²) in any 500 kHz band at the site of any radio astronomy station. (WRC-03)

51.4-55.78 GHz

Allocation to services		
Region 1	Region 2	Region 3
51.4-52.4	FIXED FIXED-SATELLITE (Earth-to-space) 5.555C MOBILE 5.338A 5.547 5.556	
52.4-52.6	FIXED 5.338A MOBILE 5.547 5.556	
52.6-54.25	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556	
54.25-55.78	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B	

5.555C The use of the frequency band 51.4-52.4 GHz by the fixed-satellite service (Earth-to-space) is limited to geostationary-satellite networks. The earth stations shall be limited to gateway earth stations with a minimum antenna diameter of 2.4 metres. (WRC-19)

5.556 In the bands 51.4-54.25 GHz, 58.2-59 GHz and 64-65 GHz, radio astronomy observations may be carried out under national arrangements. (WRC-2000)

5.556A Use of the bands 54.25-56.9 GHz, 57-58.2 GHz and 59-59.3 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed $-147 \text{ dB(W/(m}^2 \cdot 100 \text{ MHz})$ for all angles of arrival. (WRC-97)

5.556B *Additional allocation:* in Japan, the band 54.25-55.78 GHz is also allocated to the mobile service on a primary basis for low-density use. (WRC-97)

55.78-66 GHz

Allocation to services		
Region 1	Region 2	Region 3
55.78-56.9	EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	
56.9-57	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	
57-58.2	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	
58.2-59	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	
59-59.3	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	
59.3-64	FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	
64-65	FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	
65-66	EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	

5.557 *Additional allocation:* in Japan, the band 55.78-58.2 GHz is also allocated to the radiolocation service on a primary basis. (WRC-97)

5.557A In the band 55.78-56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to -26 dB(W/MHz). (WRC-2000)

5.558 In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, 122.25-123 GHz, 130-134 GHz, 167-174.8 GHz and 191.8-200 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. 5.43). (WRC-2000)

5.558A Use of the band 56.9-57 GHz by inter-satellite systems is limited to links between satellites in geostationary-satellite orbit and to transmissions from non-geostationary satellites in high-Earth orbit to those in low-Earth orbit. For links between satellites in the geostationary-satellite orbit, the single entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface, for all conditions and for all methods of modulation, shall not exceed -147 dB(W/(m² · 100 MHz)) for all angles of arrival. (WRC-97)

5.559 In the band 59-64 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. 5.43). (WRC-2000)

66-81 GHz

Allocation to services		
Region 1	Region 2	Region 3
66-71	INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71-74	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
74-76	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561	
76-77.5	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	
77.5-78	AMATEUR AMATEUR-SATELLITE RADIOLOCATION 5.559B Radio astronomy Space research (space-to-Earth) 5.149	
78-79	RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560	
79-81	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	

5.559A (SUP - WRC-07)

5.559AA The frequency band 66-71 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which this frequency band is allocated and does not establish priority in the Radio Regulations. Resolution **241 (Rev.WRC-23)** applies. (WRC-23)

5.559B The use of the frequency band 77.5-78 GHz by the radiolocation service shall be limited to short-range radar for ground-based applications, including automotive radars. The technical characteristics of these radars are provided in the most recent version of Recommendation ITU-R M.2057. The provisions of No. **4.10** do not apply. (WRC-15)

5.560 In the band 78-79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

5.561 In the band 74-76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service. (WRC-2000)

81-86 GHz

Allocation to services		
Region 1	Region 2	Region 3
81-84	FIXED 5.338A FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	
84-86	FIXED 5.338A FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149	

5.561A The 81-81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis. (WRC-2000)

5.561B In Japan, use of the band 84-86 GHz, by the fixed-satellite service (Earth-to-space) is limited to feeder links in the broadcasting-satellite service using the geostationary-satellite orbit. (WRC-2000)

86-111.8 GHz

Allocation to services		
Region 1	Region 2	Region 3
86-92	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
92-94	FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
94-94.1	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	
94.1-95	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
95-100	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	
100-102	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
102-105	FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	
105-109.5	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
109.5-111.8	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	

5.562 The use of the band 94-94.1 GHz by the Earth exploration-satellite (active) and space research (active) services is limited to spaceborne cloud radars. (WRC-97)

5.562A In the bands 94-94.1 GHz and 130-134 GHz, transmissions from space stations of the Earth exploration-satellite service (active) that are directed into the main beam of a radio astronomy antenna have the potential to damage some radio astronomy receivers. Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible. (WRC-2000)

5.562B In the frequency bands 105-109.5 GHz, 111.8-114.25 GHz and 217-226 GHz, the use of this allocation is limited to space-based radio astronomy only. (WRC-19)

111.8-119.98 GHz

Allocation to services		
Region 1	Region 2	Region 3
111.8-114.25	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
114.25-116	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
116-119.98	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341	

5.562C Use of the band 116-122.25 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 km to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed $-148 \text{ dB(W/(m}^2 \cdot \text{MHz})$ for all angles of arrival. (WRC-2000)

119.98-151.5 GHz

Allocation to services		
Region 1	Region 2	Region 3
119.98-122.25	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341	
122.25-123	FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	
123-130	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.562D 5.149 5.554	
130-134	EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A	
134-136	AMATEUR AMATEUR-SATELLITE Radio astronomy	
136-141	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	
141-148.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
148.5-151.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	

5.562D *Additional allocation:* In Korea (Rep. of), the frequency bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis. Radio astronomy stations in Korea (Rep. of) operating in the frequency bands referred to in this footnote shall not claim protection from, or constrain the use and development of, services in other countries operating in accordance with the Radio Regulations. (WRC-15)

5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz. (WRC-2000)

151.5-158.5 GHz

Allocation to services		
Region 1	Region 2	Region 3
151.5-155.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
155.5-158.5	FIXED MOBILE RADIO ASTRONOMY 5.149	

5.562F (SUP - WRC-19)**5.562G** (SUP - WRC-19)

158.5-200 GHz

Allocation to services		
Region 1	Region 2	Region 3
158.5-164	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
164-167	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
167-174.5	FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149 5.562D	
174.5-174.8	FIXED INTER-SATELLITE MOBILE 5.558	
174.8-182	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
182-185	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
185-190	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
190-191.8	EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	
191.8-200	FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554	

5.562H Use of the bands 174.8-182 GHz and 185-190 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed $-144 \text{ dB(W/(m}^2 \cdot \text{MHz})$ for all angles of arrival. (WRC-2000)

5.563 (SUP - WRC-03)

200-241 GHz

Allocation to services			
Region 1	Region 2	Region 3	
200-209	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A		
209-217	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341		
217-226	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341		
226-231.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340		
231.5-232	FIXED MOBILE Radiolocation		
232-235	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation		
235-238	EARTH EXPLORATION-SATELLITE (passive) 5.563AA FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (passive) 5.563A 5.563B		
238-239.2	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE		
239.2-240	EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE		
240-241	EARTH EXPLORATION-SATELLITE (passive) RADIOLOCATION		

5.563A In the bands 200-209 GHz, 235-238 GHz, 250-252 GHz and 265-275 GHz, ground-based passive atmospheric sensing is carried out to monitor atmospheric constituents. (WRC-2000)

5.563AA In the frequency band 235-238 GHz, stations in the Earth exploration-satellite service (passive) shall not claim protection from stations in the fixed and mobile services. (WRC-23)

5.563B The band 237.9-238 GHz is also allocated to the Earth exploration-satellite service (active) and the space research service (active) for spaceborne cloud radars only. (WRC-2000)

241-3 000 GHz

Allocation to services		
Region 1	Region 2	Region 3
241-242.2	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	
242.2-244.2	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	
244.2-247.2	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	
247.2-248	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	
248-250	AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149	
250-252	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	
252-265	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	
265-275	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	
275-3 000	(Not allocated) 5.564A 5.565	

5.564 (SUP - WRC-2000)

5.564A For the operation of fixed and land mobile service applications in frequency bands in the range 275-450 GHz:

The frequency bands 275-296 GHz, 306-313 GHz, 318-333 GHz and 356-450 GHz are identified for use by administrations for the implementation of land mobile and fixed service applications where no specific conditions are necessary to protect Earth exploration-satellite service (passive) applications.

The frequency bands 296-306 GHz, 313-318 GHz and 333-356 GHz may only be used by fixed and land mobile service applications when specific conditions to ensure the protection of Earth exploration-satellite service (passive) applications are determined in accordance with Resolution 731 (Rev.WRC-23).

In those portions of the frequency range 275-450 GHz where radio astronomy applications are used, specific conditions (e.g. minimum separation distances and/or avoidance angles) may be necessary to ensure protection of radio astronomy sites from land mobile and/or fixed service applications, on a case-by-case basis, in accordance with Resolution 731 (Rev.WRC-23).

The use of the above-mentioned frequency bands by land mobile and fixed service applications does not preclude use by, and does not establish priority over, any other applications of radio services in the range of 275-450 GHz. (WRC-23)

5.565 The following frequency bands in the range 275-1 000 GHz are identified for use by administrations for passive service applications:

- radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;
- Earth exploration-satellite service (passive) and space research service (passive): 275-286 GHz, 296-306 GHz, 313-356 GHz, 361-365 GHz, 369-392 GHz, 397-399 GHz, 409-411 GHz, 416-434 GHz, 439-467 GHz, 477-502 GHz, 523-527 GHz, 538-581 GHz, 611-630 GHz, 634-654 GHz, 657-692 GHz, 713-718 GHz, 729-733 GHz, 750-754 GHz, 771-776 GHz, 823-846 GHz, 850-854 GHz, 857-862 GHz, 866-882 GHz, 905-928 GHz, 951-956 GHz, 968-973 GHz and 985-990 GHz.

The use of the range 275-1 000 GHz by the passive services does not preclude use of this range by active services. Administrations wishing to make frequencies in the 275-1 000 GHz range available for active service applications are urged to take all practicable steps to protect these passive services from harmful interference until the date when the Table of Frequency Allocations is established in the above-mentioned 275-1 000 GHz frequency range.

All frequencies in the range 1 000-3 000 GHz may be used by both active and passive services. (WRC-12)

ARTICLE 6

Special agreements

6.1 § 1 Two or more Member States may, under the provisions for special arrangements in the Constitution, conclude special agreements regarding the sub-allocation of bands of frequencies to the appropriate services of the participating countries.

6.2 § 2 Two or more Member States may, under the provisions for special arrangements in the Constitution, conclude special agreements, as a result of a conference to which all those Member States concerned have been invited, regarding the assignment of frequencies to those of their stations which participate in one or more specific services within the frequency bands allocated to these services by Article 5, either below 5 060 kHz or above 27 500 kHz, but not between those limits.

6.3 § 3 Member States may, under the provisions for special arrangements in the Constitution, conclude, on a worldwide basis, and as a result of a conference to which all Member States have been invited, special agreements concerning the assignment of frequencies to those of their stations participating in a specific service, on condition that such assignments are within the frequency bands allocated exclusively to that service in Article 5.

6.4 § 4 Special agreements concluded in accordance with the provisions of Nos. **6.1** to **6.3** shall not be in conflict with any of the provisions of these Regulations.

6.5 § 5 The Secretary-General shall be informed, in advance, of any conference to be convened to conclude such an agreement; he shall also be informed of the terms of the agreement when concluded; and he shall inform the Member States of the existence of such agreements.

6.6 § 6 The Director of the Radiocommunication Bureau and the Chairman of the Radio Regulations Board may be invited to send representatives to participate in an advisory capacity in the preparation of these agreements and in the proceedings of the conferences, it being recognized that in the majority of cases such participation is desirable.

6.7 § 7 If, besides the action they may take in accordance with No. **6.2**, two or more Member States coordinate the use of individual frequencies in any of the frequency bands covered by Article 5 before notifying the frequency assignments concerned, they shall in all appropriate cases inform the Bureau of such coordination.

CHAPTER III

Coordination, notification and recording of frequency assignments and Plan modifications

ARTICLE 7

Application of the procedures

7.1 The procedures of this Chapter shall be applied by administrations, the Radio Regulations Board (the Board) and the Radiocommunication Bureau (the Bureau) for the purposes of:

7.2 *a)* obtaining coordination with, or the agreement of, other administrations whenever such a requirement is specified in one or more provisions of these Regulations (see Article 9);

7.3 Not used.

7.4 *b)* notifying to the Bureau frequency assignments for the purposes of examination and recording in the Master Register (see Article 11).

7.4A Unless otherwise stated in an applicable regulatory provision of these Regulations or in a Resolution relating to the application of the provisions of Articles 9 or 11, the following shall be applied by the Bureau:

- when applying the provisions of No. 9.35 or 9.36, as appropriate, the Bureau shall apply the provisions in force at the date of receipt of the information submitted under No. 9.34;
- when applying the provisions of No. 11.31, the Bureau shall apply the provisions in force at the date of receipt of the complete notice submitted under No. 11.15;
- when applying the provisions of No. 11.32, the Bureau shall apply the provisions in force at the date of receipt of complete information submitted under No. 9.34. In the case where a new form of coordination exists on the date of receipt of notification under Article 11, where no such form existed at the coordination stage, the Bureau shall apply the forms of coordination in force on the date of receipt of complete Appendix 4 data under Article 11;
- in the case where a form of coordination or coordination requirements existed on the date of receipt of complete coordination data under Article 9 where no such form or coordination requirements exist on the date of receipt of complete notification data under Article 11, the Bureau shall not take into account these forms of coordination or coordination requirements. (WRC-03)

7.5 Any administration may request the assistance of the Board or the Bureau in the application of any part of the procedures of this Chapter (see Articles 13 and 14).

7.5A If a frequency assignment is brought into use before commencement of the coordination procedure under Article 9 when coordination is required, or before notification when coordination is not required, the operation in advance of the application of the procedure shall, in no way, afford any priority.

7.6 If requested by any administration, particularly by the administration of a country in need of special assistance, the Bureau and, when necessary, the Board shall, using such means at their disposal as are appropriate in the circumstances, render the assistance requested in the application of the procedures of this Chapter.

7.7 The Board shall, in accordance with the relevant provisions of the Constitution, the Convention and these Regulations, approve the Rules of Procedure which are to be applied by the Bureau (see Article 13, Section III).

7.8 In a case of harmful interference involving the application of the provisions of Article 15, Section VI, except when there is an obligation to eliminate harmful interference under the provisions of this Chapter, administrations are urged to exercise the utmost goodwill and mutual cooperation taking into account all the relevant technical and operational factors of the case.

ARTICLE 8

Status of frequency assignments recorded in the Master International Frequency Register

8.1 The international rights and obligations of administrations in respect of their own and other administrations' frequency assignments¹ shall be derived from the recording of those assignments in the Master International Frequency Register (the Master Register) or from their conformity, where appropriate, with a plan. Such rights shall be conditioned by the provisions of these Regulations and those of any relevant frequency allotment or assignment plan.

8.2 Not used.

8.3 Any frequency assignment recorded in the Master Register with a favourable finding under No. **11.31** shall have the right to international recognition. For such an assignment, this right means that other administrations shall take it into account when making their own assignments, in order to avoid harmful interference. In addition, frequency assignments in frequency bands subject to coordination or to a plan shall have a status derived from the application of the procedures relating to the coordination or associated with the plan.

8.4 A frequency assignment shall be known as a non-conforming assignment when it is not in accordance with the Table of Frequency Allocations or the other² provisions of these Regulations. Such an assignment shall be recorded for information purposes, only when the notifying administration states that it will be operated in accordance with No. **4.4** (see also No. **8.5**).

8.5 If harmful interference to the reception of any station whose assignment is in accordance with No. **11.31** is actually caused by the use of a frequency assignment which is not in conformity with No. **11.31**, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

¹ **8.1.1** The expression “frequency assignment”, wherever it appears in this Chapter, shall be understood to refer either to a new frequency assignment or to a change in an assignment already recorded in the Master Register. Additionally, wherever the expression relates to a geostationary or non-geostationary space station, it shall be associated with § A.4 of Annex 2 to Appendix 4, as relevant, and wherever the expression relates to an earth station associated with a geostationary or non-geostationary space station, it shall be associated with § A.4.c of Annex 2 to Appendix 4, as relevant. (WRC-12)

² **8.4.1** The “other provisions” shall be identified and included in the Rules of Procedure.

ARTICLE 9

Procedure for effecting coordination with or obtaining agreement of other administrations^{1, 2, 3, 4, 5, 6, 7, 8} (WRC-19)

Section I – Advance publication of information on satellite networks or satellite systems

1 A.9.1 For the application of the provisions of this Article with respect to stations in a space radiocommunication service using frequency bands covered by the fixed-satellite service allotment Plan, see also Appendix **30B**.

2 A.9.2 These procedures may be applicable to stations on board satellite launching vehicles.

3 A.9.3 See Appendices **30** and **30A**, as appropriate, for the coordination of:

a) proposed modifications to the Appendix **30** Plans for the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2), or new or modified assignments proposed for inclusion in the Regions 1 and 3 List of additional uses, with respect to frequency assignments in the same service or in other services to which these bands are allocated;

b) frequency assignments in other services to which the frequency bands referred to in *a*) above are allocated in the same Region or in another Region, with respect to assignments in the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2);

c) proposed modifications to the Appendix **30A** Plans for feeder links to the broadcasting-satellite service in the frequency bands 17.3-17.8 GHz (in Region 2) and 14.5-14.8 GHz and 17.3-18.1 GHz (in Regions 1 and 3), or new or modified assignments proposed for inclusion in the Regions 1 and 3 Lists of additional uses, with respect to frequency assignments in the same service or in other services to which these bands are allocated;

d) frequency assignments in other services to which the frequency bands referred to in *c*) above are allocated in the same Region or in another Region, with respect to assignments in the fixed-satellite service (Earth-to-space) in the frequency bands 17.3-17.8 GHz (in Region 2) and 14.5-14.8 GHz and 17.3-18.1 GHz (in Regions 1 and 3).

For the broadcasting-satellite service and for feeder links for the broadcasting-satellite service in the fixed-satellite service in Region 2, Resolution **42 (Rev.Orb-88)*** is also applicable. (WRC-2000)

* Note by the Secretariat: This Resolution was revised by WRC-03, WRC-12, WRC-15 and WRC-19.

4 A.9.4 Resolution **49 (Rev.WRC-23)**, Resolution **552 (Rev.WRC-23)** or Resolution **32 (Rev.WRC-23)**, as appropriate, shall also be applied with respect to those satellite networks and satellite systems that are subject to it. (WRC-23)

5 A.9.5 See also Resolution **51 (Rev.WRC-2000)****. (WRC-2000)

** Note by the Secretariat: This Resolution was abrogated by WRC-15.

6 A.9.6 The provisions of Appendices **30**, **30A** and **30B** do not apply to non-geostationary satellite systems in the fixed-satellite service. (WRC-23)

7 A.9.6A For the purpose of this Article, a geostationary satellite is a geosynchronous satellite with an orbit the inclination of which is less than or equal to 15°. (WRC-03)

A.9.7 (SUP – WRC-19)

8 A.9.8 In respect of submission for Regions 1 and 3 satellite networks in the broadcasting-satellite service in the frequency band 21.4-22 GHz meeting special requirements, Resolution **553 (WRC-12)***** applies. (WRC-12)

*** Note by the Secretariat: This Resolution was revised by WRC-15 and WRC-23.

General

9.1 Before initiating any action under Article 11 in respect of frequency assignments for a satellite network or system not subject to the coordination procedure described in Section II of Article 9 below, an administration, or one⁹ acting on behalf of a group of named administrations, shall send to the Bureau a general description of the network or system for advance publication in the International Frequency Information Circular (BR IFIC) not earlier than seven years and preferably not later than two years before the planned date of bringing into use of the network or system (see also No. 11.44). The characteristics to be provided for this purpose are listed in Appendix 4. The notification information may also be communicated to the Bureau at the same time, but shall be considered as having been received by the Bureau not earlier than four months after the date of publication of the advance publication information. (WRC-19)

9.1A (SUP - WRC-23)

9.2 Amendments to the information sent in accordance with the provisions of No. 9.1 shall also be sent to the Bureau as soon as they become available. The use of an additional frequency band, or modification of the orbital location for a space station using the geostationary-satellite orbit, the modification of the reference body or the modification of the direction of transmission for a space station using a non-geostationary-satellite orbit, as well as the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station which are not subject to the coordination procedure under Section II of Article 9, will require the application of the advance publication procedure¹⁰. (WRC-19)

9.2A If the information is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

9.2B On receipt of the complete information sent under Nos. 9.1 and 9.2, the Bureau shall publish¹¹ it in a Special Section of its BR IFIC within two months. When the Bureau is not in a position to comply with the time-limit referred to above, it shall periodically so inform the administrations, giving the reasons therefor. (WRC-19)

9.2C (SUP - WRC-23)

⁹ **9.1.1** Whenever, under this provision, an administration acts on behalf of a group of named administrations, all members of that group retain the right to respond in respect of their own networks or systems.

¹⁰ **9.2.1** For geostationary-satellite networks using inter-satellite links of a geostationary space station communicating with a non-geostationary space station which are not subject to the coordination procedure under Section II of Article 9, the Appendix 4 characteristics to be provided for advance publication in the BR IFIC shall be the same as those listed for the coordination of a geostationary-satellite network. (WRC-19)

¹¹ **9.2B.1** If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action, and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received. (WRC-07)

Sub-Section IA – Advance publication of information on satellite networks or satellite systems that are not subject to coordination procedure under Section II

9.3 If, upon receipt of the BR IFIC containing information published under No. **9.2B**, any administration believes that interference which may be unacceptable may be caused to its existing or planned satellite networks or systems, it shall within four months of the date of publication of the BR IFIC communicate to the publishing administration its comments¹² on the particulars of the anticipated interference to its existing or planned systems. A copy of these comments shall also be sent to the Bureau. Thereafter, both administrations shall endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the Bureau, if so requested by either of the parties, and shall exchange any additional relevant information that may be available. If no such comments are received from an administration within the aforementioned period, it may be assumed that the administration concerned has no objections to the planned satellite network(s) of the system on which details have been published. (WRC-19)

9.4 In the case of difficulties, the administration responsible for the planned satellite network shall explore all possible means to resolve the difficulties without considering the possibility of adjustment to networks of other administrations. If no such means can be found, it may request the other administrations to explore all possible means to meet its requirements. The administrations concerned shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks. An administration on behalf of which details of planned satellite networks have been published in accordance with the provisions of No. **9.2B** may, after the period of four months, inform the Bureau of the progress made in resolving any difficulties. (WRC-19)

9.5 The Bureau shall inform all administrations of the list of administrations which have sent comments under No. **9.3** and provide a summary of the comments received.

9.5A The procedure of Sub-Section IA shall be considered mainly for the purposes of informing all administrations of developments in the use of space radiocommunications.

¹² **9.3.1** Upon receipt of the International Frequency Information Circular (BR IFIC) containing information published under No. **9.2B** for frequency assignments to non-geostationary-satellite systems subject to Resolution **32** (WRC-19)*, any administration which believes that unacceptable interference may be caused to its existing or planned satellite networks or systems shall, as soon as possible and within a period of four months, communicate to the notifying administration, with a copy to the Bureau, these comments on the particulars of the potential interference to its existing or planned systems. The Bureau shall promptly make these comments available “as received” on the ITU website. (WRC-19)

* Note by the Secretariat: This Resolution was revised by WRC-23.

Sub-Section IB (SUP - WRC-15)**9.5B** (SUP - WRC-15)**9.5C** (SUP - WRC-15)**9.5D** (SUP - WRC-15)**Section II – Procedure for effecting coordination^{13, 14}****Sub-Section IIA – Requirement and request for coordination**

9.6 Before an administration^{15, 16, 17} notifies to the Bureau or brings into use a frequency assignment in any of the cases listed below, it shall effect coordination, as required, with other administrations identified under No. **9.27**: (WRC-03)

9.7 *a)* for a station in a satellite network using the geostationary-satellite orbit, in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a plan, with the exception of coordination between earth stations operating in the opposite direction of transmission.

9.5B.1 (SUP - WRC-15)

¹³ **A.9.II.1** These procedures are also applicable for earth stations of the Earth exploration-satellite, space research, space operation and radiodetermination-satellite services intended to be used while in motion or during halts at unspecified points.

¹⁴ **A.9.II.2** The word “coordination” as used throughout this Article refers also to the process of seeking an agreement of other administrations when required under No. **9.21**.

¹⁵ **9.6.1** In the case of coordination of an assignment in a satellite network, an administration may act on behalf of a group of named administrations. Whenever, under this provision, an administration acts on behalf of a group of named administrations, all members of the group retain the right to respond in respect of their own services which could affect or be affected by the proposed assignment.

¹⁶ **9.6.2** In all cases, the coordination of an earth station with terrestrial stations or other earth stations operating in the opposite direction of transmission shall remain within the authority of the administration on the territory of which this station is located.

¹⁷ **9.6.3** Unless otherwise specified, coordination under any of the particular sharing situations defined in Nos. **9.7** to **9.21** is not applicable when limits for that sharing situation are specified elsewhere in these Regulations. (WRC-03)

- 9.7A** b)^{18, 19} for a specific earth station in a geostationary-satellite network in the fixed-satellite service in certain frequency bands, in respect of a non-geostationary-satellite system in the fixed-satellite service; (WRC-2000)
- 9.7B** c)^{18, 19} for a non-geostationary-satellite system in the fixed-satellite service in certain frequency bands, in respect of a specific earth station in a geostationary-satellite network in the fixed-satellite service. (WRC-2000)
- 9.8** (SUP - WRC-2000)
- 9.9** (SUP - WRC-2000)
- 9.10** Not used;
- 9.11** d) for a space station in the broadcasting-satellite service in any band shared on an equal primary basis with terrestrial services and where the broadcasting-satellite service is not subject to a plan, in respect of terrestrial services;
- 9.11A** e) for a station for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision, the provisions of Nos. **9.12** to **9.16** are applicable; (WRC-2000)
- 9.12** f) for a station in a satellite network using a non-geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **9.11A**, in respect of any other satellite network using a non-geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission; (WRC-2000)
- 9.12A** g) for a station in a satellite network using a non-geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **9.11A**, in respect of any other satellite network using the geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission; (WRC-2000)
- 9.13** h) for a station in a satellite network using the geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **9.11A**, in respect of any other satellite network using a non-geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission; (WRC-2000)

¹⁸ **9.7A.1** and **9.7B.1** The coordination of a specific earth station under Nos. **9.7A** or **9.7B** shall remain within the authority of the administration on whose territory the station is located. (WRC-2000)

¹⁹ **9.7A.2** and **9.7B.2** Coordination information relating to a specific earth station received by the Bureau prior to 30 June 2000 is considered as complete information under Nos. **9.7A** or **9.7B** from the date of receipt of complete information for the associated satellite network under No. **9.7**, provided that the maximum isotropic antenna gain, the lowest total receiving system noise temperature of the earth station and the necessary bandwidth of the emission received by the earth station are equal to those of any typical earth station included in the coordination request for the geostationary-satellite network in the fixed-satellite service. (WRC-2000)

- 9.14** *i)* for a transmitting space station of a satellite network for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. **9.11A** in respect of receiving stations of terrestrial services where the threshold value is exceeded; (WRC-07)
- 9.15** *j)* for either a specific earth station or typical earth station of a non-geostationary satellite network for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **9.11A**, in respect of terrestrial stations in frequency bands allocated with equal rights to space and terrestrial services and where the coordination area of the earth station includes the territory of another country; (WRC-2000)
- 9.16** *k)* for a transmitting station of a terrestrial service for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **9.11A** and which is located within the coordination area of an earth station in a non-geostationary-satellite network; (WRC-2000)
- 9.17** *l)* for any specific earth station or typical mobile earth station in frequency bands above 100 MHz allocated with equal rights to space and terrestrial services, in respect of terrestrial stations, where the coordination area of the earth station includes the territory of another country, with the exception of the coordination under No. **9.15**; (WRC-2000)
- 9.17A** *m)* for any specific earth station, in respect of other earth stations operating in the opposite direction of transmission or for any typical mobile earth station in respect of specific earth stations operating in the opposite direction of transmission, in frequency bands allocated with equal rights to space radiocommunication services in both directions of transmission and where the coordination area of the earth station includes the territory of another country or the earth station is located within the coordination area of another earth station, with the exception of the coordination under No. **9.19**; (WRC-03)
- 9.18** *n)* for any transmitting station of a terrestrial service in the bands referred to in No. **9.17** within the coordination area of an earth station, in respect of this earth station, with the exception of the coordination under Nos. **9.16** and **9.19**; (WRC-2000)
- 9.19** *o)* for any transmitting station of a terrestrial service or any transmitting earth station in the fixed-satellite service (Earth-to-space) in a frequency band shared on an equal primary basis with the broadcasting-satellite service, with respect to typical earth stations included in the service area of a space station in the broadcasting-satellite service. (WRC-2000)
- 9.20** Not used;
- 9.21** *p)* for any station of a service for which the requirement to seek the agreement of other administrations is included in a footnote to the Table of Frequency Allocations referring to this provision. (WRC-2000)
- 9.22** Not used.

9.23 Whenever there is a requirement to effect more than one form of coordination in accordance with No. **9.30**, the requests shall be appropriately identified by reference to Nos. **9.7** to **9.14** and **9.21**, and they shall as far as possible be sent to the Bureau and, where appropriate, shall be published simultaneously.

9.24 and **9.25** Not used.

9.26 Coordination may be effected for a satellite network using the information relating to the space station, including its service area, and the parameters of one or more typical earth stations located in all or part of the service area of the space station. Coordination may also be effected for terrestrial stations using the information relating to typical terrestrial stations, except for those mentioned in Nos. **11.18** to **11.23**.

9.27 Frequency assignments to be taken into account in effecting coordination are identified using Appendix **5**.

9.28 In the case of requests for coordination under No. **9.29**, the requesting administration shall, by applying the calculation method and criteria contained in Appendix **5** to those frequency assignments, identify, to the extent possible, the administrations with which coordination is to be effected.

9.29 Requests for coordination made under Nos. **9.15** to **9.19** shall be sent by the requesting administration to the identified administrations, together with the appropriate information listed in Appendix **4** to these Regulations.

9.30 Requests for coordination made under Nos. **9.7** to **9.14** and **9.21** shall be sent by the requesting administration to the Bureau, together with the appropriate information listed in Appendix **4** to these Regulations. Any additional frequency bands subsequently added to the request for coordination, or any modification to the request for coordination involving a change of the orbital location for a space station using the geostationary-satellite orbit, shall be given a new date of receipt with respect to the application of Nos. **11.44**, **11.44.1** and **11.48**. (WRC-23)

9.31 The information sent under No. **9.29** shall also, in the cases covered by Nos. **9.15**, **9.17** or **9.17A**, include a copy of diagrams drawn to appropriate scale indicating, for both transmission and reception, the location of the earth station and its associated coordination area, or the coordination area related to the service area in which it is intended to operate the mobile earth station, and the data on which the diagrams are based. In respect of terrestrial stations, in the cases covered by Nos. **9.16**, **9.18** and **9.19** the information shall include the locations of terrestrial stations within the coordination area of the relevant earth station.

9.32 If the responsible administration concludes that coordination is not required under Nos. **9.7** to **9.7B**, it shall send the relevant information pursuant to Appendix **4** to the Bureau for action under No. **9.34**. (WRC-2000)

9.32A If the responsible administration, following the application of Nos. **9.15** to **9.19**, concludes that coordination is not required, it may send the relevant information pursuant to Appendix **4** to the Bureau for action under Section I of Article **11**.

9.33 If for any reason an administration cannot act in accordance with No. **9.29**, it shall seek the assistance of the Bureau. The Bureau shall then send the request for coordination to the administration concerned and take any necessary further action as appropriate under Nos. **9.45** and **9.46**.

9.34 On receipt of the complete information sent under No. **9.30** or No. **9.32** the Bureau shall promptly:

9.35 *a)* examine that information with respect to its conformity with No. **11.31**²⁰; (WRC-19)

9.36 *b)* identify in accordance with No. **9.27** any administration with which coordination may need to be effected^{21, 22}; (WRC-19)

9.37 *c)* include their names in the publication under No. **9.38**;

9.38 *d)* publish²³, as appropriate, the complete information in the BR IFIC within four months. Where the Bureau is not in a position to comply with the time-limit referred to above, it shall periodically so inform the administrations, giving the reasons therefor. (WRC-2000)

9.39 Not used;

9.40 *e)* inform the administrations concerned of its actions and communicate the results of its calculations, drawing attention to the relevant BR IFIC.

9.40A If the information is found to be incomplete, the Bureau shall immediately seek from the administration concerned any clarification required and information not provided.

²⁰ **9.35.1** The Bureau shall include the detailed results of its examination under No. **11.31** of compliance with the limits in Tables **22-1** to **22-3** or the single-entry limits in No. **22.5L** of Article **22**, as applicable, in the publication under No. **9.38**. (WRC-19)

²¹ **9.36.1** In the case of coordination under Nos. **9.12**, **9.12A** and **9.13**, the Bureau shall also identify the satellite networks or systems with which coordination may need to be effected. The list of administrations identified by the Bureau under Nos. **9.11** to **9.14** and **9.21** and the list of satellite networks or systems identified by the Bureau under Nos. **9.12**, **9.12A** and **9.13** are only for information purposes, to help administrations comply with this procedure. (WRC-19)

²² **9.36.2** In the case of coordination under Nos. **9.7**, **9.7A** and **9.7B**, the Bureau shall also identify the specific satellite networks or earth stations with which coordination needs to be effected (see also No. **9.42**). (WRC-12)

²³ **9.38.1** If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the network specified in the publication in question no longer has to be taken into consideration by the Bureau and other administrations. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received. (WRC-07)

9.41 Following receipt of the BR IFIC referring to requests for coordination under Nos. **9.7** to **9.7B**, an administration believing that it, or any of its satellite networks not identified under No. **9.36.2**, should have been included in the request, or the initiating administration believing that an administration, or any of the satellite networks identified under No. **9.36.2**, in accordance with the provisions of No. **9.7** (GSO/GSO) (items 1) to 8) of the frequency band column), No. **9.7A** (GSO earth station/non-GSO system) or No. **9.7B** (non-GSO system/GSO earth station) of Table 5-1 of Appendix 5 should not have been included in the request, shall, within four months of the date of publication of the relevant BR IFIC, inform the initiating administration or the identified administration, as appropriate, and the Bureau, giving its technical reasons for doing so, and shall request that its name, or the name of any of its satellite networks not identified under No. **9.36.2**, be included, or that the name of the identified administration, or any of its satellite networks identified under No. **9.36.2**, be excluded, as appropriate. (WRC-12)

9.42 The Bureau shall study this information on the basis of Appendix 5 and shall inform both administrations of its conclusions. Should the Bureau agree to include or exclude, as appropriate, an administration and/or a satellite network in the request, it shall publish a Special Section, indicating the list of administrations and associated satellite networks with which coordination needs to be effected²⁴. (WRC-12)

9.43 Those administrations not responding under No. **9.41** within the time limit specified therein shall be regarded as unaffected and the provisions of Nos. **9.48** and **9.49** shall apply.

9.44 The administration requesting coordination and those with which it is requested, or the Bureau when acting pursuant to No. **7.6**, may request any additional information they consider necessary.

Sub-Section IIB – Acknowledgement of receipt of a request for coordination

9.45 An administration receiving a request for coordination under No. **9.29** shall, within 30 days from the date of the request, acknowledge receipt by telegram to the requesting administration. In the absence of an acknowledgement of receipt of its request within the 30 days, the requesting administration shall send a telegram requesting an acknowledgement.

9.46 If there is no acknowledgement of receipt within 15 days of its second request sent under No. **9.45**, the requesting administration may seek the assistance of the Bureau. In this event, the Bureau shall forthwith send a telegram to the administration which has failed to reply requesting an immediate acknowledgement.

9.47 If there is no acknowledgement of receipt within 30 days after the Bureau's action under No. **9.46**, the Bureau shall immediately send a reminder providing an additional 15-day period for the response. In the absence of such an acknowledgement within 15 days, it shall be deemed that the administration which has failed to acknowledge receipt has undertaken: (WRC-15)

9.48 a) that no complaint will be made in respect of any harmful interference affecting its own assignments which may be caused by the assignment for which coordination was requested; and

²⁴ **9.42.1** During coordination discussions between administrations, additional networks can be included in the coordination process on the basis of the agreement of the administrations concerned. (WRC-12)

9.49 b) that the use of its own assignments will not cause harmful interference to the assignment for which coordination was requested.

Sub-Section IIC – Action upon a request for coordination

9.50 An administration having received a request for coordination under Nos. 9.7 to 9.21, or having been included in the procedure following action under No. 9.41, shall promptly examine the matter with regard to interference which may be caused to or, in certain cases, by its own assignments²⁵, identified in accordance with Appendix 5^{26, 27}. (WRC-15)

9.51 Following its action under No. 9.50, the administration with which coordination was sought under Nos. 9.7 to 9.7B shall, within four months of the date of publication of the BR IFIC under No. 9.38, either inform the requesting administration and the Bureau of its agreement or act under No. 9.52. (WRC-2000)

9.51A Following its action under No. 9.50, the administration with which coordination was sought under Nos. 9.15 to 9.19 shall, within four months of the date of dispatch of the coordination data under No. 9.29, either inform the requesting administration of its agreement or act under No. 9.52.

²⁵ **9.50.1** In the absence of specific provisions in these Regulations relating to the evaluation of interference, the calculation methods and the criteria should be based on relevant ITU-R Recommendations agreed by the administrations concerned. In the event of disagreement on a Recommendation or in the absence of such a Recommendation, the methods and criteria shall be agreed between the administrations concerned. Such agreements shall be concluded without prejudice to other administrations.

²⁶ **9.50.2** Where Appendix 5 specifies a period for which planned assignments may be taken into account, that period may be extended by agreement between the administrations concerned.

²⁷ **9.50.3** See also No. 9.52.1. (WRC-15)

9.52 If an administration, following its action under No. 9.50, does not agree to the request for coordination, it shall, within four months of the date of publication of the BR IFIC under No. 9.38, or of the date of dispatch of the coordination data under No. 9.29, inform the requesting administration of its disagreement²⁸ and shall provide information concerning its own assignments upon which that disagreement is based. It shall also make such suggestions as it is able to offer with a view to satisfactory resolution of the matter. A copy of that information shall be sent to the Bureau. Where the information relates to terrestrial stations or earth stations operating in the opposite direction of transmission within the coordination area of an earth station, only that information relating to existing radiocommunication stations or to those to be brought into use within the next three months for terrestrial stations, or three years for earth stations, shall be treated as notifications under Nos. 11.2 or 11.9. (WRC-15)

9.52A In the case of coordination requested under No. 9.14, on receipt of the Special Section of the BR IFIC referred to in No. 9.38, and within the same four-month period from the publication of that Special Section, an administration in need of assistance may inform the Bureau that it has existing or planned terrestrial stations which might be affected by the planned satellite network, and may request the Bureau to determine the need for coordination by applying the Appendix 5 criteria. The Bureau shall inform the administration seeking coordination of this request, indicating the date by which it may be able to provide the results of its analysis. When these results are available, the Bureau shall inform both administrations. This request shall be considered as a disagreement, pending the results of the analysis by the Bureau of the need for coordination.

9.52B When an agreement on coordination is reached, the administration responsible for the terrestrial stations or the earth station operating in the opposite direction of transmission may send to the Bureau the information concerning those stations covered by the agreement which are intended to be notified under Nos. 11.2 or 11.9. The Bureau shall consider as notifications only that information relating to existing terrestrial or earth stations operating in the opposite direction of transmission or to those to be brought into use within the next three years.

²⁸ **9.52.1** An administration believing that:

- i) unacceptable interference may be caused to its existing or planned satellite networks or systems not subject to the coordination procedure under Section II of Article 9, or
- ii) unacceptable interference may be caused to its existing or planned satellite networks or systems subject to Section II of Article 9 by an incoming frequency assignment to a space station subject to this Section only with respect to terrestrial services, or
- iii) unacceptable interference may be caused to its existing or planned satellite networks or systems subject to Section II of Article 9 by an incoming frequency assignment to a space station subject to this Section only with respect to a list of administrations provided in the relevant footnote to Article 5, and that list does not include the potentially affected administration,

may send its comments to the requesting administration. A copy of these comments may also be sent to the Bureau. Such comments shall however not by themselves constitute a disagreement under No. 9.52. Thereafter, both administrations shall endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the Bureau, if so requested by either of the parties, and shall exchange any additional relevant information that may be available. (WRC-23)

9.52C For coordination requests under Nos. **9.11** to **9.14** and **9.21**, an administration not responding under No. **9.52** within the same four-month period shall be regarded as unaffected and, in the cases of Nos. **9.11** to **9.14**, the provisions of Nos. **9.48** and **9.49** shall apply. Furthermore, for coordination under Nos. **9.12**, **9.12A** and **9.13**, any satellite networks or systems identified under No. **9.36.1** but not confirmed in the response provided by the administration under No. **9.52** within the same four-month period shall be regarded as unaffected and the provisions of Nos. **9.48** and **9.49** shall also apply. (WRC-19)

9.52D For coordination requests under Nos. **9.12** to **9.14**, forty-five days prior to the expiry of the same four-month period the Bureau shall dispatch a circular-telegram to all administrations, bringing the matter to their attention. Upon receipt of the aforementioned circular-telegram, an administration shall acknowledge receipt immediately by telegram. If no acknowledgement is received within thirty days, the Bureau shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of fifteen days.

9.53 Thereafter, the requesting and responding administrations shall make every possible mutual effort to overcome the difficulties, in a manner acceptable to the parties concerned.

9.53A Upon expiry of the deadline for comments in respect of a coordination request under Nos. **9.11** to **9.14** and **9.21**, the Bureau shall, according to its records, publish a Special Section, indicating the list of administrations having submitted their disagreement and the list of satellite networks or systems upon which this disagreement is based, as appropriate, or other comments within the regulatory deadline. (WRC-19)

9.54 Either the administration seeking coordination or one whose assignments may be affected thereby may request additional information which it may require in order to assess the interference to its own assignments or to assist in resolving the matter.

9.55 All administrations may use correspondence, any appropriate means of telecommunication or meetings, as necessary, to assist in resolving the matter. The results thereof shall be communicated to the Bureau, which shall publish them in the BR IFIC, as appropriate.

9.56 and 9.57 Not used.

9.58 An administration which has initiated coordination, as well as any administration with which coordination is sought, shall communicate to the Bureau any modifications to the published characteristics of their respective networks that were required to reach agreement on the coordination. The Bureau shall publish this information in accordance with No. **9.38**, indicating that these modifications resulted from the joint effort of the administrations concerned to reach agreement on coordination and that, for this reason, they should be given special consideration. These modifications may involve the application of Sub-Section IIA of Article **9** with respect to other administrations.

9.59 If there is disagreement between the administration seeking coordination and an administration with which coordination is sought concerning the level of acceptable interference, either may seek the assistance of the Bureau; in such a case, it shall provide the necessary information to enable the Bureau to endeavour to effect such coordination.

**Sub-Section IID – Action in the event of no reply, no decision or disagreement
on a request for coordination**

9.60 If, within the same four-month period specified in Nos. 9.51 or 9.51A, an administration with which coordination is sought under Nos. 9.7 to 9.7B and 9.15 to 9.19 fails to reply or to give a decision under Nos. 9.51 or 9.51A or, following its disagreement under No. 9.52, fails to provide information concerning its own assignments on which its disagreement is based, the requesting administration may seek the assistance of the Bureau. (WRC-2000)

9.61 The Bureau, acting on a request for assistance under No. 9.60, shall forthwith request the administration concerned to give an early decision in the matter or provide the relevant information.

9.62 If the administration concerned fails to respond within 30 days of the Bureau's action under No. 9.61, the Bureau shall immediately send a reminder providing an additional 15-day period for the response. If the administration still fails to respond after the Bureau's reminder within the 15 days, the provisions of Nos. 9.48 and 9.49 shall apply. (WRC-15)

9.63 If there is continuing disagreement, or if any administration involved in the matter has requested the assistance of the Bureau, the Bureau shall seek any necessary information to enable it to assess the interference. It shall communicate its conclusions to the administrations involved.

9.64 If the disagreement remains unresolved after the Bureau has communicated its conclusions to the administrations involved, the administration which requested coordination shall, having regard to the other provisions of this Section, defer the submission of its notice of frequency assignments under Article 11 to the Bureau for six months from the date of the request or the BR IFIC containing the request for coordination, as appropriate.

9.65 If, at the date of receipt of a notice under No. 9.64 above, the Bureau has been informed of a continuing disagreement, the Bureau shall examine the notice under Nos. 11.32A or 11.33²⁹ and shall act in accordance with No. 11.38.

²⁹ **9.65.1** A notice of a frequency assignment for which coordination was requested under No. 9.21 and in respect of which there is continuing disagreement shall not be examined under Nos. 11.32A or 11.33; it shall, however, be examined under No. 11.31.

ARTICLE 10 (*Number not used*)

ARTICLE 11

Notification and recording of frequency assignments^{1, 2, 3, 4, 5, 6, 7} (WRC-19)

¹ **A.11.1** See also Appendices 30 and 30A as appropriate, for the notification and recording of:

- a) frequency assignments to stations in the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2);
- b) frequency assignments to stations in other services to which the frequency bands referred to in § a) above are allocated in the same Region or in another Region, so far as their relationship to the broadcasting-satellite service is concerned, in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5 GHz (in Region 1) and 12.2-12.7 GHz (in Region 2);
- c) frequency assignments to feeder-link stations in the fixed-satellite service (Earth-to-space) in the frequency bands 14.5-14.8 GHz in Region 1 (see No. 5.510) and in Region 3, 17.3-18.1 GHz in Regions 1 and 3 and 17.3-17.8 GHz in Region 2, and to stations in other services in these bands;
- d) frequency assignments to stations in the same service or other services to which the frequency bands referred to in § c) above are allocated in the same Region or in another Region, so far as their relationship to the fixed-satellite service (Earth-to-space) in these bands is concerned.

For the broadcasting-satellite service in Region 2 and for feeder links in the fixed-satellite service for the broadcasting-satellite service in Region 2, Resolution 42 (Rev.Orb-88)* is also applicable.

See also Appendix 30B for the notification and recording of assignments in the following frequency bands:

All Regions, fixed-satellite service only

4 500-4 800 MHz	(space-to-Earth)
6 725-7 025 MHz	(Earth-to-space)
10.7-10.95 GHz	(space-to-Earth)
11.2-11.45 GHz	(space-to-Earth)
12.75-13.25 GHz	(Earth-to-space)

(WRC-2000)

* Note by the Secretariat: This Resolution was revised by WRC-03, WRC-12, WRC-15 and WRC-19.

² **A.11.2** Resolution 49 (Rev.WRC-23), Resolution 552 (Rev.WRC-23) or Resolution 32 (Rev.WRC-23), as appropriate, shall also be applied with respect to those satellite networks and satellite systems that are subject to it. (WRC-23)

³ **A.11.3** See also Resolution 51 (Rev.WRC-2000)**. (WRC-2000)

** Note by the Secretariat: This Resolution was abrogated by WRC-15.

⁴ **A.11.4** The provisions of Appendices 30, 30A and 30B do not apply to non-geostationary-satellite systems in the fixed-satellite service. (WRC-2000)

⁵ **A.11.4A** For the purpose of this Article, a geostationary satellite is a geosynchronous satellite with an orbit the inclination of which is less than or equal to 15°. (WRC-03)

A.11.5 (SUP - WRC-19)

⁶ **A.11.6** If the payments are not received in accordance with the provisions of Council Decision 482, as amended, on the implementation of cost recovery for satellite network filings, the Bureau shall cancel the publication specified in Nos. 11.28 and 11.43 and the corresponding entries in the Master Register under Nos. 11.36, 11.37, 11.38, 11.39, 11.41, 11.43B or 11.43C, as appropriate, after informing the administration concerned. The Bureau shall inform all administrations of such action and that the entries specified in the publication in question no longer have to be taken into consideration by the Bureau and other administrations and that any resubmitted notice shall be considered to be a new notice. The Bureau shall send a reminder to the notifying administration not later than two months prior to the deadline for the payment in accordance with the above-mentioned Council Decision 482 unless the payment has already been received. (WRC-23)

⁷ **A.11.7** In respect of submissions for Regions 1 and 3 satellite networks in the broadcasting-satellite service in the frequency band 21.4-22 GHz meeting special requirements, Resolution 554 (WRC-12) applies. (WRC-12)

Section I – Notification

11.1 The expression “frequency assignment”, wherever it appears in this Article, shall be understood to refer either to a new frequency assignment or to a change in an assignment already recorded in the Master International Frequency Register (hereinafter called the *Master Register*).

11.2 Any frequency assignment to a transmitting station and to its associated receiving stations except for those mentioned in Nos. **11.13** and **11.14** shall be notified to the Bureau:

11.3 *a)* if the use of that assignment is capable of causing harmful interference to any service of another administration; or

11.3A (SUP - WRC-07)

11.4 *b)* if that assignment is to be used for international radiocommunication; or

11.5 *c)* if that assignment is subject to a world or regional frequency allotment or assignment plan which does not have its own notification procedure; or

11.6 *d)* if that assignment is subject to the coordination procedure of Article **9** or is involved in such a case; or

11.7 *e)* if it is desired to obtain international recognition for that assignment; or

11.8 *f)* if it is a non-conforming assignment under No. **8.4** and if the administration wishes to have it recorded for information.

11.9 Similar notification shall be made for a frequency assignment to a receiving earth station or space station, or to a receiving high-altitude platform station in the fixed service using the frequency bands mentioned in Nos. **5.457**, **5.534A**, **5.543B**, **5.550D** and **5.552A** or to a land station for reception from mobile stations, when: (WRC-19)

11.10 *a)* any of the conditions in Nos. **11.4**, **11.5** or **11.7** apply to the receiving station; or

11.11 *b)* any of the conditions in No. **11.2** apply to the associated transmitting station.

11.12 Any frequency to be used for reception by a particular radio astronomy station may be notified if it is desired that such data be included in the Master Register.

11.13 Assignments involving specific frequencies which are prescribed by these Regulations for common use by terrestrial stations of a given service shall not be notified. They shall be entered in the Master Register and a consolidated table shall also be published in the Preface to the International Frequency Information Circular (BR IFIC). (WRC-19)

11.14 Frequency assignments to ship stations and to mobile stations of other services, to stations in the amateur service, to earth stations in the amateur-satellite service, and those to broadcasting stations in the high-frequency bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz which are subject to Article **12** shall not be notified under this Article.

11.15 When notifying a frequency assignment, the administration⁸ shall provide the relevant characteristics listed in Appendix 4. (WRC-07)

11.16 Not used.

11.17 Frequency assignments relating to a number of stations or earth stations may be notified in the form of the characteristics of a typical station or a typical earth station and the intended geographical area of operation. Except for mobile earth stations, individual notices of frequency assignments are however necessary in the following cases (see also No. **11.14**):

11.18 *a)* stations covered by the Allotment Plans in Appendices **25**, **26** and **27**;

11.19 *b)* broadcasting stations;

11.20 *c)* terrestrial stations within the coordination area of an earth station;⁹

11.21 *d)* any terrestrial stations in bands shared with space services which exceed the limits specified in Tables 8a, 8b, 8c and 8d of Appendix 7 and in No. **21.3**;⁹

11.21A *e)* any terrestrial stations in bands listed in Table **21-2**;⁹

11.21B *f)* any terrestrial station in bands referred to in a footnote which includes a reference to No. **9.21**, if it pertains to a service which is subject to the application of the procedure for seeking agreement under No. **9.21**; (WRC-03)

11.22 *g)* earth stations whose coordination area includes the territory of another administration, or where the earth station is located within the coordination area of an earth station operating in the opposite direction of transmission;^{9, 10} (WRC-03)

11.23 *h)* earth stations whose interference potential is greater than that of a coordinated typical earth station.⁹ (WRC-03)

⁸ **11.15.1** A frequency assignment to a space station or typical earth station as part of the satellite network may be notified by one administration acting on behalf of a group of named administrations. Any further notice (modification or deletion) relating to such an assignment shall, in the absence of information to the contrary, be regarded as having been submitted on behalf of the entire group.

⁹ **11.20.1, 11.21.1, 11.21A.1, 11.22.1 and 11.23.1** In such cases, individual notices of frequency assignments are required for frequency bands allocated with equal rights to terrestrial and space services where coordination is required under Appendix 5, Table 5-1.

¹⁰ **11.22.2** In such cases, individual notices of frequency assignments are required for frequency bands allocated with equal rights to space services, in the opposite direction of transmission, where coordination is required under Appendix 5, Table 5-1.

11.24 Notices relating to assignments to stations of terrestrial services, except for those referred to in Nos. **11.25**, **11.26** or **11.26A**, shall reach the Bureau not earlier than three months before the assignments are brought into use. (WRC-03)

11.25 Notices relating to assignments to stations in space services, and to terrestrial stations involved in coordination with a satellite network, shall reach the Bureau not earlier than three years before the assignments are brought into use.

11.26 Notices relating to assignments for high-altitude platform stations in the fixed service in the frequency bands identified in Nos. **5.457**, **5.537A**, **5.530E**, **5.532AA**, **5.534A**, **5.543B**, **5.550D** and **5.552A** shall reach the Bureau not earlier than five years before the assignments are brought into use. (WRC-19)

11.26A Notices relating to assignments of high-altitude platform station as International Mobile Telecommunications base station in the frequency bands identified in Nos. **5.312B**, **5.314A**, **5.388A** and **5.409A** shall reach the Bureau not earlier than three years before the assignments are brought into use. (WRC-23)

Section II – Examination of notices and recording of frequency assignments in the Master Register

11.27 Notices not containing those characteristics specified in Appendix 4 as mandatory or required shall be returned with comments to help the notifying administration to complete and resubmit them, unless the information not provided is immediately forthcoming in response to an inquiry by the Bureau.

11.28 Complete notices shall be marked by the Bureau with their date of receipt and shall be examined in the date order of their receipt. On receipt of a complete notice the Bureau shall, within no more than two months, publish its contents, with any diagrams and maps and the date of receipt, in the BR IFIC which shall constitute the acknowledgement to the notifying administration of receipt of its notice¹¹. When the Bureau is not in a position to comply with the time limit referred to above, it shall periodically so inform the administrations, giving the reasons therefor. (WRC-12)

11.29 The Bureau shall not postpone the formulation of a finding on a complete notice unless it lacks sufficient data to reach a conclusion thereon. Moreover, the Bureau shall not act upon any notice having a technical bearing on an earlier notice which is still under consideration by the Bureau until it has reached a finding with respect to the earlier notice.

¹¹ **11.28.1** In case of satellite networks or systems not subject to the coordination procedure under Section II of Article 9, an administration believing that unacceptable interference may be caused to its existing or planned satellite networks or systems by submitted modifications to the characteristics initially published under No. **9.2B** may provide its comments to the notifying administration with copy to the Bureau. The Bureau shall publish any such comments received on its website. Both administrations shall thereafter cooperate to resolve any difficulties. (WRC-23)

11.30 Each notice shall be examined:

- 11.31** *a)* with respect to its conformity with the Table of Frequency Allocations¹² and the other provisions¹³ of these Regulations, except those relating to conformity with the procedures for obtaining coordination or the probability of harmful interference, or those relating to conformity with a plan, as appropriate, which are the subject of the following sub-paragraphs;¹⁴
- 11.32** *b)* with respect to its conformity with the procedures relating to coordination with other administrations applicable to the radiocommunication service and the frequency band concerned; or
- 11.32A** *c)* with respect to the probability of harmful interference that may be caused to or by assignments recorded with a favourable finding under Nos. **11.36** and **11.37** or **11.38**, or recorded in application of No. **11.41**, or published under Nos. **9.38** or **9.58** but not yet notified, as appropriate, for those cases for which the notifying administration states that the procedure for coordination under Nos. **9.7**, **9.7A**, **9.7B**, **9.11**, **9.12**, **9.12A**, **9.13** or **9.14**, could not be successfully completed (see also No. **9.65**);^{15, 16} or (WRC-15)

¹² **11.31.1** Conformity with the Table of Frequency Allocations implies the successful application of No. **9.21**, when necessary. However, the recording of the assignment with respect to those objecting administration(s) whose agreement(s) have not been obtained will be with a favourable finding, subject to the condition that the assignment in question shall not cause harmful interference to nor claim protection from the service(s) of the objecting administration(s) from which the agreement was sought. With respect to the administration(s) which have not objected under No. **9.21**, the recording of the assignment shall also be made with a favourable finding. (WRC-03)

¹³ **11.31.2** The “other provisions” shall be identified and included in the Rules of Procedure.

¹⁴ **11.31.3** Notices relating to radio astronomy stations are examined with respect to No. **11.31** only.

¹⁵ **11.32A.1** The examination of such notices with respect to any other frequency assignment for which a request for coordination under Nos. **9.7**, **9.7A**, **9.7B**, **9.12**, **9.12A** or **9.13**, as appropriate, has been published under No. **9.38** but not yet notified shall be effected by the Bureau in the order of their publication under the same number using the most recent information available. (WRC-2000)

¹⁶ **11.32A.2** For the application of No. **11.32A** with respect to the procedure for coordination under No. **9.7** in the frequency bands 5 725.5–850 MHz (Region 1), 5 850.6–725 MHz and 7 025.7–075 MHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 7°, and in the frequency bands 10.95–11.2 GHz, 11.45–11.7 GHz, 11.7–12.2 GHz (Region 2), 12.2–12.5 GHz (Region 3), 12.5–12.7 GHz (Regions 1 and 3) and 12.7–12.75 GHz (space-to-Earth) and 13.75–14.5 GHz (Earth-to-space) for satellite networks having a nominal orbital separation in the geostationary-satellite orbit of more than 6°, Resolution **762** (WRC-15) shall apply. For other cases, the methodology shall be identified and included in the Rules of Procedure, if so required. (WRC-15)

- 11.33** *d)* with respect to the probability of harmful interference that may be caused to or by other assignments recorded with a favourable finding in application of Nos. **11.36** and **11.37** or **11.38** or in application of No. **11.41**, as appropriate, for those cases for which the notifying administration states that the procedure for coordination or prior agreement under Nos. **9.15¹⁷**, **9.16¹⁷** **9.17¹⁷** **9.17A** or **9.18¹⁷** could not be successfully completed (see also No. **9.65**);¹⁸ or (WRC-2000)
- 11.34** *e)* where appropriate, with respect to its conformity with a world or regional allotment or assignment plan and the associated provisions.

11.35 In cases where the Bureau is not in a position to conduct the examination under No. **11.32A** or **11.33**, the Bureau shall immediately inform the notifying administration, which may then resubmit its notice under No. **11.41**, under the assumption that the finding under No. **11.32A** or **11.33** is unfavourable. (WRC-2000)

11.36 When the examination with respect to No. **11.31** leads to a favourable finding, the assignment shall be recorded in the Master Register or examined further with respect to Nos. **11.32** to **11.34**, as appropriate. When the finding with respect to No. **11.31** is unfavourable, the assignment shall be recorded in the Master Register for information purposes and subject to application of No. **8.5**, only if the administration undertakes that it will be operated in accordance with No. **4.4**; otherwise the notice shall be returned with an indication of the appropriate action.

11.37 When the examination with respect to No. **11.32** leads to a favourable finding, the assignment shall be recorded in the Master Register indicating the administrations with which the coordination procedure has been completed^{19,20}. When the finding is unfavourable, the notice shall be returned to the notifying administration, with an indication of the appropriate action, if Nos. **11.32A** or **11.33** do not apply. (WRC-12)

11.38 When the examination with respect to Nos. **11.32A** or **11.33** leads to a favourable finding, the assignment shall be recorded in the Master Register indicating the names of the administrations with which coordination was completed and those with which it was not completed but in respect of which the finding was favourable. When the finding is unfavourable, the notice shall be returned with an indication of the appropriate action.

¹⁷ **11.33.1** When typical earth stations are involved, administrations are required to furnish the necessary information to enable the Bureau to effect the examination.

¹⁸ **11.33.2** The examination under No. **11.33** shall also take into account assignments for terrestrial services which are in use or which are to be brought into use within the next three years and have been communicated to the Bureau as a result of continuing disagreement in coordination.

¹⁹ **11.37.1** When the agreement of the administrations affected has been obtained only for a specified period, the Bureau shall be notified accordingly and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned.

²⁰ **11.37.2** When a frequency assignment to a space station in the broadcasting-satellite service in a non-planned band other than the frequency band 21.4-22 GHz is recorded in the Master Register, a note shall be entered in the remarks column indicating that such recording does not prejudice in any way the decisions to be included in the agreements and associated plans referred to in Resolution **507** (Rev.WRC-19). (WRC-19)

11.39 When the examination with respect to No. **11.34** leads to a favourable finding, the assignment shall be recorded in the Master Register. When the finding is unfavourable, the notice shall be returned to the notifying administration, with an indication of the appropriate action. However, notices under Appendices **25**, **26** or **27** which are in accordance with the technical principles of the relevant appendix but not with the associated allotment plan shall be treated as follows: (WRC-03)

11.39A In the case of a notice in conformity with the technical principles of Appendix **27**, but not in conformity with the Allotment Plan, the Bureau shall examine whether the protection specified in Appendix **27** is afforded to the allotments in the Plan and to assignments already recorded in the Master Register with a favourable finding.

11.39B When the examination under No. **11.39A** leads to a favourable finding, the assignment shall be recorded in the Master Register. When the finding is unfavourable, the assignment shall be recorded in the Master Register with a symbol indicating that it shall cause no harmful interference to any frequency assignment which is either in conformity with the Allotment Plan or recorded in the Master Register with a favourable finding with respect to No. **11.39A**.

11.39C A notice in conformity with the technical principles of Appendix **26**, but not in conformity with the Allotment Plan, shall be examined with respect to the allotments in Part III of Appendix **26**.

11.39D When the examination under No. **11.39C** leads to a favourable finding, the assignment shall be recorded in the Master Register. When the finding is unfavourable, the assignment shall be recorded in the Master Register with a symbol indicating that it shall cause no harmful interference to any frequency assignment which is either in conformity with the Allotment Plan or recorded in the Master Register with a favourable finding with respect to No. **11.39C**.

11.39E In the case of a notice not in conformity with the Allotment Plan of Appendix **25**, the assignment may be recorded provisionally in the Master Register on the condition that the administration has initiated the procedure of Appendix **25** in accordance with § 25/1.23 of Section I of Appendix **25**.

11.39F A notice which is not in conformity with the technical principles of Appendices **25**, **26** or **27**, as applicable, shall be returned to the notifying administration, unless the administration undertakes that it will be operated in accordance with No. **4.4**; in such a case the assignment shall be recorded in the Master Register for information purposes and subject to application of No. **8.5**. (WRC-03)

11.40 Not used.

11.41 After a notice is returned under No. **11.38**, should the notifying administration resubmit the notice²¹ and insist upon its reconsideration, the Bureau shall enter the assignment in the Master Register with an indication of those administrations whose assignments were the basis of the unfavourable finding (see also No. **11.42** below). (WRC-12)

11.41.1 (SUP - WRC-12)

²¹ **11.41.2** When submitting notices in application of No. **11.41**, the notifying administration shall indicate to the Bureau that efforts have been made to effect coordination with those administrations whose assignments were the basis of the unfavourable findings under No. **11.38**, without success. (WRC-12)

11.41A Should the assignments that were the basis of the unfavourable finding under Nos. **11.32A** or **11.33** not be brought into use within the period specified in Nos. **11.24**, **11.25** or **11.44**, as appropriate, then the finding of the assignments resubmitted under No. **11.41** shall be reviewed accordingly.

11.41B Should the coordination procedure specified in No. **11.32** be completed with an administration whose assignments were the basis for the recording made under No. **11.41**, then, based on the updated information sent by the notifying administration, the relevant remarks or indications relating to assignments for which an unfavourable finding led to their recording under No. **11.41** shall be removed. (WRC-12)

11.42 Should harmful interference actually be caused by an assignment recorded under No. **11.41** to any recorded assignment which was the basis of the unfavourable finding, the administration responsible for the station using the frequency assignment recorded under No. **11.41** shall, upon receipt of a report providing the particulars relating to the harmful interference²², immediately eliminate this harmful interference. (WRC-12)

11.42A In applying No. **11.42** with respect to satellite networks, administrations involved shall cooperate in the elimination of harmful interference and may request the assistance of the Bureau, and shall exchange relevant technical and operational information required to resolve the issue. Should any administration involved in the matter inform the Bureau that all efforts to resolve the harmful interference have failed, the Bureau shall immediately inform other involved administrations and prepare a report, together with all necessary supporting documents (including comments from the administrations involved), for the next meeting of the Board for its consideration and any required action (including the possible cancellation of the assignment recorded under No. **11.41**), as appropriate. The Bureau shall thereafter implement the decision of the Board and inform the administrations concerned. (WRC-12)

11.43 In every case when a new assignment is recorded in the Master Register it shall, in accordance with the provisions of Article **8** of this Chapter, include an indication of the finding reflecting the status of the assignment. This information shall also be published in the BR IFIC.

11.43A A notice of a change in the characteristics of an assignment already recorded, as specified in Appendix **4**, shall be examined by the Bureau under Nos. **11.31** to **11.34**, as appropriate. Any change to the characteristics of an assignment that has been recorded and confirmed as having been brought into use shall be brought into use within five years from the date of the notification of the modification. Any change to the characteristics of an assignment that has been recorded but not yet brought into use shall be brought into use within the period provided for in No. **11.44**. (WRC-07)

²² **11.42.1** When providing the particulars relating to the harmful interference under No. **11.42**, administrations involved shall use, to the maximum extent possible, the format prescribed in Appendix **10** of the Radio Regulations. (WRC-12)

11.43B In the case of a change in the characteristics of an assignment which is in conformity with No. **11.31**, should the Bureau reach a favourable finding with respect to Nos. **11.32** to **11.34**, as appropriate, or find that the changes do not increase the probability of harmful interference to assignments already recorded, the amended assignment shall retain the original date of entry in the Master Register. The date of receipt by the Bureau of the notice relating to the change shall be entered in the Master Register.

11.43C Where the notifying administration resubmits the notice and the Bureau finds that the coordination procedures specified in No. **11.32** have been successfully completed with all administrations whose space or terrestrial radiocommunication stations may be affected, the assignment shall be recorded in the Master Register. The date of receipt by the Bureau of the original notice shall be entered in the appropriate column of the Master Register. The date of receipt by the Bureau of the resubmitted notice shall be entered in the “Remarks” column.

11.43D Where the notifying administration resubmits the notice with a request that the Bureau effect the required coordination under Nos. **9.7** to **9.19**, the Bureau shall take the necessary action in accordance with the relevant provisions of Articles **9** and **11**, as appropriate. However, in any subsequent recording of the assignment, the date of receipt by the Bureau of the resubmitted notice shall be entered in the “Remarks” column.

11.44 The notified date^{23, 24, 25} of bringing into use of any frequency assignment to a space station of a satellite network or system shall be not later than seven years following the date of receipt by the Bureau of the relevant complete information under No. **9.1** or **9.2** in the case of satellite networks or systems not subject to Section II of Article **9** or under No. **9.30** in the case of satellite networks or systems subject to Section II of Article **9**. Any frequency assignment not brought into use within the required period shall be cancelled by the Bureau after having informed the administration at least three months before the expiry of this period. (WRC-23)

11.44A A notice not conforming to No. **11.44** shall be returned to the notifying administration with a recommendation to restart the advance publication procedure or the coordination procedure, as appropriate. (WRC-23)

²³ **11.44.1** In the case of space station frequency assignments that are brought into use prior to the completion of the coordination process, and for which the Resolution **49** (Rev.WRC-23) or Resolution **552** (Rev.WRC-23) data, as appropriate, have been submitted to the Bureau, the assignment shall continue to be taken into consideration for a maximum period of seven years from the date of receipt of the relevant information under No. **9.30**. If the first notice for recording of the assignments in question under No. **11.15** related to No. **9.1** or No. **9.30** has not been received by the Bureau by the end of this seven-year period, the assignments shall be cancelled by the Bureau after having informed the notifying administration of its pending actions six months in advance. (WRC-23)

²⁴ **11.44.2** The notified date of bringing into use of a frequency assignment to a space station of a satellite network or system shall be the date of the commencement of the continuous period defined in No. **11.44B** or No. **11.44C**, or the date of deployment as defined in No. **11.44D** or No. **11.44E**, as applicable. (WRC-19)

²⁵ **11.44.3, 11.44B.1, 11.44C.2, 11.44D.2** and **11.44E.1** Upon receipt of this information and whenever it appears from reliable information available that a notified frequency assignment has not been brought into use in accordance with No. **11.44**, No. **11.44B**, No. **11.44C**, No. **11.44D** or No. **11.44E**, as the case may be, the consultation procedures and subsequent applicable course of action prescribed in No. **13.6** shall apply, as appropriate. (WRC-19)

11.44B A frequency assignment to a space station in the geostationary-satellite orbit shall be considered as having been brought into use when a space station in the geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment has been deployed and maintained at the notified orbital position for a continuous period of 90 days. The notifying administration shall so inform the Bureau within 30 days from the end of the 90-day period^{25, 26, 26bis}. On receipt of the information sent under this provision, the Bureau shall make that information available on the ITU website as soon as possible and shall publish it in the BR IFIC. Resolution 40 (Rev.WRC-19) shall apply. (WRC-23)

11.44C A frequency assignment to a space station in a non-geostationary-satellite orbit network or system in the fixed-satellite service, the mobile-satellite service or the broadcasting-satellite service shall be considered as having been brought into use when a space station with the capability of transmitting or receiving that frequency assignment has been deployed and maintained on one of the notified orbital plane(s)²⁷ of the non-geostationary satellite network or system for a continuous period of 90 days, irrespective of the notified number of orbital planes and satellites per orbital plane in the network or system. The notifying administration shall so inform the Bureau within 30 days from the end of the 90-day period^{25, 26bis, 28, 29}. On receipt of the information sent under this provision, the Bureau shall make that information available on the ITU website as soon as possible and shall publish it in the BR IFIC subsequently. (WRC-23)

²⁶ **11.44B.2** A frequency assignment to a space station in the geostationary-satellite orbit with a notified date of bringing into use more than 120 days prior to the date of receipt of the notification information shall also be considered as having been brought into use if the notifying administration confirms, when submitting the notification information for this assignment, that a space station in the geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment has been deployed and maintained for a continuous period of time from the notified date of bringing into use until the date of receipt of the notification information for this frequency assignment. (WRC-15)

^{26bis} **11.44B.3 and 11.44C.5** If the notifying administration has informed the Bureau of the date of commencement of the 90-day bringing-into-use period, but, as of 15 days after the end of the 90-day bringing-into-use period, has not yet informed the Bureau of the completion of the bringing-into-use period in accordance with Nos. **11.44B** or **11.44C**, the Bureau shall promptly send the notifying administration a reminder of its obligation to inform the Bureau of the completion of the bringing-into-use period under Nos. **11.44B** or **11.44C**. (WRC-23)

²⁷ **11.44C.1 and 11.44D.1** For the purposes of No. **11.44C** or No. **11.44D**, the term “notified orbital plane” means an orbital plane of the non-geostationary-satellite system, as provided to the Bureau in the most recent notification information for the system’s frequency assignments, that corresponds to Items A.4.b.4.a, A.4.b.4.d, A.4.b.4.e and A.4.b.4.i (only for orbits whose altitudes of the apogee and perigee are different) in Table A of Annex 2 to Appendix 4. For the purposes of No. **11.44C**, Resolution 8 (WRC-23) shall apply. (WRC-23)

²⁸ **11.44C.3** A frequency assignment to a space station in a non-geostationary-satellite orbit with a notified date of bringing into use more than 120 days prior to the date of receipt of the notification information shall also be considered as having been brought into use if the notifying administration confirms, when submitting the notification information for this assignment, that a space station in a non-geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment has been deployed and maintained on one of the notified orbital planes as provided for in No. **11.44C** for a continuous period of time from the notified date of bringing into use until the date of receipt of the notification information for this frequency assignment. (WRC-19)

²⁹ **11.44C.4 and 11.44D.3** For the purposes of Nos. **11.44C** and **11.44D**, when the notifying administration informs the Bureau of the bringing into use, it shall identify the orbital plane number as in the latest notification information received by the Bureau that corresponds to the orbital plane in which the space station has been deployed to bring into use the frequency assignments. (WRC-19)

11.44D A frequency assignment to a space station in a non-geostationary satellite orbit network or system with “Earth” as the reference body, other than a frequency assignment to which No. **11.44C** applies, shall be considered as having been brought into use when a space station with the capability of transmitting or receiving that frequency assignment has been deployed on one of the notified orbital plane(s)²⁷ of the non-geostationary satellite network or system, irrespective of the notified number of orbital planes and satellites per orbital plane in the network or system. The notifying administration shall so inform the Bureau as soon as possible, but not later than 30 days after the end of the period referred to in No. **11.44**.^{25, 29} On receipt of the information sent under this provision, the Bureau shall make that information available on the ITU website as soon as possible and shall publish it in the BR IFIC subsequently. (WRC-19)

11.44E A frequency assignment to a space station with a reference body that is not “Earth” shall be considered as having been brought into use when the notifying administration informs the Bureau that a space station with the capability of transmitting or receiving that frequency assignment has been deployed in accordance with the notification information. The notifying administration shall so inform the Bureau as soon as possible, but not later than 30 days after the end of the period referred to in No. **11.44**.²⁵ On receipt of the information sent under this provision, the Bureau shall make that information available on the ITU website as soon as possible and shall publish it in the BR IFIC subsequently. (WRC-19)

11.44F (SUP - WRC-03)

11.44G (SUP - WRC-03)

11.44H (SUP - WRC-03)

11.44I (SUP - WRC-03)

11.45 The notified date of bringing into use of an assignment to a terrestrial station will be extended at the request of the notifying administration by not more than six months.

11.46 In applying the provisions of this Article, any resubmitted notice which is received by the Bureau more than six months after the date on which the original notice was returned by the Bureau shall be considered to be a new notification with a new date of receipt³⁰. For frequency assignments to a space station, should the new date of receipt of such a notice not comply with the period specified in No. **11.44.1** or No. **11.43A**, as appropriate, the notice shall be returned to the notifying administration in the case of No. **11.44.1**, and the notice shall be examined as a new notice of a change in the characteristics of an assignment already recorded with a new date of receipt in the case of No. **11.43A**. The Bureau shall appropriately reflect the resubmission on the ITU website within 30 days of receipt. (WRC-19)

³⁰ **11.46.1** If the resubmitted notice is not received by the Bureau within four months from the date on which the original notice was returned by the Bureau, the Bureau shall promptly send a reminder to the notifying administration. (WRC-19)

11.47 All frequency assignments notified in advance of their being brought into use shall be entered provisionally in the Master Register. Any frequency assignment to a space station provisionally recorded under this provision shall be brought into use no later than the end of the period provided under No. **11.44**. Any other frequency assignment provisionally recorded under this provision shall be brought into use by the date specified in the notice, or by the end of the extension period granted under No. **11.45**, as the case may be. Unless the Bureau has been informed by the notifying administration of the bringing into use of the assignment, it shall, no later than fifteen days before either the notified date of bringing into use, in the case of an earth station, or the end of the regulatory period established under No. **11.44** or No. **11.45**, as appropriate, send a reminder requesting confirmation that the assignment has been brought into use within that regulatory period. If the Bureau does not receive that confirmation within thirty days following the notified date of bringing into use, in the case of an earth station, or the period provided under No. **11.44** or No. **11.45**, as the case may be, it shall cancel the entry in the Master Register. The Bureau shall, however, inform the administration concerned before taking such action. (WRC-07)

11.48 If, after the expiry of the period of seven years from the date of receipt of the relevant complete information referred to in No. **9.1** or **9.2** in the case of satellite networks or systems not subject to Section II of Article **9** or in No. **9.30** in the case of satellite networks or systems subject to Section II of Article **9**, the administration responsible for the satellite network has not brought the frequency assignments to stations of the network into use, or has not submitted the first notice for recording of the frequency assignments under No. **11.15**, or, where required, has not provided the due diligence information pursuant to Resolution **49** (Rev.WRC-23), as appropriate, the corresponding information published under Nos. **9.2B** and **9.38**, as appropriate, shall be cancelled, but only after the administration concerned has been informed at least six months before the expiry date referred to in Nos. **11.44** and **11.44.1** and, where required, § 10 of Annex 1 of Resolution **49** (Rev.WRC-23)³¹. (WRC-23)

³¹ **11.48.1** If the information pursuant to Resolution **552** (Rev.WRC-23) has not been provided, the corresponding information published under No. **9.38** shall be cancelled 30 days after the end of the seven-year period following the date of receipt by the Bureau of the relevant complete information under No. **9.30**. (WRC-23)

11.49 Wherever the use of a recorded frequency assignment to a space station of a satellite network or to all space stations of a non-geostationary-satellite system is suspended for a period exceeding six months, the notifying administration shall inform the Bureau of the date on which such use was suspended. When the recorded assignment is brought back into use, the notifying administration shall, subject to the provisions of Nos. **11.49.1**, **11.49.2**, **11.49.3** or **11.49.4**, as applicable, so inform the Bureau, as soon as possible. On receipt of the information sent under this provision, the Bureau shall make that information available as soon as possible on the ITU website and shall publish it in the BR IFIC. The date on which the recorded assignment is brought back into use³², ^{32bis}, ³³, ³⁴, ³⁵, ³⁶ shall be not later than three years from the date on which the use of the frequency assignment was suspended, provided that the notifying administration informs the Bureau

³² **11.49.1** The date of bringing back into use of a frequency assignment to a space station in the geostationary-satellite orbit shall be the date of the commencement of the 90-day period defined below. A frequency assignment to a space station in the geostationary-satellite orbit shall be considered as having been brought back into use when a space station in the geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment has been deployed and maintained at the notified orbital position for a continuous period of 90 days. The notifying administration shall so inform the Bureau within 30 days from the end of the 90-day period. Resolution **40** (Rev.WRC-19) shall apply. (WRC-19)

^{32bis} **11.49.1A and 11.49.2A** If the notifying administration has informed the Bureau of the date of commencement of the 90-day bringing-back-into-use period, but, as of 15 days after the end of the 90-day bringing-back-into-use period, has not yet informed the Bureau of the completion of the bringing-back-into-use period in accordance with Nos. **11.49.1** or **11.49.2**, the Bureau shall promptly send the notifying administration a reminder of its obligation to inform the Bureau of the completion of the bringing-back-into-use period under Nos. **11.49.1** or **11.49.2**, as applicable. (WRC-23)

³³ **11.49.2** The date of bringing back into use of a frequency assignment to a space station in a non-geostationary-satellite orbit network or system in the fixed-satellite service, the mobile-satellite service or the broadcasting-satellite service shall be the date of the commencement of the 90-day period defined below. A frequency assignment to such a space station shall be considered as having been brought back into use when a space station with the capability of transmitting or receiving that frequency assignment has been deployed and maintained on one of the notified orbital plane(s) (see No. **11.49.5**) of the non-geostationary-satellite network or system for a continuous period of 90 days, irrespective of the notified number of orbital planes and satellites per orbital plane in the network or system. The notifying administration shall so inform the Bureau within 30 days from the end of the 90-day period. When the notifying administration informs the Bureau of the bringing back into use, it shall identify the orbital plane number as in the latest notification information received by the Bureau that corresponds to the orbital plane in which the space station has been deployed to bring back into use the frequency assignments. (WRC-19)

³⁴ **11.49.3** A frequency assignment to a space station in a non-geostationary-satellite orbit network or system with “Earth” as the reference body, other than a frequency assignment to which No. **11.49.2** applies, shall be considered as having been brought back into use when a space station with the capability of transmitting or receiving that frequency assignment has been deployed on one of the notified orbital plane(s) (see No. **11.49.5**) of the non-geostationary-satellite network or system, irrespective of the notified number of orbital planes and satellites per orbital plane in the network or system. The notifying administration shall so inform the Bureau not later than 30 days after the end of the suspension period referred to in No. **11.49**. When the notifying administration informs the Bureau of the bringing back into use, it shall identify the orbital plane number as in the latest notification information received by the Bureau that corresponds to the orbital plane in which the space station has been deployed to bring back into use the frequency assignments. (WRC-19)

³⁵ **11.49.4** A frequency assignment to a space station with a reference body that is not “Earth” shall be considered as having been brought back into use when the notifying administration informs the Bureau that a space station with the capability of transmitting or receiving that frequency assignment has been deployed and operated in accordance with the notification information. The notifying administration shall so inform the Bureau not later than 30 days after the end of the suspension period referred to in No. **11.49**. (WRC-19)

³⁶ **11.49.5** For the purposes of Nos. **11.49.2** and **11.49.3**, the term “notified orbital plane” means an orbital plane of the non-geostationary-satellite system, as provided to the Bureau in the most recent notification information for the system’s frequency assignments, that corresponds to Items A.4.b.4.a, A.4.b.4.d, A.4.b.4.e and A.4.b.4.i (only for orbits whose altitudes of the apogee and perigee are different) in Table A of Annex 2 to Appendix 4. For the purposes of No. **11.49.2**, Resolution **8** (WRC-23) shall apply. (WRC-23)

of the suspension within six months from the date on which the use was suspended. If the notifying administration informs the Bureau of the suspension more than six months after the date on which the use of the frequency assignment was suspended, this three-year time period shall be reduced. In this case, the amount by which the three-year period shall be reduced shall be equal to the amount of time that has elapsed between the end of the six-month period and the date that the Bureau is informed of the suspension. If the notifying administration informs the Bureau of the suspension more than 21 months after the date on which the use of the frequency assignment was suspended, the frequency assignment shall be cancelled. Ninety days before the end of the period of suspension, the Bureau shall send a reminder to the notifying administration. If the Bureau does not receive the declaration of the commencement of the bringing-back-into-use period within thirty days following the limit date of the period of suspension established in accordance with this provision, it shall cancel the entry in the Master Register. The Bureau shall, however, inform the administration concerned before taking such action. (WRC-23)

11.50 The Bureau shall review periodically the Master Register with the aim of maintaining or improving its accuracy, with particular emphasis on the review of the findings so as to adjust them to the changing allocation situation after each conference. (WRC-03)

Section III – Maintenance of the recording of frequency assignments to non-geostationary-satellite systems in the Master Register (WRC-19)

11.51 For frequency assignments to some non-geostationary-satellite systems in specific frequency bands and services, Resolution 35 (Rev.WRC-23) and Resolution 8 (WRC-23) shall apply. (WRC-23)

ARTICLE 12

Seasonal planning of the HF bands allocated to the broadcasting service between 5 900 kHz and 26 100 kHz

Section I – Introduction

12.1 The use of the frequency bands allocated to high frequency broadcasting (HFBC) between 5 900 kHz and 26 100 kHz shall be based on the principles given below and shall be in conformity with seasonal planning based on a coordination procedure between administrations (referred in this Article as the Procedure) described in **12.2** to **12.45**. An administration may authorize a broadcasting organization (referred to in this Article as a broadcaster), among others, to act on its behalf in this coordination.

Section II – Principles

12.2 § 1 The Procedure shall be based on the principle of equal rights of all countries, large or small, to equitable access to these bands. Attempts shall also be made to achieve efficient use of these frequency bands, account being taken of the technical and economic constraints that may exist in certain cases. On the basis of the foregoing, the following principles shall be applied.

12.3 § 2 All broadcasting requirements, formulated by administrations, shall be taken into account and treated on an equitable basis, so as to guarantee the equality of rights referred to in No. **12.2**, and to enable each administration to provide a satisfactory service.

12.4 § 3 The Procedure shall be based solely on the broadcasting requirements expected to become operational during the schedule period. It shall furthermore be flexible in order to take into account new broadcasting requirements and modifications to existing broadcasting requirements.

12.5 § 4 All broadcasting requirements, national¹ and international, shall be treated on an equal basis, with due consideration of the differences between these two kinds of broadcasting requirements.

12.6 § 5 In the Procedure, an attempt shall be made to ensure, as far as practicable, continuity of use of a frequency or of a frequency band.

12.7 § 6 The Procedure shall be based on double-sideband or single-sideband emissions. Other modulation techniques recommended by ITU-R shall be permitted in place of double-sideband or single-sideband emissions, provided that the level of interference caused to existing emissions is not increased.

12.8 § 7 To promote efficient spectrum use, the number of frequencies used shall be the minimum necessary to provide a satisfactory quality of reception. Whenever practicable, only one frequency should be used.

¹ **12.5.1** An HF broadcasting requirement is considered as being for the purposes of national coverage when the transmitting station and its associated required service area are both located within the territory of the same country.

12.9 § 8 The Procedure shall include a technical analysis, as specified in the Radio Regulations Board Rules of Procedure.

12.10 § 9 The Procedure should encourage administrations or broadcasters empowered to make changes to pursue a continual coordination process to resolve incompatibilities, at meetings (regional² or worldwide, bilateral or multilateral) or by correspondence.

12.11 § 10 Regional coordination groups, which will facilitate bilateral and multilateral coordination among administrations and broadcasters in various regions of the world, shall identify themselves to the Bureau. Administrations and broadcasters shall be urged to participate in the relevant regional coordination groups. However, such participation would be on a voluntary basis.

12.12 § 11 When an administration, in particular the administration of a developing country, requests assistance in the application of the Procedure, the Bureau shall take appropriate action, including, if need be, coordination of the requirements submitted by the requesting administration.

12.13 § 12 The regional coordination groups should follow the coordination procedures prescribed in Section III. In the process of coordinating broadcasting requirements, an attempt shall be made to obtain agreement to the maximum number of submitted requirements with the quality level acceptable to administrations or broadcasters.

12.14 § 13 In order to ensure maximum success from the Procedure, administrations and broadcasters shall show the utmost goodwill and mutual cooperation, and give due consideration to all the relevant technical and operational factors involved.

Section III – The Procedure

12.15 The application of the Procedure shall be facilitated and coordinated by the Bureau as defined elsewhere in this Article.

12.16 Twice yearly, administrations shall submit their projected seasonal broadcasting schedules in the relevant frequency bands to the Bureau. These schedules shall cover the following seasonal periods:

12.17 Schedule A: Last Sunday in March to last Sunday in October.

12.18 Schedule B: Last Sunday in October to last Sunday in March.

12.19 Implementation of these schedules shall start at 0100 UTC.

12.20 If an administration considers it necessary to take account of propagation changes during the schedule period, it is recommended, for reasons of spectrum efficiency, that such requirements should be implemented on the following dates:

12.21 first Sunday in May;

12.22 first Sunday in September.

12.23 Implementation of these changes shall start at 0100 UTC on these dates.

² **12.10.1** The word “regional” in this Article is not related to the ITU Regions.

12.24 Other start and stop dates within a schedule period may be used to accommodate requirements that have different schedule periods, e.g. special events, clock changes on different dates not coincident with the schedule period, etc.

12.25 Administrations may include assignments in their schedules up to one year in advance of their use.

12.26 In those cases where an administration does not indicate its requirements for a new seasonal schedule, the Bureau shall use the assignments from the previous corresponding seasonal schedule for this administration for the new schedule period. A note in the schedule shall be used to identify such requirements. The Bureau shall follow this practice for two consecutive schedule periods.

12.27 Following the action taken in No. **12.26**, the Bureau shall notify the administration concerned that the schedule will not include their broadcasting requirements unless the administration advises otherwise.

12.28 When an administration decides to cease its broadcasting service in the HF bands, it shall notify the Bureau of that decision.

12.29 The frequencies in the schedules should be those that will be used during the season concerned, and should be the minimum number required to provide satisfactory reception of the programmes in each of the areas and for each of the periods intended. In each schedule, to the maximum possible extent, the frequencies to be used in each reception area should remain unchanged from season to season.

12.30 Administrations are encouraged to coordinate their schedules with other administrations as far as possible prior to submission. An administration may, on behalf of a group of administrations, submit their coordinated schedules, the frequencies of which shall however have no priority for use over those submitted by other administrations.

12.31 The closing dates for receipt by the Bureau of the schedules relating to the two seasons referred to in Nos. **12.17** and **12.18** shall be established and published by the Bureau.

12.32 The schedules shall be submitted with the relevant data as specified in Appendix 4.

12.33 Upon receipt of the schedules, the Bureau shall, in accordance with the Rules of Procedure, validate the data where necessary, perform a compatibility analysis and prepare the tentative high frequency broadcasting schedules (the Tentative Schedules). These Schedules shall include all assignments where administrations gave no alternatives, the selections made by the Bureau from any alternatives given, and the frequencies selected by the Bureau in cases where the need for its assistance was indicated by their intentional omission from the individual schedules. (WRC-03)

12.34 The Tentative Schedules shall be published two months and one month before the start of each of the two schedule periods in Nos. **12.17** and **12.18**. (WRC-03)

12.35 Administrations should examine the Tentative Schedule and should coordinate their frequency schedules to resolve or to minimize, as far as possible, any incompatibilities identified by the compatibility analysis, or by the monitoring results of similar assignments, or by a combination of both.

12.36 Coordination shall be achieved through bilateral or multilateral meetings of administrations or broadcasters or other means acceptable to the parties concerned.

12.37 Administrations, either jointly or separately, shall inform the Bureau, as quickly as possible, but no later than two weeks prior to the start of the schedule period, of any changes to their requirements resulting from the coordination process. The Bureau shall prepare a new consolidated high frequency broadcasting schedule (the Schedule), and shall perform a new compatibility analysis. The Bureau shall publish the Schedule and the results of the compatibility analysis at the start of the relevant broadcasting season.

12.38 Administrations shall notify the Bureau of changes to their schedules as quickly as possible and the Bureau shall update and make available the Schedule on a monthly basis. The Bureau shall perform new compatibility analyses and publish the updated Schedule and the results of these analyses at regular intervals during the season. (WRC-03)

12.39 To facilitate the coordination process, the Bureau shall also forward the schedules to the regional coordination groups.

12.40 Regional coordination groups should consider communicating with administrations and broadcasters through the use of any appropriate, mutually agreeable means, such as e-mail, news-groups, bulletin boards and other forms of electronic data transfer.

12.41 Each regional coordination group should consider appointing a steering committee to ensure smooth progress of the coordination process.

12.42 During and after the coordination process, the regional coordination groups shall exchange schedule data among themselves with a view to further enhancing the efficacy of the coordination process.

12.43 One month after the end of a season, the Bureau shall publish the final high frequency broadcasting schedule (the Final Schedule). If any changes have been notified to the Bureau since the previous consolidated Schedule, the Bureau shall also perform a compatibility analysis and publish it with the Final Schedule.

12.44 The Bureau should, as and when required, convene joint meetings of the representatives of all the regional coordination groups to develop strategies for further reduction of incompatibilities and to discuss related matters. The outcome of these meetings shall be circulated among the regional groups and administrations.

12.45 In a case of harmful interference involving the application of the provisions of Article 15, administrations are urged to exercise the utmost goodwill and mutual cooperation, taking into account all the relevant technical and operational factors of the case.

ARTICLE 13

Instructions to the Bureau

Section 0 – Development of the Rules of Procedure and proposals to resolve inconsistencies encountered in the application of the Radio Regulations (WRC-03)

13.0.1 The Board shall develop a new Rule of Procedure only when there is a clear need with proper justification for such a Rule. For all such Rules, the Board shall submit to the coming world radiocommunication conference the necessary modifications to the Radio Regulations, to alleviate such difficulties or inconsistencies and include its suggestions in the Report of the Director to the next world radiocommunication conference. (WRC-03)

13.0.2 If such a need is not identified under No. **13.0.1**, the Board shall submit also to the coming world radiocommunication conference the necessary modifications to the Radio Regulations to alleviate such difficulties or inconsistencies. (WRC-03)

Section I – Assistance to administrations by the Bureau

13.1 When an administration has difficulty in applying the procedures of Articles **9** and **11** and Appendices **30**, **30A** and **30B**, the Bureau shall, upon request, endeavour to assist in such cases.

13.2 When an administration has difficulty in resolving a case of harmful interference and seeks the assistance of the Bureau, the latter shall, as appropriate, help in identifying the source of the interference and seek the cooperation of the responsible administration in order to resolve the matter, and prepare a report for consideration by the Board, including draft recommendations to the administrations concerned.

13.3 When an administration so requests, the Bureau shall, using such means at its disposal as are appropriate in the circumstances, conduct a study of reported cases of alleged contravention or non-observance of these Regulations and shall prepare a report for consideration by the Board, including draft recommendations to the administrations concerned.

Section II – Maintenance of the Master Register and of World Plans by the Bureau

13.4 The Bureau shall be solely responsible for maintenance of the Master Register in accordance with the Rules of Procedure, and shall:

13.5 *a)* following consultation with administrations, from time to time make any necessary adjustments to the format, structure and presentation of data in the Master Register;

- 13.6 b) whenever it appears from reliable information available that a recorded assignment has not been brought into use, or is no longer in use, or continues to be in use but not in accordance with the notified required characteristics¹ as specified in Appendix 4, the Bureau shall consult the notifying administration and request clarification as to whether the assignment was brought into use in accordance with the notified characteristics or continues to be in use in accordance with the notified characteristics. Such a request shall include the reason for the query. In the event of a response and subject to the agreement of the notifying administration the Bureau shall cancel, suitably modify, or retain the basic characteristics of the entry. If the notifying administration does not respond within three months, the Bureau shall issue a reminder. In the event the notifying administration does not respond within one month of the first reminder, the Bureau shall issue a second reminder. In the event the notifying administration does not respond within one month of the second reminder, action taken by the Bureau to cancel the entry shall be subject to a decision of the Board. In the event of non-response or disagreement by the notifying administration, the entry will continue to be taken into account by the Bureau when conducting its examinations until the decision to cancel or modify the entry is made by the Board. In the event of a response, the Bureau shall inform the notifying administration of the conclusion reached by the Bureau within three months of the administration's response. When the Bureau is not in a position to comply with the three-month deadline referred to above, the Bureau shall so inform the notifying administration together with the reasons therefor. In case of disagreement between the notifying administration and the Bureau, the matter shall be carefully investigated by the Board, including taking into account submissions of additional supporting materials from administrations through the Bureau within the deadlines as established by the Board. The application of this provision shall not preclude the application of other provisions of the Radio Regulations. (WRC-19)
- 13.7 c) enter in the Master Register and publish in the Preface to the International Frequency Information Circular (BR IFIC) all frequencies prescribed by these Regulations for common use; (WRC-19)
- 13.8 d) make appropriate entries in the Master Register resulting from its examinations of frequency assignment notices in accordance with Article 11;
- 13.9 e) maintain and periodically update the Preface to the BR IFIC. (WRC-19)
- 13.10 The Bureau shall also compile, for publication by the Secretary-General in the form of the BR IFIC, comprehensive listings of entries extracted from the Master Register and such other extracts as may periodically be required. (WRC-19)
- 13.11 The Bureau shall maintain master copies of all world frequency allotment or assignment plans contained in Appendices to these Regulations, or adopted by world conferences convened by the Union, including, where applicable, the carrier-to-interference ratios, or margins, as appropriate, associated with each assignment or allotment, and incorporating any modifications resulting from the successful application of the relevant modification procedure, and shall provide such copies in an appropriate form for publication by the Secretary-General when justified by circumstances.

1 13.6.1 See also No. 11.51, frequency assignments to non-geostationary-satellite systems recorded in the Master Register. (WRC-19)

Section III – Maintenance of the Rules of Procedure by the Bureau

13.12 The Board shall approve a set of Rules of Procedure to govern its own activities and those of the Bureau in the application of the Radio Regulations, to ensure the impartial, accurate and consistent processing of frequency assignment notices and to assist in the application of these Regulations.

13.12A In the preparation and development of the Rules of Procedure, the Board, the Bureau and administrations shall apply the following steps:

- a) the Bureau shall also publish under No. **13.17**, on the ITU website, a list of future proposed Rules and the time-frame for their consideration by the Board and for comments by administrations on the list of future proposed Rules;
- b) any practice used by the Bureau in the application of the provisions of the Radio Regulations shall be identified and proposed for inclusion in the Rules of Procedure in accordance with the procedures of this section;
- c) all draft Rules prepared by the Bureau shall be available to administrations on the ITU website and by Circular Letter at least ten weeks prior to the start of the Board meeting;
- d) any comments on these draft Rules of Procedure from administrations shall be submitted to the Bureau at least four weeks before the start of the Board meeting;
- e) in submitting comments administrations should, if possible, suggest the actual text of their proposed Rules;
- f) all comments from administrations shall be posted on the ITU website. However, those comments that do not meet the above time-limits shall not be considered by the Board;
- g) any Rules of Procedure are to be in conformity with the spirit and principle of the Constitution, Convention and the Radio Regulations and shall avoid any relaxation to the application of the corresponding provisions of the Radio Regulation to which the Rules make reference. (WRC-03)

13.13 The Rules of Procedure shall include, *inter alia*, calculation methods and other data required for the application of these Regulations. These shall be based upon the decisions of world radiocommunication conferences and the Recommendations of the Radiocommunication Sector. Where requirements arise for new data for which there are no such decisions or Recommendations the Bureau shall develop such data in accordance with No. **13.14**, and shall revise them when appropriate decisions or Recommendations are available.

13.14 The Bureau shall submit to the Board the final drafts of all proposed changes to the Rules of Procedure. The Rules of Procedure approved by the Board shall be published and shall be open for comment by administrations. In case of continuing disagreement, the matter shall be submitted by the Director in his report, with the agreement of the concerned administration, to the next world radiocommunication conference. The Director of the Bureau shall also inform the appropriate study groups of this matter. Pending resolution of the matter, the Board and the Bureau shall continue to use the particular Rule of Procedure in dispute but, following resolution of the matter by a decision of a world radiocommunication conference, the Board shall promptly review and revise as necessary the Rules of Procedure and the Bureau shall review all relevant findings.

13.15 If an administration, or the Board or the Bureau identifies a need for a special study, in relation to the Rules of Procedure, of any provisions of these Regulations or of a regional agreement with an associated frequency allotment or assignment plan, the case shall be handled under No. **13.14**. The same shall apply if as a consequence of the review of a finding or other action by the Board it is necessary to re-examine the Rules of Procedure.

13.16 The Rules of Procedure shall be maintained and published in a form that will facilitate easy modification and maximize their value to administrations and other users.

Section IV – Board documents

13.17 The Bureau shall, where appropriate, prepare draft modifications or additions to the Rules of Procedure which shall be made available for comment before being submitted to the Board. One week beforehand, the draft agenda of each Board meeting shall be sent by facsimile, or mailed, to all administrations and shall also be made available in electronic form. At the same time, all documents which are both referred to in that draft agenda and available at that time shall be sent by facsimile, or mailed, to those administrations requesting them as well as simultaneously being made accessible in electronic form.

13.18 Within one week after a meeting of the Board, a summary of all decisions, including the reasons for each decision, taken in that meeting shall be made available on the ITU website. After each Board meeting the approved minutes of that meeting shall normally be circulated at least one month before the start of the following meeting to administrations by means of a circular letter and these approved minutes shall also be made available on the ITU website. (WRC-03)

13.19 A copy of all documents considered at the Board's meetings, including the minutes, shall be available for public inspection by administrations in the offices of the Bureau, and shall be made available in electronic form as soon as possible. (WRC-2000)

ARTICLE 14

Procedure for the review of a finding or other decision of the Bureau

14.1 Any administration may request a review of a finding, a review of the results of a special study under these Regulations or under a regional agreement and plan, or a review of any other decision of the Bureau. The review of a finding may also be undertaken on the initiative of the Bureau itself when it considers this is justified.

14.2 For this purpose, the administration concerned shall submit a request for a review to the Bureau; it shall also cite the relevant provisions of the Radio Regulations and other references and shall state the action it seeks.

14.3 The Bureau shall promptly acknowledge receipt of the request and shall consider the matter forthwith. Thereafter, every effort shall be made with the administration concerned to resolve the matter without adversely affecting the interests of other administrations.

14.4 If the outcome of the review successfully resolves the matter with the requesting administration without adversely affecting the interests of other administrations, the Bureau shall publish an outline of the review, the arguments, the settlement and any implications affecting other administrations for the information of all Members of the Union. If this review results in a modification to a finding previously formulated by the Bureau, the Bureau shall reapply the relevant steps of the procedure under which the previous finding had been formulated, including, if appropriate, removal of the corresponding entries from the Master Register or any consequential effect on notices subsequently received by the Bureau.

14.5 If the outcome of the review does not successfully resolve the matter, or if it would adversely affect the interests of other administrations, the Bureau shall prepare a report and send it in advance to the administration which requested the review and to any others concerned in order to enable them, if they so desire, to address the Board. The Bureau shall then send the report with all supporting documentation to the Board.

14.6 The decision of the Board on the review, to be taken in accordance with the Convention, shall be regarded as final in so far as the Bureau and the Board are concerned. That decision, together with the supporting information, shall be published as under No. **14.4**. If the review results in a modification to a finding previously formulated by the Bureau, the Bureau shall re-apply the relevant steps of the procedure under which the previous finding had been formulated, including, if appropriate, removal of the corresponding entries from the Master Register or any consequential effect on notices subsequently received by the Bureau. However, if the administration which requested the review disagrees with the Board's decision it may raise the matter at a world radiocommunication conference. (WRC-2000)

14.7 The Bureau shall then initiate all other necessary action decided by the Board.

14.8 Following resolution of the matter by a decision at a world radiocommunication conference, the Bureau shall promptly take the consequential actions, including a request to the Board for reviewing all relevant findings, if necessary.

CHAPTER IV

Interferences

ARTICLE 15

Interferences

Section I – Interference from Radio Stations

15.1 § 1 All stations are forbidden to carry out unnecessary transmissions, or the transmission of superfluous signals, or the transmission of false or misleading signals, or the transmission of signals without identification (except as provided for in Article 19).

15.2 § 2 Transmitting stations shall radiate only as much power as is necessary to ensure a satisfactory service.

15.3 § 3 In order to avoid interference (see also Article 3 and No. 22.1):

15.4 a) locations of transmitting stations and, where the nature of the service permits, locations of receiving stations shall be selected with particular care;

15.5 b) radiation in and reception from unnecessary directions shall be minimized by taking the maximum practical advantage of the properties of directional antennas whenever the nature of the service permits;

15.6 c) the choice and use of transmitters and receivers shall be in accordance with the provisions of Article 3;

15.7 d) the conditions specified under No. 22.1 shall be fulfilled.

15.8 § 4 Special consideration shall be given to avoiding interference on distress and safety frequencies, those related to distress and safety identified in Article 31 and those related to safety and regularity of flight identified in Appendix 27. (WRC-07)

15.9 § 5 The class of emission to be employed by a station should be such as to achieve minimum interference and to assure efficient spectrum utilization. In general this requires that in selecting the class of emission to meet these objectives every effort shall be made to minimize the bandwidth occupied, taking into account the operational and technical considerations of the service to be performed.

15.10 § 6 The out-of-band emissions of transmitting stations should not cause harmful interference to services which operate in adjacent bands in accordance with these Regulations and which use receivers in conformity with Nos. 3.3, 3.11, 3.12, 3.13 and relevant ITU-R Recommendations.

15.11 § 7 If, while complying with the provisions of Article 3, a station causes harmful interference through its spurious emissions, special measures shall be taken to eliminate such interference.

Section II – Interference from electrical apparatus and installations of any kind except equipment used for industrial, scientific and medical applications

15.12 § 8 Administrations shall take all practicable and necessary steps to ensure that the operation of electrical apparatus or installations of any kind, including power and telecommunication distribution networks, but excluding equipment used for industrial, scientific and medical applications, does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations¹.

Section III – Interference from equipment used for industrial, scientific and medical applications

15.13 § 9 Administrations shall take all practicable and necessary steps to ensure that radiation from equipment used for industrial, scientific and medical applications is minimal and that, outside the bands designated for use by this equipment, radiation from such equipment is at a level that does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations¹.

Section IV – Tests

15.14 § 10 1) Before authorizing tests and experiments in any station, each administration, in order to avoid harmful interference, shall prescribe the taking of all possible precautions such as the choice of frequency and of time and the reduction or, in all cases where this is possible, the suppression of radiation. Any harmful interference resulting from tests and experiments shall be eliminated with the least possible delay.

15.15 2) For the identification of transmissions made during tests, adjustments or experiments, see Article 19.

15.16 3) In the aeronautical radionavigation service, it is undesirable, for safety reasons, to transmit the normal identification during emissions conducted to check or adjust equipment already in service. Unidentified emissions should however be restricted to a minimum.

15.17 4) Signals for testing and adjustment shall be chosen in such a manner that no confusion will arise with a signal, abbreviation, etc., having a special meaning defined by these Regulations or by the International Code of Signals.

15.18 5) For testing stations in the mobile service see No. 57.9.

¹ **15.12.1** and **15.13.1** In this matter, administrations should be guided by the latest relevant ITU-R Recommendations.

Section V – Reports of Infringements

15.19 § 11 Infringements of the Constitution, Convention or Radio Regulations shall be reported to their respective administrations by the control organization, stations or inspectors detecting them. For this purpose they shall use forms similar to the specimen given in Appendix 9.

15.20 § 12 Representations relating to any serious infringement committed by a station shall be made to the administration of the country having jurisdiction over the station, by the administrations which detect it.

15.21 § 13 If an administration has information of an infringement of the Constitution, the Convention or the Radio Regulations (in particular Article 45 of the Constitution and No. 15.1 of the Radio Regulations) committed by a station under its jurisdiction, the administration shall ascertain the facts and take the necessary actions. (WRC-12)

Section VI – Procedure in a case of harmful interference

15.22 § 14 It is essential that Member States exercise the utmost goodwill and mutual assistance in the application of the provisions of Article 45 of the Constitution and of this Section to the settlement of problems of harmful interference.

15.23 § 15 In the settlement of these problems, due consideration shall be given to all factors involved, including the relevant technical and operating factors, such as: adjustment of frequencies, characteristics of transmitting and receiving antennas, time sharing, change of channels within multichannel transmissions.

15.24 § 16 For the purpose of this Section, the term “administration” may include the centralizing office designated by the administration, in accordance with No. 16.3.

15.25 § 17 Administrations shall cooperate in the detection and elimination of harmful interference, employing where appropriate the facilities described in Article 16 and the procedures detailed in this Section.

15.26 § 18 Where practicable, and subject to agreement by administrations concerned, the case of harmful interference may be dealt with directly by their specially designated monitoring stations or by direct coordination between their operating organizations.

15.27 § 19 Full particulars relating to harmful interference shall, whenever possible, be given in the form indicated in Appendix 10.

15.28 § 20 Recognizing that transmissions on distress and safety frequencies and frequencies used for the safety and regularity of flight (see Article 31 and Appendix 27) require absolute international protection and that the elimination of harmful interference to such transmissions is imperative, administrations undertake to act immediately when their attention is drawn to any such harmful interference. (WRC-07)

15.29 § 21 In cases of harmful interference where rapid action is required, communications between administrations shall be transmitted by the quickest means available and, subject to prior authorization by the administrations concerned in such cases, information may be exchanged directly between specially designated stations of the international monitoring system.

15.30 § 22 When a case of such harmful interference is reported by a receiving station, it shall give to the transmitting station whose service is being interfered with all possible information which will assist in determining the source and characteristics of the interference.

15.31 § 23 If a case of harmful interference so justifies, the administration having jurisdiction over the receiving station experiencing the interference shall inform the administration having jurisdiction over the transmitting station whose service is being interfered with, giving all possible information.

15.32 § 24 If further observations and measurements are necessary to determine the source and characteristics of and to establish the responsibility for the harmful interference, the administration having jurisdiction over the transmitting station whose service is being interfered with may seek the cooperation of other administrations, particularly of the administration having jurisdiction over the receiving station experiencing the interference, or of other organizations.

15.33 § 25 When cases of harmful interference occur as a result of emissions from space stations, the administrations having jurisdiction over these interfering stations shall, upon request from the administration having jurisdiction over the station experiencing the interference, furnish current ephemeral data necessary to allow determination of the positions of the space stations when not otherwise known.

15.34 § 26 Having determined the source and characteristics of the harmful interference, the administration having jurisdiction over the transmitting station whose service is being interfered with shall inform the administration having jurisdiction over the interfering station, giving all useful information in order that this administration may take such steps as may be necessary to eliminate the interference.

15.35 § 27 On being informed that a station over which it has jurisdiction is believed to have been the cause of harmful interference, an administration shall, as soon as possible, acknowledge receipt of that information by the quickest means available. Such acknowledgement shall not constitute an acceptance of responsibility. (WRC-2000)

15.36 § 28 When a safety service suffers harmful interference the administration having jurisdiction over the receiving station experiencing the interference may also approach directly the administration having jurisdiction over the interfering station. The same procedure may also be followed in other cases with the prior approval of the administration having jurisdiction over the transmitting station whose service is being interfered with.

15.37 § 29 An administration receiving a communication to the effect that one of its stations is causing harmful interference to a safety service shall promptly investigate the matter and take any necessary remedial action and respond in a timely manner. (WRC-2000)

15.38 § 30 When the service rendered by an earth station suffers harmful interference, the administration having jurisdiction over the receiving station experiencing such interference may also approach directly the administration having jurisdiction over the interfering station.

15.39 § 31 If the harmful interference persists in spite of the action taken in accordance with the procedures outlined above, the administration having jurisdiction over the transmitting station whose service is being interfered with may address to the administration having jurisdiction over the interfering station a report of irregularity or infraction in accordance with the provisions of Section V.

15.40 § 32 If there is a specialized international organization for a particular service, reports of irregularities and of infractions relating to harmful interference caused or suffered by stations in this service may be addressed to such organization at the same time as to the administration concerned.

15.41 § 33 1) If it is considered necessary, and particularly if the steps taken in accordance with the procedures described above have not produced satisfactory results, the administration concerned shall forward details of the case to the Bureau for its information.

15.42 2) In such a case, the administration concerned may also request the Bureau to act in accordance with the provisions of Section I of Article 13; but it shall then supply the Bureau with the full facts of the case, including all the technical and operational details and copies of the correspondence.

15.43 § 34 1) In the case where an administration has difficulty in identifying a source of harmful interference in the HF bands and urgently wishes to seek the assistance of the Bureau, it shall promptly inform the Bureau.

15.44 2) On receipt of this information, the Bureau shall immediately request the cooperation of appropriate administrations or specially designated stations of the international monitoring system that may be able to help in identifying the source of harmful interference.

15.45 3) The Bureau shall consolidate all reports received in response to requests under No. **15.44** and, using such other information as it has available, shall promptly attempt to identify the source of harmful interference.

15.46 4) The Bureau shall thereafter forward its conclusions and recommendations to the administration reporting the case of harmful interference. These shall also be forwarded to the administration believed to be responsible for the source of harmful interference, together with a request for prompt action.

ARTICLE 16

International monitoring

16.1 To assist to the extent practicable in the implementation of these Regulations, in particular to help ensure efficient and economical use of the radio-frequency spectrum and to help in the prompt elimination of harmful interference, administrations agree to continue the development of monitoring facilities and, to the extent practicable, to cooperate in the continued development of the international monitoring system, taking into account the relevant ITU-R Recommendations.¹

16.2 The international monitoring system comprises only those monitoring stations which have been so nominated by administrations in the information sent to the Secretary-General in accordance with Resolution ITU-R 23 and the most recent version of Recommendation ITU-R SM.1139. These stations may be operated by an administration or, in accordance with an authorization granted by the appropriate administration, by a public or private enterprise, by a common monitoring service established by two or more countries, or by an international organization. (WRC-15)

16.3 Each administration or common monitoring service established by two or more countries, or international organizations participating in the international monitoring system, shall designate a centralizing office to which all requests for monitoring information shall be addressed and through which monitoring information will be forwarded to the Bureau or to centralizing offices of other administrations.

16.4 However, these provisions shall not affect private monitoring arrangements made for special purposes by administrations, international organizations, or public or private enterprises.

16.5 Administrations shall, as far as they consider practicable, conduct such monitoring as may be requested of them by other administrations or by the Bureau.

16.6 Administrative and procedural requirements for use and operation of the international monitoring system should be in accordance with the most recent version of Recommendation ITU-R SM.1139. (WRC-12)

16.7 The Bureau shall record the results supplied by the monitoring stations participating in the international monitoring system, and shall prepare periodically, for publication by the Secretary-General, summaries of the useful monitoring data received by it including a list of the stations contributing the data.

16.8 When an administration, in supplying monitoring observations from one of its monitoring stations taking part in the international monitoring system, states to the Bureau that a clearly identified emission is not in conformity with these Regulations, the Bureau shall draw the attention of the administration concerned to those observations.

¹ **16.1.1** Information on this subject is also provided in the ITU-R Handbook on Spectrum Monitoring.

CHAPTER V

Administrative provisions

ARTICLE 17

Secrecy

17.1 In the application of the appropriate provisions of the Constitution and the Convention, administrations bind themselves to take the necessary measures to prohibit and prevent:

- 17.2** *a)* the unauthorized interception of radiocommunications not intended for the general use of the public;
- 17.3** *b)* the divulgence of the contents, simple disclosure of the existence, publication or any use whatever, without authorization of information of any nature whatever obtained by the interception of the radiocommunications mentioned in No. **17.2**.

ARTICLE 18

Licences

18.1 § 1 1) No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject (however, see Nos. **18.2**, **18.8** and **18.11**).

18.2 2) However, the government of a country may conclude with the government of one or more neighbouring countries a special agreement concerning one or several stations of its broadcasting service or of its land mobile services, operating on frequencies above 41 MHz, situated in the territory of a neighbouring country and intended to improve national coverage. This agreement, which shall be compatible with the provisions of the present Regulations as well as of those regional agreements to which the countries concerned are signatories, may allow exceptions to the provisions of No. **18.1** and shall be communicated to the Secretary-General in order that it may be brought to the notice of administrations for their information.

18.3 3) Mobile stations which are registered in a territory or group of territories which does not have full responsibility for its international relations may be considered, in so far as the issue of licences is concerned, as subject to the authority of that territory or group of territories.

18.4 § 2 The holder of a licence is required to preserve the secrecy of telecommunications, as provided in the relevant provisions of the Constitution and the Convention. Moreover, the licence shall mention, specifically or by reference, that if the station includes a receiver, the interception of radiocommunication correspondence, other than that which the station is authorized to receive, is forbidden, and that in cases where such correspondence is involuntarily received, it shall not be reproduced, nor communicated to third parties, nor used for any purpose, and even its existence shall not be disclosed.

18.5 § 3 To facilitate the verification of licences issued to mobile stations and mobile earth stations, a translation of the text in one of the working languages of the Union shall be added, when necessary, to the text written in the national language.

18.6 § 4 1) The government which issues a licence to a mobile station or a mobile earth station shall indicate therein in clear form the particulars of the station, including its name, call sign and, where appropriate, the public correspondence category, as well as the general characteristics of the installation.

18.7 2) For land mobile stations, including stations consisting only of one or more receivers, a clause shall be included in the licence, specifically or by reference, under which the operation of these stations shall be forbidden in countries other than the country in which the licence is issued, except as may be provided by special agreement between the governments of the countries concerned.

18.8 § 5 1) In the case of a new registration of a ship or aircraft in circumstances where delay is likely to occur in the issue of a licence by the country in which it is to be registered, the administration of the country from which the mobile station or mobile earth station wishes to make its voyage or flight may, at the request of the operating company, issue a certificate to the effect that the station complies with these Regulations. This certificate, drawn up in a form determined by the issuing administration, shall give the particulars mentioned in No. **18.6** and shall be valid only for the duration of the voyage or flight to the country in which the registration of the ship or aircraft will be effected, or for a period of three months, whichever is less.

18.9 2) The administration issuing the certificate shall inform the administration responsible for issuing the licence of the action taken.

18.10 3) The holder of the certificate shall comply with the provisions of these Regulations applicable to licence holders.

18.11 § 6 In the case of hire, lease or interchange of aircraft, the administration having authority over the aircraft operator receiving an aircraft under such an arrangement may, by agreement with the administration of the country in which the aircraft is registered, issue a licence in conformity with that specified in No. **18.6** as a temporary substitute for the original licence.

ARTICLE 19

Identification of stations

Section I – General provisions

19.1 § 1 All transmissions shall be capable of being identified either by identification signals or by other means¹.

19.2 § 2 1) All transmissions with false or misleading identification are prohibited.

19.3 2) Where practicable and in appropriate services, identification signals should be automatically transmitted in accordance with relevant ITU-R Recommendations.

19.4 3) All transmissions in the following services should, except as provided in Nos. **19.13** to **19.15**, carry identification signals:

19.5 a) amateur service;

19.6 b) broadcasting service;

19.7 c) fixed service in the bands below 28 000 kHz;

19.8 d) mobile service;

19.9 e) standard frequency and time signal service.

19.10 4) All operational transmissions by radiobeacons shall carry identification signals. However, it is recognized that, for radiobeacons and for certain other radionavigation services that normally carry identification signals, during periods of malfunction or other non-operational service the deliberate removal of identification signals is an agreed means of warning users that the transmissions cannot safely be used for navigational purposes.

19.11 5) All transmissions by satellite emergency position-indicating radiobeacons (EPIRBs) operating in the frequency band 406-406.1 MHz shall carry identification signals. (WRC-23)

19.12 6) When identification signals are transmitted they shall comply with the provisions of this Article.

19.13 7) However, the requirements for certain transmissions to carry identification signals need not apply to:

19.14 a) survival craft stations when transmitting distress signals automatically;

19.15 b) emergency position-indicating radiobeacons (except for those in No. **19.11**).

¹ **19.1.1** In the present state of the technique, it is recognized nevertheless that the transmission of identifying signals for certain radio systems (e.g. radiodetermination, radio relay systems and space systems) is not always possible.

19.16 § 3 In transmissions carrying identification signals a station shall be identified by a call sign, by a maritime mobile service identity or by other recognized means of identification which may be one or more of the following: name of station, location of station, operating agency, official registration mark, flight identification number, selective call number or signal, selective call identification number or signal, characteristic signal, characteristic of emission or other clearly distinguishing features readily recognized internationally.

19.17 § 4 For transmissions carrying identification signals, in order that stations may be readily identified, each station shall transmit its identification as frequently as practicable during the course of transmissions, including those made for tests, adjustments or experiments. During such transmissions, however, identification signals shall be transmitted at least hourly, preferably within the period from five minutes before to five minutes after the hour (UTC) unless to do so would cause unreasonable interruption of traffic, in which case identification shall be given at the beginning and end of transmissions.

19.18 § 5 Identification signals shall wherever practicable be in one of the following forms:

19.19 a) speech, using simple amplitude or frequency modulation;

19.20 b) international Morse code transmitted at manual speed;

19.21 c) a telegraph code compatible with conventional printing equipment;

19.22 d) any other form recommended by the Radiocommunication Sector.

19.23 § 6 To the extent possible the identification signal should be transmitted in accordance with relevant ITU-R Recommendations.

19.24 § 7 Administrations should ensure that wherever practicable superimposed identification methods be employed in accordance with ITU-R Recommendations.

19.25 § 8 When a number of stations work simultaneously in a common circuit, either as relay stations, or in parallel on different frequencies, each station shall, as far as practicable, transmit its own identification or those of all the stations concerned.

19.26 § 9 Administrations shall ensure, except in the cases mentioned in Nos. **19.13** to **19.15**, that all transmissions not carrying identification signals can be identified by other means when they are capable of causing harmful interference to the services of another administration operating in accordance with these Regulations.

19.27 § 10 Administrations shall, having regard to the provisions of these Regulations relating to the notification of assignments for recording in the Master Register, adopt their own measures to ensure compliance with the provisions of No. **19.26**.

19.28 § 11 Each Member State reserves the right to establish its own measures for identifying its stations used for national defence. However, it shall use, as far as possible, call signs recognizable as such, and containing the distinctive characters of its nationality.

Section II – Allocation of international series and assignment of call signs

19.28A § 11A 1) For the purpose of the supply of identification signals, a *territory* or *geographical area* shall be understood to mean the territory within the limits of which the station is located. For mobile stations, it shall be understood to mean the territory within the limits of which the responsible administration is located. A territory which does not have full responsibility for its international relations shall also be considered as a geographical area for this purpose.

19.28B 2) In all documents of the Union where the terms *allocation* of call sign series and *assignment* of call signs are to be used, they shall be used with the following meaning:

Identification means	Terms used in these Regulations
International series of call signs (including maritime identification digits (MIDs) and selective call numbers)	Allocation to the administration of a Member State (see definition in No. 1002 of the Constitution)
Call signs (including maritime identification digits (MIDs) and selective call numbers)	Assignment by any administration to stations operating in a territory or geographical area (see No. 19.28A)

19.29 § 12 1) All stations open to international public correspondence, all amateur stations, and other stations which are capable of causing harmful interference beyond the boundaries of the territory or geographical area in which they are located, shall have call signs from the international series allocated to its administration as given in the Table of Allocation of International Call Sign Series in Appendix **42**.

19.30 2) As the need arises, ship stations and ship earth stations to which the provisions of Chapter **IX** apply, and coast stations, coast earth stations, or other non-shipborne stations capable of communicating with such ship stations, shall have assigned to them maritime mobile service identities in accordance with Section VI of this Article. (WRC-07)

19.31 3) It is not compulsory to assign call signs from the international series to stations identified by maritime mobile service identities or which are easily identified by other means (see No. **19.16**) and whose signals of identification or characteristics of emission are published in international documents.

19.31A 4) Means shall be provided for uniquely identifying mobile stations operating in automated terrestrial or satellite communication systems for the purposes of answering distress calls, for avoiding interference and for billing. Identification of the mobile station by accessing a registration database is satisfactory, provided that the system can associate the mobile station calling number with the particular mobile station user. (WRC-03)

19.32 § 13 Should the available call sign series in Appendix **42** be exhausted, new call sign series may be allocated according to the principles set out in Resolution **13 (Rev.WRC-97)** relating to the formation of call signs and the allocation of new international series.

19.33 § 14 Between radiocommunication conferences, the Secretary-General is authorized to deal with questions relating to changes in the allocation of series of call signs, on a provisional basis, and subject to confirmation by the following conference (see also No. **19.32**).

19.34 § 15 The Secretary-General shall be responsible for allocating maritime identification digits (MIDs) to administrations and shall regularly publish information regarding allocated MIDs.

19.35 § 16 The Secretary-General shall be responsible for allocating additional maritime identification digits (MIDs) to administrations within the limits specified, provided that it is ascertained that the possibilities offered by the MIDs allocated to an administration will soon be exhausted despite judicious ship station identity assignment as outlined in Section VI. (WRC-03)

19.36 § 17 Each administration has been allocated one or more maritime identification digit (MID) for its use. A second or subsequent MID should not be requested² unless the previously allocated MID is more than 80% exhausted and the rate of assignments is such that 90% exhaustion is foreseen. (WRC-19)

19.37 § 18 The Secretary-General shall be responsible for supplying series of selective call numbers or signals (see Nos. **19.92** to **19.95**) at the request of the administrations concerned.

19.38 § 19 1) Each administration shall choose the call signs from the international series allocated or supplied to it; and shall notify this information to the Secretary-General together with the information which is to appear in Lists I, IV and V. These notifications do not include call signs assigned to amateur and experimental stations. (WRC-07)

19.39 2) Each administration shall choose the maritime mobile service identities of its stations from the maritime identification digits allocated to it and notify this information to the Secretary-General for inclusion in the relevant lists, as provided for in Article **20**.

19.40 3) The Secretary-General shall ensure that the same call sign, the same maritime mobile service identity, the same selective call number or the same identification number is not assigned more than once and that call signs which might be confused with distress signals, or with other signals of the same nature, are not assigned.

19.41 § 20 1) When a fixed station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency.

19.35.1 (SUP - WRC-03)

² **19.36.1** In no circumstances may an administration claim more MIDs than the total number of its ship stations notified to ITU divided by 1 000, plus one. Administrations shall make every attempt to reuse the Maritime Mobile Service Identities (MMSI) assigned from earlier MID resources, which become redundant after ships leave their national ship registry. Such numbers should be considered for reassignment after being absent from at least two successive editions of List V of the ITU service publications. Administrations seeking additional MID resources must meet the criteria of having notified all previous assignments, in accordance with No. **20.16**. This criteria applies only to MMSIs in the basic category and to all MIDs assigned to the administration. (WRC-07)

19.42 2) When a broadcasting station uses more than one frequency in the international service, each frequency may be identified by a separate call sign used solely for this frequency or by some other appropriate means, such as announcing the name of the place and frequency used.

19.43 3) When a land station uses more than one frequency, each frequency may, if desired, be identified by a separate call sign.

19.44 4) Where practicable, coast stations should use a common call sign for each frequency series³.

Section III – Formation of call signs

19.45 § 21 1) The twenty-six letters of the alphabet, as well as digits in the cases specified below, may be used to form call signs. Accented letters are excluded.

19.46 2) However, the following combinations shall not be used as call signs:

19.47 a) combinations which might be confused with distress signals or with other signals of a similar nature;

19.48 b) combinations in Recommendation ITU-R M.1172-0 that are reserved for the abbreviations to be used in the radiocommunication services. (WRC-15)

19.49 (SUP - WRC-03)

19.50 § 22 Call signs in the international series are formed as indicated in Nos. **19.51** to **19.71**. The first two characters shall be two letters or a letter followed by a digit or a digit followed by a letter. The first two characters or in certain cases the first character of a call sign constitute the nationality identification⁴.

19.51 *Land and fixed stations*

19.52 § 23 1)

- two characters and one letter, *or*
- two characters and one letter followed by not more than three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

19.53 2) However, it is recommended that, as far as possible, the call signs of fixed stations consist of:

- two characters and one letter followed by two digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

³ **19.44.1** By “frequency series” is meant a group of frequencies each of which belongs to one of the different bands between 4 000 kHz and 27 500 kHz that are allocated exclusively to the maritime mobile service.

⁴ **19.50.1** For call sign series beginning with B, F, G, I, K, M, N, R, W and 2, only the first character is required for nationality identification. In the cases of half series (i.e. when the first two characters are allocated to more than one Member State), the first three characters are required for nationality identification. (WRC-03)

- 19.54** *Ship stations*
- 19.55** § 24
- two characters and two letters, *or*
 - two characters, two letters and one digit (other than the digits 0 or 1), *or*
 - two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*
 - two characters and one letter followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter). (WRC-07)
- 19.56** (SUP - WRC-07)
- 19.57** *Aircraft stations*
- 19.58** § 25
- two characters and three letters.
- 19.59** *Ship's survival craft stations*
- 19.60** § 26
- the call sign of the parent ship followed by two digits (other than the digits 0 or 1 in cases where they immediately follow a letter).
- 19.61** *Emergency position-indicating radiobeacon stations*
- 19.62** § 27
- the Morse letter B and/or the call sign of the parent ship to which the radiobeacon belongs.
- 19.63** *Aircraft survival craft stations*
- 19.64** § 28
- the complete call sign of the parent aircraft (see No. **19.58**), followed by a single digit other than 0 or 1.
- 19.65** *Land mobile stations*
- 19.66** § 29
- two characters (provided that the second is a letter) followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter), *or*
 - two characters and one or two letters followed by four digits (other than the digits 0 or 1 in cases where they immediately follow a letter).

19.67 *Amateur and experimental stations***19.68** § 30 1)

- one character (provided that it is the letter B, F, G, I, K, M, N, R or W) and a single digit (other than 0 or 1), followed by a group of not more than four characters, the last of which shall be a letter, *or*
- two characters and a single digit (other than 0 or 1), followed by a group of not more than four characters, the last of which shall be a letter.⁵ (WRC-03)

19.68A 1A) On special occasions, for temporary use, administrations may authorize use of call signs with more than the four characters referred to in No. **19.68**. (WRC-03)

19.69 2) However, the prohibition of the use of the digits 0 and 1 does not apply to amateur stations.

19.70 *Stations in the space service*

19.71 § 31 When call signs for stations in the space service are employed, it is recommended that they consist of:

- two characters followed by two or three digits (other than the digits 0 and 1 in cases where they immediately follow a letter).

Section IV – Identification of stations using radiotelephony

19.72 § 32 Stations using radiotelephony shall be identified as indicated in Nos. **19.73** to **19.82A**. (WRC-03)

19.73 § 33 1) *Coast stations*

- a call sign (see No. **19.52**); *or*
- the geographical name of the place as it appears in the List of Coast Stations and Special Service Stations, followed preferably by the word RADIO or by any other appropriate indication. (WRC-07)

19.74 2) *Ship stations*

- a call sign (see No. **19.55**); *or*
- the official name of the ship preceded, if necessary, by the name of the owner on condition that there is no possible confusion with distress, urgency and safety signals; *or*
- its selective call number or signal.

19.75 3) *Ship's survival craft stations*

- a call sign (see No. **19.60**); *or*
- a signal of identification consisting of the name of the parent ship followed by two digits.

⁵ **19.68.1** In the case of half series (i.e. when the first two characters are allocated to more than one Member State), the first three characters are required for nationality identification. In such cases, the call sign shall consist of three characters followed by a single digit and a group of not more than three characters, the last of which shall be a letter. (WRC-07)

- 19.76** 4) *Emergency position-indicating radiobeacon stations*
- When speech transmission is used:
- the name and/or the call sign of the parent ship to which the radiobeacon belongs. (WRC-07)
- 19.77** § 34 1) *Aeronautical stations*
- the name of the airport or geographical name of the place followed, if necessary, by a suitable word indicating the function of the station.
- 19.78** 2) *Aircraft stations*
- a call sign (see No. **19.58**), which may be preceded by a word designating the owner or the type of aircraft; *or*
 - a combination of characters corresponding to the official registration mark assigned to the aircraft; *or*
 - a word designating the airline, followed by the flight identification number.
- 19.79** 3) In the exclusive aeronautical mobile frequency bands, aircraft stations using radiotelephony may use other methods of identification, after special agreement between governments, and on condition that they are internationally known.
- 19.80** 4) *Aircraft survival craft stations*
- a call sign (see No. **19.64**).
- 19.81** § 35 1) *Base stations*
- a call sign (see No. **19.52**); *or*
 - the geographical name of the place followed, if necessary, by any other appropriate indication.
- 19.82** 2) *Land mobile stations*
- a call sign (see No. **19.66**); *or*
 - the identity of the vehicle or any other appropriate indication.
- 19.82A** § 35A *Amateur stations and experimental stations*
- a call sign (see No. **19.68**). (WRC-03)

Section V – Selective call numbers in the maritime mobile service

- 19.83** § 36 When stations of the maritime mobile service use selective calling devices in accordance with the most recent versions of Recommendations ITU-R M.476 and ITU-R M.625, their call numbers should be assigned by the responsible administrations in accordance with the provisions below. (WRC-23)

19.84 *Formation of ship station selective call numbers and coast station identification numbers*

19.85 § 37 1) The ten digits from 0 to 9 inclusive shall be used to form selective call numbers.

19.86 2) However, combinations of numbers commencing with the digits 00 (zero, zero) shall not be used when forming the identification numbers for coast stations.

19.87 3) Ship station selective call numbers and coast station identification numbers in the series are formed as indicated in Nos. **19.88**, **19.89** and **19.90**.

19.88 4) *Coast station identification numbers*

- four digits (see No. **19.86**).

19.89 5) *Ship station selective call numbers*

- five digits.

19.90 6) *Predetermined groups of ship stations*

- five digits consisting of:

- the same digit repeated five times; or
- two different digits repeated alternately.

19.91 *Assignment of ship station selective call numbers and coast station identification numbers*

19.92 § 38 1) In cases where selective call numbers for ship stations and identification numbers for coast stations are required for use in the maritime mobile service, the selective call numbers and identification numbers shall be supplied by the Secretary-General on request. Upon notification by an administration of the introduction of selective calling for use in the maritime mobile service: (WRC-07)

19.93 a) selective call numbers for ships will be supplied as required as single numbers or in blocks not exceeding 100 (one hundred); (WRC-12)

19.94 b) coast station identification numbers will be supplied in blocks of 10 (ten) to meet actual requirements;

19.95 c) selective call numbers for selective calling of predetermined groups of ship stations in accordance with No. **19.90** will be supplied as required as single numbers.

19.96 2) Each administration shall choose the selective call numbers to be assigned to its ship stations from the blocks of the series supplied to it. Administrations shall notify the Bureau immediately in accordance with No. **20.16** when assigning selective call numbers to ship stations.

19.96A (SUP - WRC-23)

19.97 3) Each administration shall choose the coast station identification numbers to be assigned to its coast stations from the blocks of the series supplied to it. (WRC-23)

Section VI – Identities in the maritime mobile service (WRC-12)

19.98

A – General

19.99 § 39 When a station⁶ operating in the maritime mobile service or the maritime mobile-satellite service is required to use maritime mobile service identities, the responsible administration shall assign the identity to the station in accordance with the provisions described in Annex 1 of Recommendation ITU-R M.585-9. In accordance with No. **20.16**, administrations shall notify the Radiocommunication Bureau immediately when assigning maritime mobile service identities. (WRC-23)

19.100 § 40 1) Maritime mobile service identities are formed of a series of nine digits which are transmitted over the radio path in order to uniquely identify ship stations, ship earth stations, coast stations, coast earth stations, and other non-shipborne stations operating in the maritime mobile service or the maritime mobile-satellite service, and group calls. (WRC-07)

19.101 2) These identities are formed in such a way that the identity or part thereof can be used by telephone and telex subscribers connected to the public telecommunications network principally to call ships automatically in the shore-to-ship direction. Access to public networks may also be achieved by means of free-form numbering plans, so long as the ship can be uniquely identified using the system's registration database (see No. **19.31A**) to obtain the ship station identity, call sign or ship name and nationality. (WRC-03)

19.102 3) The types of maritime mobile service identities shall be as described in Annex 1 to Recommendation ITU-R M.585-9. (WRC-23)

19.103 (SUP - WRC-07)

19.104 (SUP - WRC-07)

19.105 (SUP - WRC-07)

19.106 (SUP - WRC-07)

19.107 (SUP - WRC-07)

B – Maritime identification digits (MIDs)

19.108A § 41 The maritime identification digits $M_1I_2D_3$ are an integral part of the maritime mobile service identity and denote, in principle, the administration responsible for the station so identified. In some cases, $M_1I_2D_3$ may denote a geographical area under the responsibility of a specific administration. Furthermore, as indicated in the most recent version of Recommendation ITU-R M.585, some maritime identification digits are reserved for maritime devices and do not correspond either to an administration or to a geographical area. (WRC-15)

19.109 (SUP - WRC-03)

⁶ **19.99.1** In this Section a reference to a ship station or a coast station may include the respective earth stations.

19.110 *C – Maritime mobile service identities* (WRC-07)

19.111 § 43 1) Administrations shall follow Annex 1 to Recommendation ITU-R M.585-9 concerning the assignment and use of maritime mobile service identities. (WRC-23)

19.112 2) Administrations should: (WRC-07)

19.113 a) make optimum use of the possibilities of forming identities from the single MID allocated to them; (WRC-07)

19.114 (SUP - WRC-19)

19.115 (SUP - WRC-03)

19.116 (SUP - WRC-03)

19.117 to 19.126 (SUP - WRC-07)

Section VII – Special provisions

19.127 § 47 1) In the aeronautical mobile service, after communication has been established by means of the complete call sign, the aircraft station may use, if confusion is unlikely to arise, an abbreviated call sign or identification consisting of:

19.128 a) in radiotelegraphy, the first character and last two letters of the complete call sign (see No. **19.58**);

19.129 b) in radiotelephony:

- the first character of the complete call sign; *or*
- the abbreviation of the name of the owner of the aircraft (company or individual); *or*
- the type of aircraft;

followed by the last two letters of the complete call sign (see No. **19.58**) or by the last two characters of the registration mark.

19.130 2) The provisions of Nos. **19.127**, **19.128** and **19.129** may be amplified or modified by agreement between administrations concerned.

19.131 § 48 The distinguishing signals allotted to ships for visual and aural signalling shall, in general, agree with the call signs of ship stations.

ARTICLE 20

Service publications and online information systems (WRC-07)

Section I – Titles and contents of service publications (WRC-03)

20.1 § 1 The following publications shall be issued by the Secretary-General. As circumstances warrant and in response to individual requests by administrations, the published information shall also be available in various formats and by appropriate means. (WRC-07)

20.2 § 2 *BR IFIC – The International Frequency Information Circular.* (WRC-19)

20.3 The BR IFIC shall contain: (WRC-19)

20.4 a) particulars of frequency assignments recorded in the Master International Frequency Register;

20.5 b) the frequencies prescribed by these Regulations for common use by certain services; (WRC-07)

20.6 c) the allotments in the Allotment Plans included in Appendices **25, 26** and **27**.

20.7 § 3 *List IV – List of Coast Stations and Special Service Stations.* (WRC-07)

20.8 § 4 *List V – List of Ship Stations and Maritime Mobile Service Identity Assignments.* (WRC-07)

20.9 (SUP - WRC-07)

20.10 (SUP - WRC-07)

20.11 (SUP - WRC-2000)

20.12 § 8 *List VIII – List of International Monitoring Stations.*

20.13 § 9 *List VIII A – List of Stations in the Space Radiocommunication Services and in the Radio Astronomy Service.*

20.14 § 10 *Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services.*

Section II – Online information systems (WRC-07)

20.14A § 10A The following online information system(s) are made available by the Radiocommunication Bureau:

the ITU Maritime mobile Access and Retrieval System (MARS). (WRC-07)

Section III – Preparation and amendment of service publications and online information systems (WRC-07)

20.15 § 11 The form, the content and the periodicity of each publication shall be decided by the Radiocommunication Bureau in consultation with administrations and the international organizations concerned. Similar consultation shall be made with regard to the maritime online information systems. (WRC-07)

20.16 § 12 1) Administrations shall take all appropriate measures to notify the Radiocommunication Bureau immediately of any changes in the operational information contained in Lists IV and V, in view of the importance of this information, particularly with regard to safety. In the case of the data published in List V, which is also made available online through MARS, administrations shall communicate those changes at least once a month. In the case of other publications, administrations shall communicate the changes in the information contained in them as soon as possible. (WRC-07)

20.16A 2) The names of the administrations which have failed to notify the Radiocommunication Bureau of the changes in the operational information contained in Lists IV and V shall be published in these Lists. (WRC-07)

20.16B 3) The Radiocommunication Bureau will periodically request administrations to reconfirm the information published in Lists IV and V. If no information has been received by the Radiocommunication Bureau for two consecutive editions of Lists IV and V, unvalidated information shall be deleted. The Radiocommunication Bureau shall however inform the administration concerned before taking such action. (WRC-07)

20.17 § 13 For the purpose of the service publications, a “country” shall be understood to mean the territory within the limits of which the station is located; a territory which does not have full responsibility for its international relations shall also be considered as a country for this purpose. (WRC-03)

CHAPTER VI

Provisions for services and stations

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I – Choice of sites and frequencies

21.1 § 1 Sites and frequencies for terrestrial stations and earth stations, operating in frequency bands shared with equal rights between terrestrial radiocommunication and space radiocommunication services, shall be selected having regard to the relevant ITU-R Recommendations with respect to geographical separation between earth stations and terrestrial stations.

21.2 § 2 1) As far as practicable, sites for transmitting^{1,3} stations, in the fixed or mobile service, employing maximum values of equivalent isotropically radiated power (e.i.r.p.) exceeding the values given in Table 21-1 in the frequency bands indicated, should be selected so that the direction of maximum radiation of any antenna will be separated from the geostationary-satellite orbit by at least the angle in degrees shown in the Table, taking into account the effect of atmospheric refraction²: (WRC-12)

TABLE 21-1

Frequency band (GHz)	e.i.r.p. value (dBW) (see also Nos. 21.2 and 21.4)	Minimum separation angle with respect to geostationary-satellite orbit (degrees)
1-10	+35	2
10-15	+45	1.5
25.25-27.5	+24 (in any 1 MHz band)	1.5
Other bands above 15 GHz	+55	No limit ³

¹ **21.2.1** For their own protection receiving stations in the fixed or mobile service operating in frequency bands shared with space radiocommunication services (space-to-Earth) should also avoid directing their antennas towards the geostationary-satellite orbit if their sensitivity is sufficiently high that interference from space station transmissions may be significant. In particular, in the frequency bands 13.4-13.65 GHz and 21.4-22 GHz, it is recommended to maintain a minimum separation angle of 1.5° with respect to the direction of the geostationary-satellite orbit. (WRC-15)

² **21.2.2** Information on this subject is given in the most recent version of Recommendation ITU-R SF.765. (WRC-23)

21.2.3 Not used.

³ **21.2.4** For frequency bands above 15 GHz (except 25.25-27.5 GHz), there is no restriction on the angular separation for transmitting stations of the fixed or mobile service. This matter is being studied in ITU-R.

Section II – Power limits for terrestrial stations

21.3 § 3 1) The maximum equivalent isotropically radiated power (e.i.r.p.) of a station in the fixed or mobile service shall not exceed +55 dBW.

21.4 2) Where compliance with No. **21.2** for frequency bands between 1 GHz and 10 GHz is impracticable, the maximum equivalent isotropically radiated power (e.i.r.p.) of a station in the fixed or mobile service shall not exceed:

+47 dBW in any direction within 0.5° of the geostationary-satellite orbit; or

+47 dBW to +55 dBW, on a linear decibel scale (8 dB per degree), in any direction between 0.5° and 1.5° of the geostationary-satellite orbit, taking into account the effect of atmospheric refraction⁴.

21.5 3) The power delivered by a transmitter to the antenna of a station in the fixed or mobile services shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz, or +10 dBW in frequency bands above 10 GHz, except as cited in No. **21.5A**. (WRC-2000)

21.5A As an exception to the power levels given in No. **21.5**, the sharing environment within which the Earth exploration-satellite (passive) and space research (passive) services shall operate in the band 18.6–18.8 GHz is defined by the following limitations on the operation of the fixed service: the power of each RF carrier frequency delivered to the input of each antenna of a station in the fixed service in the band 18.6–18.8 GHz shall not exceed -3 dBW. (WRC-2000)

21.6 4) The limits given in Nos. **21.2**, **21.3**, **21.4**, **21.5** and **21.5A** apply, where applicable, to the services and frequency bands indicated in Table **21-2** for reception by space stations where the frequency bands are shared with equal rights with the fixed or mobile services: (WRC-2000)

⁴ **21.4.1** Information on this subject is given in the most recent version of Recommendation ITU-R SF.765. (WRC-23)

TABLE 21-2 (Rev.WRC-23)

Frequency band	Service	Limit as specified in Nos.
1 427-1 429 MHz 1 610-1 645.5 MHz (No. 5.359) 1 646.5-1 660 MHz (No. 5.359) 1 980-2 010 MHz 2 010-2 025 MHz (Region 2) 2 025-2 110 MHz 2 200-2 290 MHz 2 655-2 670 MHz ⁵ (Regions 2 and 3) 2 670-2 690 MHz ⁵ (Regions 2 and 3) 5 670-5 725 MHz (Nos. 5.453 and 5.455) 5 725-5 755 MHz ⁵ (Region 1 countries listed in Nos. 5.453 and 5.455) 5 755-5 850 MHz ⁵ (Region 1 countries listed in Nos. 5.453 and 5.455) 5 850-7 075 MHz 7 145-7 235 MHz* 7 900-8 400 MHz	Fixed-satellite Meteorological-satellite Space research Space operation Earth exploration-satellite Mobile-satellite	21.2, 21.3, 21.4 and 21.5
10.7-11.7 GHz ⁵ (Region 1) 12.5-12.75 GHz ⁵ (Nos. 5.494 and 5.496) 12.7-12.75 GHz ⁵ (Region 2) 12.75-13.25 GHz 13.75-14 GHz (Nos. 5.499 and 5.500) 14.0-14.25 GHz (No. 5.505) 14.25-14.3 GHz (Nos. 5.505 and 5.508) 14.3-14.4 GHz ⁵ (Regions 1 and 3) 14.4-14.5 GHz 14.5-14.8 GHz 51.4-52.4 GHz	Fixed-satellite	21.2, 21.3 and 21.5
17.7-18.4 GHz 18.6-18.8 GHz 19.3-19.7 GHz 22.55-23.55 GHz 24.45-29.5 GHz	Fixed-satellite Earth exploration-satellite Space research Inter-satellite	21.2, 21.3, 21.5 and 21.5A

NOTE: Additional frequency bands above 29.5 GHz may be considered for inclusion in Table 21-2 by a future competent conference.

21.7 5) Transhorizon systems in the 1 700-1 710 MHz, 1 980-2 010 MHz, 2 025-2 110 MHz and 2 200-2 290 MHz bands may exceed the limits given in Nos. 21.3 and 21.5, but the provisions of Nos. 21.2 and 21.4 should be observed. Considering the difficult sharing conditions with other services, administrations are urged to keep the number of transhorizon systems in these bands to a minimum. (WRC-2000)

⁵ **21.6.1** The equality of right to operate when a band of frequencies is allocated in different Regions to different services of the same category is established in No. 4.8. Therefore any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

* For this frequency band only the limits of Nos. 21.3 and 21.5 apply.

Section III – Power limits for earth stations

21.8 § 4 1) The equivalent isotropically radiated power (e.i.r.p.) transmitted in any direction towards the horizon by an earth station shall not exceed the following limits except as provided in No. **21.10** or **21.11**:

a) in frequency bands between 1 GHz and 15 GHz

+40 dBW in any 4 kHz band for $\theta \leq 0^\circ$

+40 + 3 θ dBW in any 4 kHz band for $0^\circ < \theta \leq 5^\circ$; and

b) in frequency bands above 15 GHz

+64 dBW in any 1 MHz band for $\theta \leq 0^\circ$

+64 + 3 θ dBW in any 1 MHz band for $0^\circ < \theta \leq 5^\circ$,

where θ is the angle of elevation of the horizon viewed from the centre of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

21.9 2) For angles of elevation of the horizon greater than 5° there shall be no restriction as to the equivalent isotropically radiated power (e.i.r.p.) transmitted by an earth station towards the horizon.

21.10 3) As an exception to the limits given in No. **21.8**, the equivalent isotropically radiated power (e.i.r.p.) towards the horizon for an earth station in the space research service (deep space) shall not exceed +55 dBW in any 4 kHz band in frequency bands between 1 GHz and 15 GHz, or +79 dBW in any 1 MHz band in frequency bands above 15 GHz.

21.11 4) The limits given in Nos. **21.8** and **21.10**, as applicable, may be exceeded by not more than 10 dB. However, when the resulting coordination area extends into the territory of another country, such increase shall be subject to agreement by the administration of that country.

21.12 5) The limits given in No. **21.8** apply, where applicable, to the services and frequency bands indicated in Table **21-3** below for transmission by earth stations where the frequency bands are shared with equal rights with the fixed or mobile service:

TABLE 21-3 (Rev.WRC-19)

Frequency band	Services
2 025-2 110 MHz	Earth exploration-satellite
5 670-5 725 MHz	Fixed-satellite Meteorological-satellite Mobile-satellite Space operation
5 725-5 755 MHz ⁶	(for Region 1 with respect to the countries listed in Nos. 5.453 and 5.455)
5 755-5 850 MHz ⁶	(for Region 1 with respect to the countries listed in Nos. 5.453 and 5.455)
5 850-7 075 MHz	Space research
7 190-7 250 MHz	
7 900-8 400 MHz	
10.7-11.7 GHz ⁶	(for Region 1)
12.5-12.75 GHz ⁶	(for Region 1 with respect to the countries listed in No. 5.494)
12.7-12.75 GHz ⁶	(for Region 2)
12.75-13.25 GHz	
14.0-14.25 GHz	(with respect to the countries listed in No. 5.505)
14.25-14.3 GHz	(with respect to the countries listed in Nos. 5.505 and 5.508)
14.3-14.4 GHz ⁶	(for Regions 1 and 3)
14.4-14.8 GHz	
17.7-18.1 GHz	Fixed-satellite
22.55-23.15 GHz	Earth exploration-satellite
27.0-27.5 GHz ⁶	Mobile-satellite
27.5-29.5 GHz	Space research
31.0-31.3 GHz	(for the countries listed in No. 5.545)
34.2-35.2 GHz	(for the countries listed in No. 5.550 with respect to the countries listed in No. 5.549)
51.4-52.4 GHz	Fixed-satellite

21.13 6) The equivalent isotropically radiated power (e.i.r.p.) transmitted in any direction by an earth station in the radiodetermination-satellite service in the band 1 610-1 626.5 MHz shall not exceed -3 dBW in any 4 kHz band.

⁶ **21.12.1** The equality of right to operate when a band of frequencies is allocated in different Regions to different services of the same category is established in No. **4.8**. Therefore any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

21.13A 7) In the band 13.75-14 GHz, the level of off-axis e.i.r.p. emitted by an earth station of a geostationary fixed-satellite service network with an antenna diameter smaller than 4.5 m shall not exceed the following values:

<i>Angle off-axis (degrees)</i>	<i>Maximum e.i.r.p. in any 1 MHz band (dBW)</i>	
$2 \leq \varphi \leq 7$	$43 - 25 \log \varphi$	
$7 < \varphi \leq 9.2$	22	
$9.2 < \varphi \leq 48$	$46 - 25 \log \varphi$	
$\varphi > 48$	4	(WRC-03)

Section IV – Minimum angle of elevation of earth stations

21.14 § 5 1) Earth station antennas shall not be employed for transmission at elevation angles of less than 3° measured from the horizontal plane to the direction of maximum radiation, except when agreed to by administrations concerned and those whose services may be affected. In case of reception by an earth station, the above value shall be used for coordination purposes if the operating angle of elevation is less than that value.

21.15 2) As an exception to No. 21.14, earth station antennas in the space research service (near Earth) shall not be employed for transmission at elevation angles of less than 5° , and earth station antennas in the space research service (deep space) shall not be employed for transmission at elevation angles of less than 10° , both angles being those measured from the horizontal plane to the direction of maximum radiation. In the case of reception by an earth station, the above values shall be used for coordination purposes if the operating angle of elevation is less than those values.

Section V – Limits of power flux-density from space stations

21.16 § 6 1) The power flux-density at the Earth's surface produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limit given in Table 21-4. The limit relates to the power flux-density which would be obtained under assumed free-space propagation conditions and applies to emissions by a space station of the service indicated where the frequency bands are shared with equal rights with the fixed or mobile service, unless otherwise stated.

TABLE 21-4 (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth	
		0°-5°	5°-25°	25°-90°		
1 670-1 700 MHz	Earth exploration-satellite Meteorological-satellite	–133 (value based on sharing with meteorological aids service)			1.5 MHz	
1 518-1 525 MHz (Applicable to the territory of the United States in Region 2 between the longitudes 71° W and 125° W)	Mobile-satellite (space-to-Earth)	0° ≤ δ ≤ 4° –181.0	4° < δ ≤ 20° –193.0 + 20 log δ	20° < δ ≤ 60° –213.3 + 35.6 log δ	60° < δ ≤ 90° –150.0	4 kHz
1 518-1 525 MHz (Applicable to all other territory of the United States in Region 2)	Mobile-satellite (space-to-Earth)	0° ≤ δ ≤ 43.4° –155.0	43.4° < δ ≤ 60° –213.3 + 35.6 log δ	60° < δ ≤ 90° –150.0	4 kHz	
1 525-1 530 MHz ⁷ (Region 1, Region 3) 1 670-1 690 MHz ¹² 1 690-1 700 MHz (Nos. 5.381 and 5.382) 1 700-1 710 MHz 2 025-2 110 MHz 2 200-2 300 MHz	Meteorological-satellite (space-to-Earth) Space research (space-to-Earth) (space-to-space) Space operation (space-to-Earth) (space-to-space) Earth exploration-satellite (space-to-Earth) (space-to-space)	0°-5° –154 ⁹	5°-25° –154 + 0.5(δ – 5) ⁹		25°-90° –144 ⁹	4 kHz
2 500-2 690 MHz 2 520-2 670 MHz 2 500-2 516.5 MHz (No. 5.404) 2 500-2 520 MHz 2 520-2 535 MHz (No. 5.403)	Fixed-satellite Broadcasting-satellite Radiodetermination-satellite Mobile-satellite Mobile-satellite (except aeronautical mobile-satellite)	–136 ¹⁰	–136 + 11/20(δ – 5) ¹⁰		–125 ¹⁰	1 MHz
3 400-4 200 MHz	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	–152	–152 + 0.5(δ – 5)		–142	4 kHz
3 400-4 200 MHz	Fixed-satellite (space-to-Earth) (non-geostationary-satellite orbit)	–138 – Y ^{22, 23}	–138 – Y + (12 + Y)(δ – 5)/20 ^{22, 23}		–126 ²³	1 MHz

TABLE 21-4 (*continued*) (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
4 500-4 800 MHz 5 670-5 725 MHz (Nos. 5.453 and 5.455) 7 250-7 900 MHz	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth) Mobile-satellite Space research	-152	-152 + 0.5(δ - 5)	-142	4 kHz
5 150-5 216 MHz	Fixed-satellite (space-to-Earth)		-164		4 kHz
6 700-6 825 MHz	Fixed-satellite (space-to-Earth)	-137 ¹⁷	-137 + 0.5(δ - 5)	-127	1 MHz
6 825-7 075 MHz	Fixed-satellite (space-to-Earth)	-154 and -134	-154 + 0.5(δ - 5) and -134 + 0.5(δ - 5)	-144 and -124	4 kHz 1 MHz
8 025-8 500 MHz	Earth exploration- satellite (space-to-Earth) Space research (space-to-Earth)	-150	-150 + 0.5(δ - 5)	-140	4 kHz
9 900-10 400 MHz	Earth exploration- satellite (active)	0°-5°	5°-70°-53°	53°-90°	1 MHz
		-113 ¹⁸	-109 + 25 log(δ - 5) ¹⁸	-66.6 ¹⁸	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	0°-5°	5°-25°	25°-90°	4 kHz
		-150	-150 + 0.5(δ - 5)	-140	
10.7-11.7 GHz	Fixed-satellite (space-to-Earth) (non-geostationary- satellite orbit) ²⁵	-126	-126 + 0.5(δ - 5)	-116	1 MHz
10.7-11.7 GHz 11.7-12.5 GHz (Region 1) 12.5-12.75 GHz (Region 1 countries listed in Nos. 5.494 and 5.496) 11.7-12.7 GHz (Region 2) 11.7-12.75 GHz (Region 3)	Fixed-satellite (space-to-Earth) (non-geostationary- satellite orbit) ²⁴	-129 ²³	-129 + 0.75(δ - 5) ²³	-114 ²³	1 MHz

TABLE 21-4 (continued) (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
11.7-12.5 GHz (Region 1)	Fixed-satellite (space-to-Earth) (non-geostationary-satellite orbit) ²⁵	-124	-124 + 0.5(δ - 5)	-114	1 MHz
12.5-12.75 GHz (Region 1 countries listed in Nos. 5.494 and 5.496)					
11.7-12.7 GHz (Region 2)					
11.7-12.75 GHz (Region 3)					
12.2-12.75 GHz ⁷ (Region 3)	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	-148	-148 + 0.5(δ - 5)	-138	4 kHz
12.5-12.75 GHz ⁷ (Region 1 countries listed in Nos. 5.494 and 5.496)					
13.4-13.65 GHz (Region 1)	Fixed-satellite (space-to-Earth) (geostationary-satellite orbit)	0°-25°	25°-80°	80°-84°	84°-90°
		-159 + 0.4 δ ¹⁹	-149 ¹⁹	-149 - 0.5(δ - 80) ¹⁹	-151 ¹⁹
17.7-19.3 GHz ^{7,8}	Fixed-satellite (space-to-Earth) Inter-satellite Meteorological-satellite (space-to-Earth)	0°-5°	5°-25°	25°-90°	1 MHz
		-115 ^{14, 15} or -115 - X ¹³	-115 + 0.5(δ - 5) ^{14, 15} or -115 - X + ((10 + X)/20) (δ - 5) ¹³	-105 ^{14, 15} or -105 ¹³	
17.7-19.3 GHz ^{7,8}	Fixed-satellite (space-to-Earth) Inter-satellite	0°-3°	3°-12°	12°-25°	-105 ¹⁶
		-120 ¹⁶	-120 + (8/9) (δ - 3) ¹⁶	-112 + (7/13) (δ - 12) ¹⁶	1 MHz
19.3-19.7 GHz	Fixed-satellite (space-to-Earth) Inter-satellite	0°-3°	3°-12°	12°-25°	-105 ¹⁶
		-120 ¹⁶	-120 + (8/9) (δ - 3) ¹⁶	-112 + (7/13) (δ - 12) ¹⁶	1 MHz

TABLE 21-4 (continued) (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
19.3-19.7 GHz 21.4-22 GHz (Regions 1 and 3) 22.55-23.55 GHz 24.45-24.75 GHz 25.25-27.5 GHz	Fixed-satellite (space-to-Earth) Broadcasting-satellite Earth exploration-satellite (space-to-Earth) Inter-satellite Space research (space-to-Earth)	-115 ¹⁵	-115 + 0.5(δ - 5) ¹⁵	-105 ¹⁵	1 MHz
27.500-27.501 GHz	Fixed-satellite (space-to-Earth)	-115	-115 + 0.5(δ - 5)	-105	1 MHz
27.5-30.0 GHz	Inter-satellite (non-geostationary satellite orbit) ²⁶	-120	-120 + 0.5(δ - 5)	-110	1 MHz
31.0-31.3 GHz 34.7-35.2 GHz (space-to-Earth transmissions referred to in No. 5.550 on the territories of countries listed in No. 5.549)	Space research	-115	-115 + 0.5(δ - 5)	-105	1 MHz
31.8-32.3 GHz	Space research	-120 ²⁰	-120 + 0.75(δ - 5) ²⁰	-105	1 MHz
32.3-33 GHz	Inter-satellite	-135	-135 + (δ - 5)	-115	1 MHz
37-38 GHz	Space research (non-geostationary-satellite orbit)	-120 ²⁰	-120 + 0.75(δ - 5) ²⁰	-105	1 MHz
37-38 GHz	Space research (geostationary-satellite orbit)	-125	-125 + (δ - 5)	-105	1 MHz
37.5-40 GHz	Fixed-satellite (non-geostationary-satellite orbit) Mobile-satellite (non-geostationary-satellite orbit)	-120 ^{11, 21}	-120 + 0.75(δ - 5) ^{11, 21}	-105 ^{11, 21}	1 MHz
37.5-40 GHz	Fixed-satellite (geostationary-satellite orbit)	0°-5°	5°-20°	20°-25°	1 MHz
	Mobile-satellite (geostationary-satellite orbit)	-127 ²¹	-127 + (4/3)(δ - 5) ²¹	-107 + 0.4(δ - 20) ²¹	
40-40.5 GHz	Fixed-satellite Mobile-satellite	-115	-115 + 0.5(δ - 5)	-105	1 MHz
40.5-42 GHz	Fixed-satellite (non-geostationary-satellite orbit) Broadcasting-satellite (non-geostationary-satellite orbit)	-115 ^{11, 21}	-115 + 0.5(δ - 5) ^{11, 21}	-105 ^{11, 21}	1 MHz

TABLE 21-4 (end) (Rev.WRC-23)

Frequency band	Service*	Limit in dB(W/m ²) for angles of arrival (δ) above the horizontal plane			Reference bandwidth	
		0°-5°	5°-25°	25°-90°		
40.5-42 GHz	Fixed-satellite (geostationary-satellite orbit)	-120 ²¹	5°-15°	15°-25°	-105 ²¹	1 MHz
	Broadcasting-satellite (geostationary-satellite orbit)		-120 + (δ - 5) ²¹	-110 + 0.5 (δ - 15) ²¹		
42-42.5 GHz	Fixed-satellite (non-geostationary-satellite orbit)	-120 ^{11, 21}	5°-25°		-105 ^{11, 21}	1 MHz
	Broadcasting-satellite (non-geostationary-satellite orbit)		-120 + 0.75(δ - 5) ^{11, 21}			
42-42.5 GHz	Fixed-satellite (geostationary-satellite orbit)	-127 ²¹	5°-20°	20°-25°	-105 ²¹	1 MHz
	Broadcasting-satellite (geostationary-satellite orbit)		-127 + (4/3) (δ - 5) ²¹	-107 + 0.4 (δ - 20) ²¹		
In Region 1: 47.5-47.9 GHz 48.2-48.54 GHz 49.44-50.2 GHz	Fixed-satellite (geostationary-satellite orbit)	-115	5°-25°		-105	1 MHz
			-115 + 0.5(δ - 5)			

* The references to services are those services which have allocations in Article 5.

⁷ **21.16.1** The equality of right to operate when a frequency band is allocated in different Regions to different services of the same category is established in No. 4.8. Therefore, any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

⁸ **21.16.2** In addition to the limits given in Table 21-4, in the band 18.6-18.8 GHz the sharing environment within which the Earth exploration-satellite (passive) and space research (passive) services shall operate is defined by the following limitations on the operation of the fixed-satellite service: the power flux-density across the 200 MHz band 18.6-18.8 GHz produced at the surface of the Earth by emissions from a space station under assumed free-space propagation conditions shall not exceed -95 dB(W/m²), except for less than 5% of time, when the limit may be exceeded by up to 3 dB. The provisions of No. 21.17 do not apply in this band. (WRC-2000)

⁹ **21.16.3** These power flux-density values are derived on the basis of protecting the fixed service using line-of-sight techniques. Where a fixed service using tropospheric scatter operates in the bands listed in the first column and there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter, in order to ensure that the interference power at the receiver input of the fixed-service station does not exceed -168 dBW in any 4 kHz band.

¹⁰ **21.16.3A** Resolution 903 (Rev.WRC-19) shall apply. (WRC-19)

¹¹ **21.16.4** The values given in this table entry shall apply to emissions of space stations of non-geostationary satellites in systems operating with 99 or fewer satellites. Further study concerning the applicability of these values is necessary in order to apply them to systems operating with 100 or more satellites. (WRC-2000)

¹² **21.16.5** These values are applicable where this band is shared with equal rights with meteorological aids service.

¹³ **21.16.6** The function X is defined as a function of the number, N , of satellites in the non-geostationary satellite constellation in the fixed-satellite service and N_v , as follows:

$X = 0$	dB	for	$N \leq 50$
$X = \frac{5}{119}(N - 50)$	dB	for	$50 < N \leq 288$
$X = \frac{1}{69}(N + 402)$	dB	for	$288 < N \leq 999$
$X = \max\{20.3; 10 \log_{10}(N_v)\}$	dB	for	$1\,000 \leq N \leq 6\,000$
$X = 10 \log_{10}(N_v) + 1$	dB	for	$N > 6\,000$

where:

N_v^* is the maximum number of visible space stations – considering a minimum elevation angle equal to 0 degrees – from any location on the surface of the Earth and within the *service* area of the non-GSO system. N_v does not depend on latitude; it encompasses the maximum number of visible satellites across all latitudes within the service area of the relevant non-GSO system.

In the frequency band 18.8-19.3 GHz, these limits apply to emissions of any space station in a non-geostationary-satellite system

- in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Radiocommunication Bureau since 17 November 1995 and which was not operational by that date, and
 - in the inter-satellite service.
- * Where N_v is determined as follows: $N_v = \max(N_v(j=0,1,2,\dots))$ with $N_v(j) = \max(N_v(j(t)), N_v(j(t-1)))$, where $N_v(j(t))$ represents all visible satellites (with elevation ≥ 0 degrees) at each time-step (t) on any point on the surface of the Earth (j).

(WRC-23)

¹⁴ **21.16.6A** These limits apply to emissions of a space station in the meteorological-satellite service and of a geostationary satellite in the fixed-satellite and inter-satellite services. They also apply to emissions of any space station in a non-geostationary-satellite system in the fixed-satellite service in the band 18.8-19.3 GHz for which complete coordination or notification information has been received by the Radiocommunication Bureau by 17 November 1995, or which was in operation by that date. (WRC-23)

¹⁵ **21.16.6B** These limits also apply to fixed-satellite service space stations using highly-inclined orbits having an apogee altitude greater than 18 000 km and an orbital inclination between 35° and 145° in the band 17.7-19.7 GHz to which Resolution **147 (WRC-07)** applies. (WRC-07)

¹⁶ **21.16.6C** These limits apply to all space stations that use highly-inclined orbits having an apogee altitude greater than 18 000 km and an orbital inclination between 35° and 145° in the band 17.7-19.7 GHz in the fixed-satellite service and that are not covered by Resolution **147 (WRC-07)**, and for which complete coordination or notification information, as appropriate, was received by the Radiocommunication Bureau after 16 November 2007, and in the inter-satellite service. (WRC-23)

¹⁷ **21.16.7** These power flux-density limits are subject to review by ITU-R and shall apply until they are revised by a competent world radiocommunication conference.

¹⁸ **21.16.8** The pfd values given for EESS (active) are mean pfd values defined as follows:

$$pfd(\delta) = P + 10\log(\tau) + 10\log(PRF) - 30 - 10\log(Bc) + G_t(\delta) - 10\log(4\pi d^2(\delta))$$

where:

P: RF peak power at the input of the antenna of the SAR satellite (dBW)

τ: SAR pulse length (μs)

PRF: SAR pulse repetition frequency (kHz)

δ: elevation angle of the EESS SAR satellite above ground, in the vertical plane (perpendicular to the satellite orbit) (°)

Bc: SAR emission bandwidth (MHz)

G_t(δ): transmit antenna gain of the SAR satellite in the vertical plane (perpendicular to the satellite orbit) for the elevation angle *δ* considered (dBi)

d(δ): distance between the SAR satellite and the ground for the elevation angle *δ* considered (m). (WRC-15)

¹⁹ **21.16.9** These values are also based on sharing with the Earth exploration-satellite (active) and space research services. (WRC-15)

²⁰ **21.16.10** During the launch and near-Earth operational phase of deep-space facilities, non-geostationary satellite systems in the space research service shall not exceed a power flux-density value of:

-115 dB(W/m²) for δ < 5°

-115 + 0.5(δ - 5) dB(W/m²) for 5° ≤ δ ≤ 25°

-105 dB(W/m²) for δ > 25°

in any 1 MHz band, where *δ* is the angle of arrival above the horizontal plane. (WRC-2000)

21.16.11 (SUP - WRC-03)

21.16.12 (SUP - WRC-03)

21.16.13 (SUP - WRC-03)

²¹ **21.16.14** When addressing the sharing conditions between the fixed service and the fixed-satellite service in the bands 37.5-40 GHz and 40.5-42.5 GHz, the power flux-density at the Earth's surface from any FSS satellite should be no greater than the level(s) required to meet the FSS link availability and performance objectives of the subject applications, taking into account the technical and operational requirements of the overall design of the satellite network. In any case, the levels shall not exceed the applicable power flux-density limits in Table 21.4. (WRC-03)

²² **21.16.15** The value of *Y* is defined as *Y* = 0 for max(*N_N*, *N_S*) ≤ 2; *Y* = 5 log(max(*N_N*, *N_S*)) for max(*N_N*, *N_S*) > 2, where *N_N* is the maximum number of space stations in a system simultaneously transmitting on a co-frequency basis in the fixed-satellite service in the Northern Hemisphere, and *N_S* is the maximum number of space stations in the same system simultaneously transmitting on a co-frequency basis in the fixed-satellite service in the Southern Hemisphere. In determining *N_N* and *N_S*, two space stations simultaneously transmitting during periods of short-duration handover shall be considered as one satellite. (WRC-03)

²³ **21.16.16** The applicability of these limits may need to be reviewed by a future competent conference if the number of co-frequency non-geostationary systems brought into use and simultaneously operating in the same hemisphere is greater than five. (WRC-03)

²⁴ **21.16.17** These limits apply to non-geostationary fixed-satellite service space stations employing an orbit with an inclination angle between 35° and 145° and apogee altitude greater than 18 000 km. (WRC-03)

²⁵ **21.16.18** These limits apply to non-geostationary fixed-satellite service space stations that are not covered by No. **21.16.17**. (WRC-03)

²⁶ **21.16.19** The methodology included in Annex 2 to Resolution **679** (WRC-23) shall be applied to calculate the pfd produced at the surface of the Earth by emissions from a non-geostationary-satellite space station transmitting in the frequency band 27.5-30.0 GHz. (WRC-23)

21.17 2) The limits given in Table 21-4 may be exceeded on the territory of any country whose administration has so agreed.

Section VI – Protection of aeronautical radionavigation service systems from aggregate emissions of space stations of radionavigation-satellite service systems in the 1 164-1 215 MHz band (WRC-03)

21.18 § 7 Administrations operating or planning to operate radionavigation-satellite service systems or networks in the 1 164-1 215 MHz frequency band, for which complete coordination or notification information, as appropriate, was received by the Bureau after 2 June 2000, shall, in accordance with *resolves* 2 of Resolution 609 (WRC-03)*, take all necessary steps to ensure that the actual aggregate interference into aeronautical radionavigation service systems caused by such radionavigation-satellite service systems or networks operating co-frequency in these frequency bands does not exceed the equivalent power flux-density level shown in *resolves* 1 of Resolution 609 (WRC-03)*. (WRC-03)

* Note by the Secretariat: This Resolution was revised by WRC-07.

ARTICLE 22

Space services¹

Section I – Cessation of emissions

22.1 § 1 Space stations shall be fitted with devices to ensure immediate cessation of their radio emissions by telecommand, whenever such cessation is required under the provisions of these Regulations.

Section II – Control of interference to geostationary-satellite systems

22.2 § 2 1) Non-geostationary-satellite systems shall not cause unacceptable interference to and, unless otherwise specified in these Regulations, shall not claim protection from geostationary-satellite networks in the fixed-satellite service and the broadcasting-satellite service operating in accordance with these Regulations. No. **5.43A** does not apply in this case. (WRC-07)

22.3 2) Whenever the emissions from geostationary satellites in the inter-satellite service are directed towards space stations at distances from Earth greater than that of the geostationary-satellite orbit, the boresight of the antenna mainbeam of the geostationary satellite shall not be pointed within 15° of any point on the geostationary-satellite orbit.

22.4 § 3 In the frequency band 29.95-30 GHz space stations in the Earth exploration-satellite service on board geostationary satellites and operating with space stations in the same service on board non-geostationary satellites shall have the following restriction:

Whenever the emissions from the geostationary satellites are directed towards the geostationary-satellite orbit and cause unacceptable interference to any geostationary-satellite space system in the fixed-satellite service, these emissions shall be reduced to a level at or less than accepted interference.

22.5 § 4 In the frequency band 8 025-8 400 MHz, which the Earth exploration-satellite service using non-geostationary satellites shares with the fixed-satellite service (Earth-to-space) or the meteorological-satellite service (Earth-to-space), the maximum power flux-density produced at the geostationary-satellite orbit by any Earth exploration-satellite service space station shall not exceed -174 dB(W/m²) in any 4 kHz band.

22.5A § 5 In the frequency band 6 700-7 075 MHz, the maximum aggregate power flux-density produced at the geostationary-satellite orbit and within ± 5° of inclination around the geostationary-satellite orbit by a non-geostationary-satellite system in the fixed-satellite service shall not exceed -168 dB(W/m²) in any 4 kHz band. The maximum aggregate power flux-density shall be calculated in accordance with Recommendation ITU-R S.1256-0. (WRC-15)

¹ **A.22.1** In applying the provisions of this Article, the level of accepted interference (see No. **1.168**) shall be fixed by agreement between the administrations concerned, using the relevant ITU-R Recommendations as a guide.

22.5B (SUP - WRC-2000)

22.5C § 6 1) The equivalent power flux-density², $epfd \downarrow$, at any point on the Earth's surface visible from the geostationary-satellite orbit, produced by emissions from all the space stations of a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Tables 22-1A to 22-1E, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Tables 22-1A to 22-1E for the given percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Tables 22-1A to 22-1E, for all pointing directions towards the geostationary-satellite orbit. (WRC-03)

22.5CA 2) The limits given in Tables 22-1A to 22-1E may be exceeded on the territory of any country whose administration has so agreed (see also Resolution 140 (Rev.WRC-23)). (WRC-23)

² **22.5C.1** The equivalent power flux-density is defined as the sum of the power flux-densities produced at a geostationary-satellite system receive station on the Earth's surface or in the geostationary orbit, as appropriate, by all the transmit stations within a non-geostationary-satellite system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing in its nominal direction. The equivalent power flux-density is calculated using the following formula:

$$epfd = 10 \log_{10} \left[\sum_{i=1}^{N_a} 10^{10} \cdot \frac{P_i}{4 \pi d_i^2} \cdot \frac{G_t(\theta_i)}{G_r(\varphi_i)} \cdot \frac{G_r(\varphi_i)}{G_{r,max}} \right]$$

where:

- N_a : number of transmit stations in the non-geostationary-satellite system that are visible from the geostationary-satellite system receive station considered on the Earth's surface or in the geostationary orbit, as appropriate
- i : index of the transmit station considered in the non-geostationary-satellite system
- P_i : RF power at the input of the antenna of the transmit station, considered in the non-geostationary-satellite system (dBW) in the reference bandwidth
- θ_i : off-axis angle between the boresight of the transmit station considered in the non-geostationary-satellite system and the direction of the geostationary-satellite system receive station
- $G_t(\theta_i)$: transmit antenna gain (as a ratio) of the station considered in the non-geostationary-satellite system in the direction of the geostationary-satellite system receive station
- d_i : distance (m) between the transmit station considered in the non-geostationary-satellite system and the geostationary-satellite system receive station
- φ_i : off-axis angle between the boresight of the antenna of the geostationary-satellite system receive station and the direction of the i -th transmit station considered in the non-geostationary-satellite system
- $G_r(\varphi_i)$: receive antenna gain (as a ratio) of the geostationary-satellite system receive station in the direction of the i -th transmit station considered in the non-geostationary-satellite system
- $G_{r,max}$: maximum gain (as a ratio) of the antenna of the geostationary-satellite system receive station
- $epfd$: computed equivalent power flux-density (dB(W/m²)) in the reference bandwidth. (WRC-2000)

TABLE 22-1A (WRC-03)

Limits to the epfd_{\downarrow} radiated by non-geostationary-satellite systems in the fixed-satellite service systems in certain frequency bands^{3, 4, 5, 6}

Frequency band (GHz)	epfd_{\downarrow} (dB(W/m ²))	Percentage of time during which epfd_{\downarrow} may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ⁷
10.7-11.7 in all Regions; 11.7-12.2 in Region 2; 12.2-12.5 in Region 3 and 12.5-12.75 in Regions 1 and 3	-175.4	0	40	60 cm Recommendation ITU-R S.1428-1
	-174	90		
	-170.8	99		
	-165.3	99.73		
	-160.4	99.991		
	-160	99.997		
	-160	100		
	-181.9	0		1.2 m Recommendation ITU-R S.1428-1
	-178.4	99.5		
	-173.4	99.74		
	-173	99.857		
	-164	99.954		
	-161.6	99.984		
	-161.4	99.991		
	-160.8	99.997		
	-160.5	99.997		
	-160	99.9993		
	-160	100		

³ **22.5C.2** For certain geostationary fixed-satellite service system receive earth stations, see also Nos. 9.7A and 9.7B. (WRC-2000)

⁴ **22.5C.3** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plan of Appendix 30B will be fully protected. (WRC-2000)

⁵ **22.5C.4** In addition to the limits shown in Table 22-1A, the following single-entry epfd_{\downarrow} limits apply to all antenna sizes greater than 60 cm in the frequency bands listed in Table 22-1A:

100% of the time epfd_{\downarrow} (dB(W/(m ² · 40 kHz)))	Latitude (North or South) (degrees)
-160	0 < Latitude ≤ 57.5
-160 + 3.4 (57.5 - Latitude)/4	57.5 < Latitude ≤ 63.75
-165.3	63.75 < Latitude

(WRC-2000)

⁶ **22.5C.5** For each reference antenna diameter, the limit consists of the complete curve on a plot which is linear (dB) for the epfd_{\downarrow} levels and logarithmic for the time percentages, with straight lines joining the data points. (WRC-2000)

⁷ **22.5C.6** For this Table, reference patterns of Recommendation ITU-R S.1428-1 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service systems into geostationary-satellite systems in the fixed-satellite service. (WRC-03)

TABLE 22-1A (end) (WRC-03)

Frequency band (GHz)	$\text{epfd}\downarrow$ (dB(W/m ²))	Percentage of time during which $\text{epfd}\downarrow$ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ⁷
	-190.45 -189.45 -187.45 -182.4 -182 -168 -164 -162 -160 -160	0 90 99.5 99.7 99.855 99.971 99.988 99.995 99.999 100	40	3 m Recommendation ITU-R S.1428-1
	-195.45 -195.45 -190 -190 -172.5 -160 -160	0 99 99.65 99.71 99.99 99.998 100	40	10 m Recommendation ITU-R S.1428-1

TABLE 22-1B (Rev.WRC-23)

**Limits to the $\text{epfd}\downarrow$ radiated by non-geostationary-satellite systems
in the fixed-satellite service in certain frequency bands^{3, 6, 8, 8bis}**

Frequency band (GHz)	$\text{epfd}\downarrow$ (dB(W/m ²))	Percentage of time during which $\text{epfd}\downarrow$ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ⁷
17.3-17.7 in Region 2; 17.8-18.6	-175.4	0	40	1 m Recommendation ITU-R S.1428-1
	-175.4	90		
	-172.5	99		
	-167	99.714		
	-164	99.971		
	-164	100		
	-161.4	0		
	-161.4	90		
	-158.5	99		
	-153	99.714		
17.8-18.6	-150	99.971	1 000	2 m Recommendation ITU-R S.1428-1
	-150	100		
	-178.4	0		
	-178.4	99.4		
	-171.4	99.9		
	-170.5	99.913		
	-166	99.971		
	-164	99.977		
	-164	100		
	-164.4	0	40	5 m Recommendation ITU-R S.1428-1
17.8-18.6	-164.4	99.4		
	-157.4	99.9		
	-156.5	99.913		
	-152	99.971		
	-150	99.977		
	-150	100		
	-185.4	0		
	-185.4	99.8		
	-180	99.8		
	-180	99.943		
17.8-18.6	-172	99.943	1 000	
	-164	99.998		
	-164	100		
	-171.4	0		
	-171.4	99.8		
	-166	99.8		
	-166	99.943		
	-158	99.943		
	-150	99.998		
	-150	100		

⁸ **22.5C.7** A non-geostationary-satellite system shall meet the limits of this Table in both the 40 kHz and the 1 MHz reference bandwidths. (WRC-2000)

^{8bis} **22.5C.13** In Region 2, a non-geostationary-satellite system in the fixed-satellite service shall meet the limits of this table for the 17.3-17.7 GHz band with respect to geostationary-satellite systems in the broadcasting-satellite service and shall utilize the reference patterns of Recommendation ITU-R BO.1443-3. (WRC-23)

TABLE 22-1C (WRC-03)

Limits to the epfd_{\downarrow} radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands^{3, 6, 8}

Frequency band (GHz)	epfd_{\downarrow} (dB(W/m ²))	Percentage of time during which epfd_{\downarrow} may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ⁷
19.7-20.2	-187.4	0	40	70 cm Recommendation ITU-R S.1428-1
	-182	71.429		
	-172	97.143		
	-154	99.983		
	-154	100		
	-173.4	0		
	-168	71.429		
	-158	97.143		
	-140	99.983		
	-140	100		
	-190.4	0	40	90 cm Recommendation ITU-R S.1428-1
	-181.4	91		
	-170.4	99.8		
	-168.6	99.8		
	-165	99.943		
	-160	99.943		
	-154	99.997		
	-154	100		
	-176.4	0	1 000	2.5 m Recommendation ITU-R S.1428-1
	-167.4	91		
	-156.4	99.8		
	-154.6	99.8		
	-151	99.943		
	-146	99.943		
	-140	99.997		
	-140	100		
	-196.4	0	40	5 m Recommendation ITU-R S.1428-1
	-162	99.98		
	-154	99.99943		
	-154	100		
	-182.4	0	1 000	
	-148	99.98		
	-140	99.99943		
	-140	100		
	-200.4	0		
	-189.4	90	40	5 m Recommendation ITU-R S.1428-1
	-187.8	94		
	-184	97.143		
	-175	99.886		
	-164.2	99.99		
	-154.6	99.999		
	-154	99.9992		
	-154	100		
	-186.4	0		
	-175.4	90		

TABLE 22-1D (Rev.WRC-15)

Limits to the epfd_{\downarrow} radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands into 30 cm, 45 cm, 60 cm, 90 cm, 120 cm, 180 cm, 240 cm and 300 cm broadcasting-satellite service antennas^{6, 9, 10, 11}

Frequency band (GHz)	epfd_{\downarrow} (dB(W/m ²))	Percentage of time during which epfd_{\downarrow} may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ¹²
11.7-12.5 in Region 1; 11.7-12.2 and 12.5-12.75 in Region 3; 12.2-12.7 in Region 2	-165.841	0	40	30 cm Recommendation ITU-R BO.1443-3, Annex 1
	-165.541	25		
	-164.041	96		
	-158.6	98.857		
	-158.6	99.429		
	-158.33	99.429		
	-158.33	100		
	-175.441	0		45 cm Recommendation ITU-R BO.1443-3, Annex 1
	-172.441	66		
	-169.441	97.75		
	-164	99.357		
	-160.75	99.809		
	-160	99.986		
	-160	100		
	-176.441	0	40	60 cm Recommendation ITU-R BO.1443-3, Annex 1
	-173.191	97.8		
	-167.75	99.371		
	-162	99.886		
	-161	99.943		
	-160.2	99.971		
	-160	99.997		
	-160	100		

9 22.5C.8 For broadcasting-satellite service antenna diameters 180 cm, 240 cm and 300 cm, in addition to the single-entry limits shown in Table 22-1D, the following single-entry 100% of the time epfd_{\downarrow} limits also apply in the frequency bands listed in Table 22-1D:

100% of the time epfd_{\downarrow} (dB(W/(m ² · 40 kHz)))	Latitude (North or South) (degrees)
-160	0 < Latitude ≤ 57.5
-160 + 3.4 (57.5 - Latitude)/4	57.5 < Latitude ≤ 63.75
-165.3	63.75 < Latitude

(WRC-2000)

10 22.5C.9 For a broadcasting-satellite service earth station antenna diameter of 240 cm, in addition to the single-entry 100% of the time epfd_{\downarrow} limit specified in No. 22.5C.8 to this Table, a single-entry 100% of the time operational epfd_{\downarrow} limit is specified in Table 22-4C*. (WRC-2000)

* Note by the Secretariat: Table 22-4C has been suppressed by WRC-19.

11 22.5C.10 In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plans of Appendix 30 will be fully protected. (WRC-2000)

12 22.5C.11 For this Table, reference patterns of Annex 1 to Recommendation ITU-R BO.1443-3 shall be used only for the calculation of interference from non-geostationary satellite systems in the fixed-satellite service into geostationary-satellite systems in the broadcasting-satellite service. (WRC-15)

TABLE 22-1D (end) (Rev.WRC-15)

Frequency band (GHz)	epfd↓ (dB(W/m ²))	Percentage of time during which epfd↓ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern ¹²
11.7-12.5 in Region 1; 11.7-12.2 and 12.5-12.75 in Region 3; 12.2-12.7 in Region 2	-178.94 -178.44 -176.44 -171 -165.5 -163 -161 -160 -160	0 33 98 99.429 99.714 99.857 99.943 99.991 100	40	90 cm Recommendation ITU-R BO.1443-3, Annex 1
	-182.44 -180.69 -179.19 -178.44 -174.94 -173.75 -173 -169.5 -167.8 -164 -161.9 -161 -160.4 -160	0 90 98.9 98.9 99.5 99.68 99.68 99.85 99.915 99.94 99.97 99.99 99.998 100	40	120 cm Recommendation ITU-R BO.1443-3, Annex 1
	-184.941 -184.101 -181.691 -176.25 -163.25 -161.5 -160.35 -160 -160	0 33 98.5 99.571 99.946 99.974 99.993 99.999 100	40	180 cm Recommendation ITU-R BO.1443-3, Annex 1
	-187.441 -186.341 -183.441 -178 -164.4 -161.9 -160.5 -160 -160	0 33 99.25 99.786 99.957 99.983 99.994 99.999 100	40	240 cm Recommendation ITU-R BO.1443-3, Annex 1
	-191.941 -189.441 -185.941 -180.5 -173 -167 -162 -160 -160	0 33 99.5 99.857 99.914 99.951 99.983 99.991 100	40	300 cm Recommendation ITU-R BO.1443-3, Annex 1

TABLE 22-1E (WRC-03)
Limits to the $\text{epfd} \downarrow$ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands

Frequency band (MHz)	$\text{epfd} \downarrow$ (dB(W/m ²))	Percentage of time during which $\text{epfd} \downarrow$ may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter and reference radiation pattern (m)
3 700-4 200	-195.4	100	4	1.8 ¹³
	-197.9	100	4	2.4 ¹³
	-201.6	100	4	3.7 ¹³
	-203.3	100	4	4.5 ¹³
	-204.5	100	4	5.5 ¹³
	-207.5	100	4	8 ¹³
	-208.5	100	4	10 ¹³
	-212.0	100	4	15 ¹³

¹³ **22.5C.12** The associated reference radiation pattern is defined as follows:

a) for values of $\left(\frac{D}{\lambda}\right) \geq 100$:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \quad \text{for } 0 \leq \varphi < \varphi_m$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < \varphi_r$$

$$G(\varphi) = 29 - 25 \log \varphi \quad \text{for } \varphi_r \leq \varphi < 20^\circ$$

$$G(\varphi) = -3.5 \quad \text{for } 20^\circ \leq \varphi < 26.3^\circ$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } 26.3^\circ \leq \varphi < 48^\circ$$

$$G(\varphi) = -10 \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ$$

b) for values of $42 \leq \left(\frac{D}{\lambda}\right) < 100$:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \quad \text{for } 0 \leq \varphi < \varphi_m$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m \leq \varphi < 100 \left(\frac{\lambda}{D}\right)$$

$$G(\varphi) = 29 - 25 \log \varphi \quad \text{for } 100 \left(\frac{\lambda}{D}\right) \leq \varphi < 20^\circ$$

$$G(\varphi) = -3.5 \quad \text{for } 20^\circ \leq \varphi < 26.3^\circ$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } 26.3^\circ \leq \varphi < 48^\circ$$

$$G(\varphi) = -10 \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ$$

22.5D 3) The equivalent power flux-density¹⁴, $\text{epfd} \uparrow$, produced at any point in the geostationary-satellite orbit by emissions from all the earth stations in a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Table 22-2, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 22-2 for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Table 22-2, for all pointing directions towards the Earth's surface visible from any given location in the geostationary-satellite orbit. (WRC-2000)

¹³ **22.5C.12 (continued)**

c) for values of $\left(\frac{D}{\lambda}\right) < 42$:

$$G(\varphi) = G_{max} - 2.5 \times 10^{-3} \left(\frac{D}{\lambda}\varphi\right)^2 \quad \text{for } 0^\circ \leq \varphi < \varphi_m$$

$$G(\varphi) = G_1 \quad \text{for } \varphi_m^\circ \leq \varphi < 100^\circ \left(\frac{\lambda}{D}\right)$$

$$G(\varphi) = 32 - 25 \log \varphi \quad \text{for } 100^\circ \left(\frac{\lambda}{D}\right) \leq \varphi < 48^\circ$$

$$G(\varphi) = -10 \quad \text{for } 48^\circ \leq \varphi \leq 180^\circ$$

where:

D : antenna diameter
 λ : wavelength } expressed in the same units

φ : off-axis angle of the antenna (degrees)

$$G_1: \text{gain of the first side lobe} = 2 + 15 \log \left(\frac{D}{\lambda}\right) \text{ dBi}$$

$$\varphi_m = \frac{20\lambda}{D} \sqrt{G_{max} - G_1} \text{ degrees}$$

$$\varphi_r = 15.85 \left(\frac{D}{\lambda}\right)^{-0.6} \text{ degrees}$$

$$G_{max} = 7.7 + 20 \log \left(\frac{D}{\lambda}\right) \text{ dBi} \quad (\text{WRC-03})$$

¹⁴ **22.5D.1** See No. **22.5C.1.** (WRC-2000)

TABLE 22-2 (WRC-03)

Limits to the epfd^\uparrow radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands¹⁵

Frequency band	epfd^\uparrow (dB(W/m ²))	Percentage of time epfd^\uparrow level may not be exceeded	Reference bandwidth (kHz)	Reference antenna beamwidth and reference radiation pattern ¹⁶
5 925-6 725 MHz	-183.0	100	4	1.5° Recommendation ITU-R S.672-4, $L_s = -20$
12.5-12.75 GHz 12.75-13.25 GHz 13.75-14.5 GHz	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$
17.3-18.1 GHz (Regions 1 and 3) 17.8-18.1 GHz (Region 2) ¹⁷	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$
27.5-28.6 GHz	-162	100	40	1.55° Recommendation ITU-R S.672-4, $L_s = -10$
29.5-30 GHz	-162	100	40	1.55° Recommendation ITU-R S.672-4, $L_s = -10$

22.5E (SUP - WRC-2000)

22.5F 4) The equivalent power flux-density¹⁸, epfd_{is} , produced at any point in the geostationary-satellite orbit by emissions from all the space stations in a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Table 22-3, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Table 22-3 for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions into a reference antenna and in the reference bandwidth specified in Table 22-3, for all pointing directions towards the Earth's surface visible from any given location in the geostationary-satellite orbit. (WRC-2000)

¹⁵ **22.5D.2** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the Plans of Appendices 30A and 30B will be fully protected. (WRC-2000)

¹⁶ **22.5D.3** For this Table, reference patterns of Recommendation ITU-R S.672-4 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service into geostationary-satellite systems in the fixed-satellite service. For the case of $L_s = -10$, the values $a = 1.83$ and $b = 6.32$ shall be used in the equations in Annex 1 to Recommendation ITU-R S.672-4 for single-feed circular beams. In all cases of L_s , the parabolic main beam equation shall start at zero. (WRC-2000)

¹⁷ **22.5D.4** This epfd^\uparrow level also applies to the frequency band 17.3-17.8 GHz to protect broadcasting-satellite service feeder links in Region 2 from non-geostationary fixed-satellite service Earth-to-space transmissions in Regions 1 and 3. (WRC-2000)

¹⁸ **22.5F.1** See No. 22.5C.1. (WRC-2000)

TABLE 22-3 (Rev.WRC-23)

Limits to the epfd_{is} radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands^{19, 19bis}

Frequency band (GHz)	epfd_{is} (dB(W/m ²))	Percentage of time during which epfd_{is} level may not be exceeded	Reference bandwidth (kHz)	Reference antenna beamwidth and reference radiation pattern ²⁰
10.7-11.7 (Region 1) 12.5-12.75 (Region 1) 12.7-12.75 (Region 2)	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$
17.3-17.7 (Regions 1 and 2) 17.8-18.4	-160	100	40	4° Recommendation ITU-R S.672-4, $L_s = -20$

22.5G

(SUP - WRC-2000)

22.5H 5) The limits specified in Nos. **22.5C** (except for Table **22-1E**) to **22.5D** (except for Table **22-2** for the frequency band 5 925-6 725 MHz) and **22.5F** apply to non-geostationary-satellite systems in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Bureau after 22 November 1997. The limits specified in Table **22-1E** and those specified in Table **22-2** for the frequency band 5 925-6 725 MHz apply to non-geostationary-satellite systems in the fixed-satellite service for which complete notification information has been received by the Bureau after 5 July 2003. The limits in Tables **22-4A**, **22-4A1** and **22-4B** do not apply to non-geostationary-satellite systems in the fixed-satellite service for which complete coordination or notification information, as appropriate, has been received by the Bureau before 22 November 1997. (WRC-19)

¹⁹ **22.5F.2** In meeting these limits, the administrations intending to develop such systems shall ensure that the assignments appearing in the feeder-link Plans of Appendix **30A** will be fully protected. (WRC-2000)

^{19bis} **22.5F.4** A non-geostationary-satellite system operating in Region 1 or 2, at any position in the orbit, shall meet the limits of this table for the 17.3-17.7 GHz band with respect to a receiving space station in the broadcasting-satellite feeder link of Appendix **30A**, in all three Regions. (WRC-23)

²⁰ **22.5F.3** In this Table, the reference pattern of Recommendation ITU-R S.672-4 shall be used only for the calculation of interference from non-geostationary-satellite systems in the fixed-satellite service into geostationary-satellite systems in the fixed-satellite service. In applying the equations of Annex 1 to Recommendation ITU-R S.672-4, the parabolic main beam equation shall start at zero. (WRC-2000)

22.5I 6) An administration operating a non-geostationary-satellite system in the fixed-satellite service which is in compliance with the limits in Nos. **22.5C**, **22.5D** and **22.5F** shall be considered as having fulfilled its obligations under No. **22.2** with respect to any geostationary-satellite network, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite system and the geostationary-satellite network, provided that the $\text{epfd}\downarrow$ radiated by the non-geostationary-satellite system in the fixed-satellite service into any operating geostationary fixed-satellite service earth station does not exceed the operational and additional operational limits given in Tables **22-4A**, **22-4A1** and **22-4B**, when the diameter of the earth station antenna is equal to the values given in Table **22-4A** or **22-4A1**, or the gain of the earth station is equal to or greater than the values given in Table **22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite. Except as otherwise agreed between concerned administrations, an administration operating a non-geostationary-satellite system in the fixed-satellite service that is subject to the limits in Nos. **22.5C**, **22.5D** and **22.5F** and which radiates $\text{epfd}\downarrow$ into any operating geostationary fixed-satellite service earth station at levels in excess of the operational or additional operational limits given in Tables **22-4A**, **22-4A1** and **22-4B**, when the diameter of the earth station antenna is equal to the values given in Table **22-4A** or **22-4A1**, or the gain of the earth station is equal to or greater than the values given in Table **22-4B** for the corresponding orbital inclination of the geostationary fixed-satellite service satellite, shall be considered to be in violation of its obligations under No. **22.2**, and the provisions of Article **15** (Section V) apply. In addition, administrations are encouraged to use the relevant ITU-R Recommendations to determine whether such a violation has occurred. (WRC-19)

TABLE 22-4A (REV.WRC-07)

Operational limits to the $\text{epfd} \downarrow$ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands^{21, 22, 23}

Frequency band (GHz)	$\text{epfd} \downarrow$ (dB(W/m ²))	Percentage of time during which $\text{epfd} \downarrow$ may not be exceeded	Reference bandwidth (kHz)	Geostationary-satellite system receive earth station antenna diameter ²⁴ (m)	Orbital inclination of the geostationary satellite (degrees)
10.7-11.7 in all Regions 11.7-12.2 in Region 2 12.2-12.5 in Region 3, and 12.5-12.75 in Regions 1 and 3 (prior to 31 December 2005)	-163	100	40	3	≤ 2.5
	-166			6	
	-167.5			9	
	-169.5			≥ 18	
	-160	100	40	3	> 2.5 and ≤ 4.5
	-163			6	
	-164.5			9	
	-166.5			≥ 18	
10.7-11.7 in all Regions 11.7-12.2 in Region 2 12.2-12.5 in Region 3, and 12.5-12.75 in Regions 1 and 3 (from 31 December 2005)	-161.25	100	40	3	≤ 2.5
	-164			6	
	-165.5			9	
	-167.5			≥ 18	
	-158.25	100	40	3	> 2.5 and ≤ 4.5
	-161			6	
	-162.5			9	
	-164.5			≥ 18	

²¹ **22.5H.1** For certain geostationary fixed-satellite service receive earth stations, see also Nos. 9.7A and 9.7B. (WRC-2000)

²² **22.5H.2** In addition to the operational limits shown in Table 22-4A, the additional operational limits in Table 22-4A1 apply to certain geostationary fixed-satellite service earth station antenna sizes in the frequency bands listed in Table 22-4A. (WRC-2000)

²³ **22.5H.3** The operational limits on the $\text{epfd} \downarrow$ radiated by non-geostationary-satellite systems in the fixed-satellite service shall be the values given in No. 22.5C.4 or Table 22-4A, whichever are the more stringent. (WRC-2000)

²⁴ **22.5H.4** For antenna diameters between the values given in this Table, the limits are given by linear interpolation using a linear scale for $\text{epfd} \downarrow$ (dB) and a logarithmic scale for antenna diameter (m). (WRC-2000)

TABLE 22-4A1 (WRC-2000)

Additional operational limits to the $\text{epfd}\downarrow$ radiated by non-geostationary-satellite systems in the fixed-satellite service into 3 m and 10 m geostationary fixed-satellite service earth station antennas

$\text{epfd}\downarrow$ (dB(W/(m ² · 40 kHz)))	Percentage of time during which $\text{epfd}\downarrow$ may not be exceeded	Geostationary-satellite system receive earth station antenna diameter (m)
-182	99.9	
-179	99.94	
-176	99.97	
-171	99.98	
-168	99.984	
-165	99.993	
-163	99.999	
-161.25	99.99975	
-161.25	100	
		3
-185	99.97	
-183	99.98	
-179	99.99	
-175	99.996	
-171	99.998	
-168	99.999	
-166	99.9998	
-166	100	
		10

TABLE 22-4B (Rev.WRC-23)

Operational limits to the $\text{epfd}\downarrow$ radiated by non-geostationary-satellite systems in the fixed-satellite service in certain frequency bands^{21,25}

Frequency band (GHz)	$\text{epfd}\downarrow$ (dB(W/m ²))	Percentage of time during which $\text{epfd}\downarrow$ may not be exceeded	Reference bandwidth (kHz)	Geostationary-satellite system receive earth station antenna gain (dBi)	Orbital inclination of geostationary satellite (degrees)
19.7-20.2	-157	100	40	≥ 49	≤ 2.5
	-157	100	40	≥ 43	≤ 2.5
	-155	100	40	≥ 49	$> 2.5 \text{ and } \leq 4.5$
19.7-20.2	-143	100	1 000	≥ 49	≤ 2.5
	-143	100	1 000	≥ 43	≤ 2.5
	-141	100	1 000	≥ 49	$> 2.5 \text{ and } \leq 4.5$
17.3-17.7 in Region 2 17.8-18.6	-164	100	40	≥ 49	≤ 2.5
	-162	100	40	≥ 49	$> 2.5 \text{ and } \leq 4.5$
17.3-17.7 in Region 2 17.8-18.6	-150	100	1 000	≥ 49	≤ 2.5
	-148	100	1 000	≥ 49	$> 2.5 \text{ and } \leq 4.5$

²⁵ **22.5H.5** The operational limit applies to non-geostationary-satellite systems operating at altitudes of 7 000 km or above in order to protect geostationary-satellite systems in the fixed-satellite service employing adaptive coding. (WRC-2000)

22.5H.6 (SUP - WRC-19)

22.5J 7) In case of *force majeure*, telecommand and ranging carriers transmitted to non-geostationary satellites in the fixed-satellite service are not subject to the limits given in Table 22-2. (WRC-2000)

22.5K 8) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the frequency bands listed in Tables 22-1A to 22-1D of No. 22.5C will apply the provisions of Resolution 76 (Rev.WRC-15)* to ensure that the actual aggregate interference into geostationary fixed-satellite service and geostationary broadcasting-satellite service networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate power levels shown in Tables 1A to 1D of Resolution 76 (Rev.WRC-15)*. In the event that an administration operating a geostationary-satellite network in conformity with the Radio Regulations identifies equivalent power flux-density levels from non-geostationary-satellite systems in the fixed-satellite service which may be in excess of the aggregate limits contained in Tables 1A to 1D of Resolution 76 (Rev.WRC-15)*, the administrations responsible for the non-geostationary-satellite systems in the fixed-satellite service will apply the provisions contained in *resolves* 2 of Resolution 76 (Rev.WRC-15)*. (WRC-19)

22.5L 9) A non-geostationary-satellite system in the fixed-satellite service in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) shall not exceed:

- a single-entry increase of 3% of the time allowance for the *C/N* value associated with the shortest percentage of time specified in the short-term performance objective of the generic²⁶ geostationary-satellite orbit reference links; and
- a single-entry permissible allowance of at most 3% reduction in time-weighted average spectral efficiency calculated on an annual basis for the generic geostationary-satellite orbit reference links using adaptive coding and modulation. (WRC-19)

22.5M 10) Administrations operating or planning to operate non-geostationary-satellite systems in the fixed-satellite service in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) shall ensure that the aggregate interference to geostationary-satellite FSS, MSS, and BSS networks caused by all non-geostationary-satellite FSS systems operating in these frequency bands does not exceed:

- an increase of 10% of the time allowance for the *C/N* value associated with the shortest percentage of time specified in the short-term performance objective of the generic geostationary-satellite orbit reference links; and

* Note by the Secretariat: This Resolution was revised by WRC-23.

²⁶ **22.5L.1** Generic geostationary-satellite orbit reference links are comprised of parametric link budget parameters and are used for the purpose of determining the compliance of a non-geostationary-satellite system with respect to No. 22.5L. The generic geostationary-satellite orbit reference link parameters are found in Table 1 of Annex 1 to Resolution 770 (WRC-19)**.

The procedures and methodologies specified in Resolution 770 (WRC-19)** shall be used for the calculations. The equivalent power flux-density levels from the non-geostationary-satellite FSS system should be derived using the most recent version of Recommendation ITU-R S.1503. (WRC-19)

** Note by the Secretariat: This Resolution was revised by WRC-23.

- a reduction of at most 8% in a calculated annual time-weighted average spectral efficiency for the generic geostationary-satellite orbit reference links using adaptive coding and modulation, taking into account that the methodology ensures that the degradation of time-weighted average spectral efficiency on each link is lower than the maximum permissible reduction,

for each generic geostationary-satellite orbit reference link in Annex 1 to Resolution **770 (WRC-19)***;

and:

- an increase of 10% of the time allowance for the *C/N* values associated with the short-term performance objectives of the supplemental geostationary-satellite orbit links; and
- a reduction of at most 8% in a calculated annual time-weighted average spectral efficiency for the supplemental geostationary-satellite orbit links associated with notified and brought into use frequency assignments using adaptive coding and modulation, taking into account that the methodology ensures that the degradation of time-weighted average spectral efficiency on each link is lower than the maximum permissible reduction.

Resolution **769 (WRC-19)** shall also apply. (WRC-19)

Section III – Station keeping of space stations²⁷

- 22.6** § 6 1) Space stations on board geostationary satellites which use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service²⁸:
- 22.7** a) shall have the capability of maintaining their positions within $\pm 0.1^\circ$ of the longitude of their nominal positions;
- 22.8** b) shall maintain their positions within $\pm 0.1^\circ$ of longitude of their nominal positions;
but
- 22.9** c) experimental stations on board geostationary satellites need not comply with No. **22.7** nor No. **22.8**, but shall maintain their positions within $\pm 0.5^\circ$ of longitude of their nominal positions;
- 22.10** d) however, space stations need not comply with No. **22.8** nor No. **22.9** as appropriate as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits given in Nos. **22.8** and **22.9**.

* Note by the Secretariat: This Resolution was revised by WRC-23.

²⁷ **A.22.III.1** In the case of space stations on board geosynchronous satellites with circular orbits having an angle of inclination greater than 5° , the positional tolerance shall relate to the nodal point.

²⁸ **22.6.1** Space stations in the broadcasting-satellite service on geostationary satellites operating in the band 11.7-12.7 GHz are exempted from these provisions but shall maintain their positions in accordance with Appendix **30**.

22.11 2) Space stations on board geostationary satellites which do not use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service:

22.12 *a)* shall have the capability of maintaining their positions within $\pm 0.5^\circ$ of the longitude of their nominal positions;

22.13 *b)* shall maintain their positions within $\pm 0.5^\circ$ of longitude of their nominal positions;
but

22.14 *c)* need not comply with No. **22.13** as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits given in No. **22.13**.

22.15 3) Space stations²⁹ on board geostationary satellites which are put into service prior to 1 January 1987, with the advance publication information for the network having been published before 1 January 1982, are exempted from the provisions of Nos. **22.6** to **22.14** inclusive; however they

22.16 *a)* shall have the capability of maintaining their positions within $\pm 1^\circ$ of the longitude of their nominal positions, but efforts should be made to achieve a capability of maintaining their positions at least within $\pm 0.5^\circ$ of the longitude of their nominal positions;

22.17 *b)* shall maintain their positions within $\pm 1^\circ$ of longitude of their nominal positions;
but

22.18 *c)* need not comply with No. **22.17** as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits given in No. **22.17**.

Section IV – Pointing accuracy of antennas on geostationary satellites

22.19 § 7 1) The pointing direction of maximum radiation of any earthward beam of antennas on geostationary satellites³⁰ shall be capable of being maintained within:

a) 10 % of the half-power beamwidth relative to the nominal pointing direction, or

b) 0.3° relative to the nominal pointing direction, whichever is greater. This position applies only when such a beam is intended for less than global coverage.

²⁹ **22.15.1** Space stations in the broadcasting-satellite service on geostationary satellites operating in the band 11.7-12.7 GHz are exempted from these provisions but shall maintain their positions in accordance with Appendix **30**.

³⁰ **22.19.1** Transmitting antennas of space stations in the broadcasting-satellite service operating in the band 11.7-12.7 GHz are not subject to these provisions but shall maintain their pointing accuracy in accordance with § 3.14.1 of Annex 5 to Appendix **30**.

22.20 2) In the event that the beam is not rotationally symmetrical about the axis of maximum radiation, the tolerance in any plane containing this axis shall be related to the half power beamwidth in that plane.

22.21 3) This accuracy shall be maintained only if it is required to avoid unacceptable interference to other systems.

Section V – Radio astronomy in the shielded zone of the Moon

22.22 § 8 1) In the shielded zone of the Moon³¹ emissions causing harmful interference to radio astronomy observations³² and to other users of passive services shall be prohibited in the entire frequency spectrum except in the following bands:

22.23 a) the frequency bands allocated to the space research service using active sensors;

22.24 b) the frequency bands allocated to the space operation service, the Earth exploration-satellite service using active sensors, and the radiolocation service using stations on spaceborne platforms, which are required for the support of space research, as well as for radiocommunications and space research transmissions within the lunar shielded zone.

22.25 2) In frequency bands in which emissions are not prohibited by Nos. 22.22 to 22.24, radio astronomy observations and passive space research in the shielded zone of the Moon may be protected from harmful interference by agreement between administrations concerned.

Section VI – Off-axis power limits on earth stations of a geostationary-satellite network in the fixed-satellite service^{33, 34} (WRC-2000)

22.26 § 9 The level of equivalent isotropically radiated power (e.i.r.p.) emitted by an earth station of a geostationary-satellite network shall not exceed the following values for any off-axis angle ϕ which is 3° or more off the main-lobe axis of an earth station antenna:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>	
$3^\circ \leq \phi \leq 7^\circ$	$42 - 25 \log \phi \text{ dB(W/40 kHz)}$	
$7^\circ < \phi \leq 9.2^\circ$	21 dB(W/40 kHz)	
$9.2^\circ < \phi \leq 48^\circ$	$45 - 25 \log \phi \text{ dB(W/40 kHz)}$	
$48^\circ < \phi \leq 180^\circ$	3 dB(W/40 kHz)	(WRC-2000)

³¹ **22.22.1** The shielded zone of the Moon comprises the area of the Moon's surface and an adjacent volume of space which are shielded from emissions originating within a distance of 100 000 km from the centre of the Earth.

³² **22.22.2** The level of harmful interference is determined by agreement between the administrations concerned, with the guidance of the relevant ITU-R Recommendations.

³³ **22.VI.1** The provisions of this section shall not be used for coordination of, or to evaluate interference between, geostationary fixed-satellite service networks (see No. 9.50.1). (WRC-2000)

³⁴ **22.VI.2** Although the provisions of this section cover off-axis power limitations in all directions, the radiation pattern of geostationary fixed-satellite service earth station antennas in more than two orthogonal planes is not required. (WRC-2000)

22.27 For frequency-modulated television emissions with energy dispersal, the limits in No. **22.26** above may be exceeded by up to 3 dB, provided that the off-axis total e.i.r.p. of the transmitted frequency-modulated television carrier does not exceed the following values:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>	(WRC-2000)
$3^\circ \leq \varphi \leq 7^\circ$	56 – 25 log φ dBW	
$7^\circ < \varphi \leq 9.2^\circ$	35 dBW	
$9.2^\circ < \varphi \leq 48^\circ$	59 – 25 log φ dBW	
$48^\circ < \varphi \leq 180^\circ$	17 dBW	

22.28 Frequency-modulated television carriers which operate without energy dispersal should be modulated at all times with programme material or appropriate test patterns. In this case, the off-axis total e.i.r.p. of the emitted frequency-modulated television carrier shall not exceed the following values:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p.</i>	(WRC-2000)
$3^\circ \leq \varphi \leq 7^\circ$	56 – 25 log φ dBW	
$7^\circ < \varphi \leq 9.2^\circ$	35 dBW	
$9.2^\circ < \varphi \leq 48^\circ$	59 – 25 log φ dBW	
$48^\circ < \varphi \leq 180^\circ$	17 dBW	

22.29 The e.i.r.p. limits given in Nos. **22.26**, **22.27** and **22.28** are applicable in the following frequency bands allocated to the fixed-satellite service (Earth-to-space):

12.75-13.25 GHz

13.75-14 GHz

14-14.5 GHz.

(WRC-97)

22.30 The e.i.r.p. limits given in Nos. **22.26**, **22.27**, **22.28** and **22.32** do not apply to earth station antennas in service or ready to be in service³⁵ prior to 2 June 2000, nor to earth stations associated with a satellite network in the fixed-satellite service for which complete coordination or notification information has been received before 2 June 2000. (WRC-2000)

22.31 Telecommand and ranging³⁶ carriers transmitted to geostationary satellites in the fixed-satellite service in normal mode of operation (i.e. earth station transmitting telecommand and ranging carriers to a directional receiving antenna on the space station) may exceed the levels given in No. **22.26** by no more than 16 dB in the frequency bands 12.75-13.25 GHz and 13.75-14.5 GHz. In all other modes of operation, and in case of *force majeure*, telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service are exempted from the levels given in No. **22.26**. (WRC-2000)

³⁵ **22.30.1** “Ready to be in service” relates to the case where antennas have been installed but the start of service has been delayed due to *force majeure*. (WRC-2000)

³⁶ **22.31.1** Measurement of the distance to the satellite. (WRC-2000)

22.32 § 10 The level of equivalent isotropically radiated power (e.i.r.p.) density emitted by an earth station in a geostationary-satellite network in the 29.5-30 GHz frequency band shall not exceed the following values for any off-axis angle φ which is 3° or more off the main-lobe axis of an earth station antenna:

<i>Off-axis angle</i>	<i>Maximum e.i.r.p. density</i>	(WRC-2000)
$3^\circ \leq \varphi \leq 7^\circ$	$28 - 25 \log \varphi \text{ dB(W/40 kHz)}$	
$7^\circ < \varphi \leq 9.2^\circ$	7 dB(W/40 kHz)	
$9.2^\circ < \varphi \leq 48^\circ$	$31 - 25 \log \varphi \text{ dB(W/40 kHz)}$	
$48^\circ < \varphi \leq 180^\circ$	-1 dB(W/40 kHz)	

22.33 Not used. (WRC-2000)

22.34 Telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service in normal mode of operation (i.e. earth station transmitting telecommand and ranging carriers to a directional receiving antenna on the space station) may exceed the levels given in No. **22.32** by no more than 10 dB in the frequency band 29.5-30 GHz. In all other modes of operation, and in case of *force majeure*, telecommand and ranging carriers transmitted to geostationary satellites in the fixed-satellite service are exempted from the levels given in No. **22.32**. (WRC-2000)

22.35 For geostationary-satellite systems in which the earth stations are expected to transmit simultaneously in the same 40 kHz band, e.g. for geostationary-satellite systems employing code-division multiple access, the maximum e.i.r.p. values given in No. **22.32** should be decreased by $10 \log(N) \text{ dB}$, where N is the number of earth stations which are in the receive satellite beam of the satellite with which these earth stations are communicating and which are expected to transmit simultaneously on the same frequency. (WRC-2000)

22.36 Earth stations operating in the frequency band 29.5-30 GHz should be designed in such a manner that 90% of their peak off-axis e.i.r.p. density levels do not exceed the values given in No. **22.32**. Further study is needed to determine the off-axis angular range over which these exceedences would be permitted, taking into account the interference level into adjacent satellites. The statistical processing of the off-axis e.i.r.p. density peaks should be carried out using the method given in the most recent version of Recommendation ITU-R S.732. (WRC-07)

22.37 The limits given in Nos. **22.26** to **22.28** and **22.32** apply under clear-sky conditions. During rain-fade conditions, the limits may be exceeded by earth stations when using uplink power control. (WRC-2000)

22.38 Earth stations in the fixed-satellite service operating in the 29.5-30 GHz band, which have lower elevation angles to the geostationary-satellite orbit, will require higher e.i.r.p. levels relative to the same terminals at higher elevation angles to achieve the same power flux-densities at the geostationary-satellite orbit, due to the combined effect of increased distance and atmospheric absorption. Earth stations with low elevation angles may exceed the levels given in No. **22.32** by the following amounts:

<i>Elevation angle to geostationary-satellite orbit, ε</i>	<i>Increase in e.i.r.p. density (dB)</i>	
$\varepsilon \leq 5^\circ$	2.5	
$5^\circ < \varepsilon \leq 30^\circ$	$0.1(25 - \varepsilon) + 0.5$	(WRC-2000)

22.39 The values in No. **22.32** applicable to the off-axis angle range from 48° to 180° are intended to account for spillover effects. (WRC-2000)

**Section VII – Limits to the interference into the frequency band 14.5-14.8 GHz by
the fixed-satellite service (Earth-to-space) not for feeder links for
the broadcasting satellite service** (WRC-15)

22.40 Under assumed free-space propagation conditions, the power flux-density emitted by an earth station of a geostationary-satellite network not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)** shall not exceed the value of $-76 \text{ dB(W/(m}^2 \cdot 27 \text{ MHz})$) at any point in the geostationary-satellite orbit. (WRC-23)

ARTICLE 23

Broadcasting services

Section I – Broadcasting service

23.1

A – General

23.2 § 1 1) The establishment and use of broadcasting stations (sound broadcasting and television broadcasting stations) on board ships, aircraft or any other floating or airborne objects outside national territories is prohibited.

23.3 2) In principle, except in the frequency band 3 900-4 000 kHz, broadcasting stations using frequencies below 5 060 kHz or above 41 MHz shall not employ power exceeding that necessary to maintain economically an effective national service of good quality within the frontiers of the country concerned.

23.4

B – Broadcasting in the Tropical Zone

23.5 § 2 1) In these Regulations, the expression “broadcasting in the Tropical Zone” indicates a type of broadcasting for internal national use in countries in the zone defined in Nos. **5.16** to **5.21**, where it may be shown that because of the difficulty of high atmospheric noise level and propagation it is not possible to provide economically a more satisfactory service by using low, medium, or very high frequencies.

23.6 2) The use by the broadcasting service of the bands listed below is restricted to the Tropical Zone:

- | | |
|-----------------|-------------------|
| 2 300-2 498 kHz | (Region 1) |
| 2 300-2 495 kHz | (Regions 2 and 3) |
| 3 200-3 400 kHz | (all Regions) |
| 4 750-4 995 kHz | (all Regions) |
| 5 005-5 060 kHz | (all Regions). |

23.7 3) The carrier power of the transmitters operating in this service in the bands listed in No. **23.6** shall not exceed 50 kW.

23.8 4) Within the Tropical Zone, the broadcasting service has priority over the other services with which it shares the bands listed in No. **23.6**.

23.9 5) However, in that part of Libya north of parallel 30° North the broadcasting service in the bands listed in No. **23.6** has equal rights to operate with other services in the Tropical Zone with which it shares these bands.

23.10 6) The broadcasting service operating inside the Tropical Zone, and other services operating outside this zone, are subject to the provisions of No. **4.8**.

23.11 *C – HF bands allocated to the broadcasting service except the bands as referred to in No. 23.6* (WRC-03)

23.12 § 3 Transmitting stations of the broadcasting service operating in the HF bands allocated to the broadcasting service, except the bands as referred to in No. 23.6, shall meet the system specifications contained in Appendix 11. (WRC-03)

Section II – Broadcasting-satellite service

23.13 § 4 In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum, the radiation over the territory of other countries unless an agreement has been previously reached with such countries.

23.13A If the Bureau receives an indication of a written agreement under No. 23.13, it shall include reference to that agreement when the assignments to the system are recorded with reference to No. 23.13 in the Remarks column of the Master International Frequency Register or included in the Regions 1 and 3 List. (WRC-2000)

23.13B If, within the four-month period following the publication of the Special Section for a broadcasting-satellite service (except sound broadcasting) network submitted for coordination under Article 9 or Appendix 30, an administration informs the Bureau that all technical means have not been used to reduce the radiation over its territory, the Bureau shall draw the attention of the responsible administration to the comments received. The Bureau shall request the two administrations to make every effort possible in order to resolve the issue. Either administration may request the Bureau to study the matter and submit its report to the administrations concerned. If no agreement can be reached, then the Bureau shall delete the territory of the objecting administration from the service area without adversely affecting the rest of the service area and inform the responsible administration. (WRC-2000)

23.13C If, after the four-month period mentioned above, an administration objects to remaining in the service area, the Bureau shall delete the territory of the objecting administration from the service area of the broadcasting-satellite service (except sound broadcasting) network concerned without adversely affecting the rest of the service area and inform the responsible administration. (WRC-2000)

ARTICLE 24

Fixed service

24.1 Administrations are urged to discontinue, in the fixed service, the use of double-sideband radiotelephone (class A3E) transmissions.

24.2 Class F3E or G3E emissions are prohibited in the fixed service in the bands below 30 MHz.

24.3 (SUP - WRC-03)

24.4 (SUP - WRC-03)

24.5 (SUP - WRC-03)

24.6 (SUP - WRC-03)

ARTICLE 25

Amateur services

Section I – Amateur service

25.1 § 1 Radiocommunication between amateur stations of different countries shall be permitted unless the administration of one of the countries concerned has notified that it objects to such radiocommunications. (WRC-03)

25.2 § 2 1) Transmissions between amateur stations of different countries shall be limited to communications incidental to the purposes of the amateur service, as defined in No. **1.56** and to remarks of a personal character. (WRC-03)

25.2A 1A) Transmissions between amateur stations of different countries shall not be encoded for the purpose of obscuring their meaning, except for control signals exchanged between earth command stations and space stations in the amateur-satellite service. (WRC-03)

25.3 2) Amateur stations may be used for transmitting international communications on behalf of third parties only in case of emergencies or disaster relief. An administration may determine the applicability of this provision to amateur stations under its jurisdiction. (WRC-03)

25.4 (SUP - WRC-03)

25.5 § 3 1) Administrations shall determine whether or not a person seeking a licence to operate an amateur station shall demonstrate the ability to send and receive texts in Morse code signals. (WRC-03)

25.6 2) Administrations shall verify the operational and technical qualifications of any person wishing to operate an amateur station. Guidance for standards of competence may be found in the most recent version of Recommendation ITU-R M.1544. (WRC-03)

25.7 § 4 The maximum power of amateur stations shall be fixed by the administrations concerned. (WRC-03)

25.8 § 5 1) All pertinent Articles and provisions of the Constitution, the Convention and of these Regulations shall apply to amateur stations. (WRC-03)

25.9 2) During the course of their transmissions, amateur stations shall transmit their call sign at short intervals.

25.9A § 5A Administrations are encouraged to take the necessary steps to allow amateur stations to prepare for and meet communication needs in support of disaster relief. (WRC-03)

25.9B § 5B An administration may determine whether or not to permit a person who has been granted a licence to operate an amateur station by another administration to operate an amateur station while that person is temporarily in its territory, subject to such conditions or restrictions it may impose. (WRC-03)

Section II – Amateur-satellite service

25.10 § 6 The provisions of Section I of this Article shall apply equally, as appropriate, to the amateur-satellite service.

25.11 § 7 Administrations authorizing space stations in the amateur-satellite service shall ensure that sufficient earth command stations are established before launch to ensure that any harmful interference caused by emissions from a station in the amateur-satellite service can be terminated immediately (see No. **22.1**). (WRC-03)

ARTICLE 26

Standard frequency and time signal service

26.1 § 1 1) To facilitate more efficient use of the radio frequency spectrum and to assist other technical and scientific activities, administrations providing or intending to provide a standard frequency and time signal service shall coordinate, in accordance with the provisions in this Article, the establishment and operation of such a service on a worldwide basis. Attention should be given to the extension of this service to those areas of the world not adequately served.

26.2 2) To this end, each administration shall take steps to coordinate, with the assistance of the Bureau, any new standard frequency or time signal transmission or any change in existing transmissions in the standard frequency bands. For this purpose, administrations shall exchange between themselves, and furnish to the Bureau, all relevant information. On this matter, the Bureau shall consult other international organizations having a direct and substantial interest in the subject.

26.3 3) In so far as is practicable, a new frequency assignment in the standard frequency bands should not be made or notified to the Bureau until appropriate coordination has been completed.

26.4 § 2 Administrations shall cooperate in reducing interference in the frequency bands to which the standard frequency and time signal service is allocated.

26.5 § 3 Administrations which provide this service shall cooperate through the Bureau in the collation and distribution of the results of the measurements of standard frequencies and time signals, as well as details concerning adjustments to the frequencies and time signals.

26.6 § 4 In selecting the technical characteristics of standard frequency and time signal transmissions, administrations shall be guided by the relevant ITU-R Recommendations.

ARTICLE 27

Experimental stations

27.1 § 1 1) An experimental station may enter into communication with an experimental station of another country only after it has been authorized to do so by its administration. Each administration shall notify other administrations concerned when such authorizations are issued.

27.2 2) The administrations concerned determine by special arrangement the conditions under which communications may be established.

27.3 § 2 Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an experimental station.

27.4 § 3 The administrations concerned shall fix the maximum power of experimental stations, having regard to the purpose for which their establishment has been authorized and the conditions under which they are to operate.

27.5 § 4 1) All the general rules of the Constitution, the Convention and of these Regulations shall apply to experimental stations. In particular, experimental stations shall comply with the technical conditions imposed upon transmitters operating in the same frequency bands, except where the technical principles of the experiments prevent this. In such a case, the administration which authorizes the operation of these stations may grant a dispensation in an appropriate form.

27.6 2) During the course of their transmissions, experimental stations shall transmit, at short intervals, their call sign or any other recognized form of identification (see Article 19).

27.7 § 5 Where there is no risk of an experimental station causing harmful interference to a service of another country, the administration concerned may, if considered desirable, adopt different provisions from those contained in this Article.

ARTICLE 28

Radiodetermination services

Section I – General provisions

28.1 § 1 Administrations which have established a radiodetermination service shall take the necessary steps to ensure the effectiveness and regularity of that service; however they accept no responsibility for the consequences that might arise from the use of inaccurate information furnished, defective working, or failure of their stations.

28.2 § 2 In the case of doubtful or unreliable observations, the station taking the bearing or fixing the position shall, whenever possible, notify the station to which this information is given of any such doubt or unreliability.

28.3 § 3 Administrations shall notify to the Bureau the characteristics of each radiodetermination station providing an international service of value to the maritime mobile service and, if considered necessary, for each station or group of stations, the sectors in which the information furnished is normally reliable. This information is published in the List of Coast Stations and Special Service Stations (List IV), and the Bureau shall be notified of any change of a permanent nature. (WRC-07)

28.4 § 4 The method of identification of radiodetermination stations shall be so chosen as to avoid any doubt as to their identity.

28.5 § 5 Signals sent by radiodetermination stations shall be such as to permit accurate and precise measurements.

28.6 § 6 Any information concerning modification or irregularity of working of a radiodetermination station shall be notified without delay in the following manner:

28.7 a) land stations of countries operating a radiodetermination service shall send out daily, if necessary, notices of modifications or irregularities in working until such time as normal working is restored or, if a permanent alteration has been made, until such time as it can reasonably be taken that all navigators interested have been warned;

28.8 b) permanent alterations or irregularities of long duration shall be published as soon as possible in the relevant notices to navigators.

Section II – Provisions for the radiodetermination-satellite service

28.9 § 7 1) The provisions of Nos. **28.1** to **28.8**, excluding No. **28.2**, shall be applied to the maritime radionavigation-satellite service.

28.10 2) The provisions of Nos. **28.1** to **28.8**, excluding Nos. **28.2** and **28.3**, shall be applied to the aeronautical radionavigation-satellite service.

28.11 3) The provisions of Nos. **28.1** to **28.8**, excluding Nos. **28.2** and **28.3**, shall be applied to the radiodetermination-satellite service.

Section III – Radio direction-finding stations

28.12 § 8 1) In the maritime radionavigation service, the radiotelegraph frequency normally used for radio direction-finding is 410 kHz. All direction-finding stations of the maritime radionavigation service using radiotelegraphy shall be able to use this frequency. They shall, in addition, be able to take bearings on 500 kHz, especially for locating stations sending signals of distress, alarm and urgency.

28.13 2) Where a radio direction-finding service is provided in the authorized bands between 1 606.5 kHz and 2 850 kHz, the radio direction-finding stations should be able to take bearings on the radiotelephone distress and calling frequency 2 182 kHz. (WRC-03)

28.14 3) Where a radio direction-finding station as defined in No. **1.12**, operates in the bands between 156 MHz and 174 MHz, it should be able to take bearings on the VHF distress and calling frequency 156.8 MHz and on the VHF digital selective calling frequency 156.525 MHz.

28.15 Not used.

28.16 § 9 In the absence of prior arrangements, an aircraft station which calls a radio direction-finding station for a bearing shall use for this purpose a frequency on which the station called normally keeps watch.

28.17 § 10 In the aeronautical radionavigation service, the procedure contemplated for radio direction-finding in this Section is applicable, except where special procedures are in force as a result of arrangements concluded between the administrations concerned.

Section IV – Radiobeacon stations

28.18 § 11 When an administration thinks it desirable in the interests of navigation to organize a service of radiobeacon stations, it may use for this purpose:

28.19 a) radiobeacons properly so-called, established on land or on ships permanently moored or, exceptionally, on ships navigating in a restricted area, the limits of which are known and published. The emissions of these radiobeacons may have either directional or non-directional patterns;

28.20 b) fixed stations, coast stations or aeronautical stations designated to function as radiobeacons, at the request of mobile stations.

28.21 § 12 1) Radiobeacons properly so-called shall use the frequency bands which are available to them under Chapter **II**.

28.22 2) Other stations notified as radiobeacons shall use for this purpose their normal working frequency and their normal class of emission.

28.23 3) The power radiated by each radiobeacon properly so-called shall be adjusted to the value necessary to produce the stipulated field strength at the limit of the range required (see Appendix **12**).

28.24 § 13 Special rules applicable to aeronautical radio beacons operating in the bands between 160 kHz and 535 kHz and to the maritime radio beacons operating in the bands between 283.5 kHz and 335 kHz are given in Appendix **12**.

ARTICLE 29

Radio astronomy service

Section I – General provisions

29.1 § 1 Administrations shall cooperate in protecting the radio astronomy service from interference, bearing in mind:

29.2 *a)* the exceptionally high sensitivity of radio astronomy stations;

29.3 *b)* the frequent need for long periods of observation without harmful interference; and

29.4 *c)* that the small number of radio astronomy stations in each country and their known locations often make it practicable to give special consideration to the avoidance of interference.

29.5 § 2 The locations of the radio astronomy stations to be protected and their frequencies of observation shall be notified to the Bureau in accordance with No. 11.12 and published in accordance with No. 20.16 for communication to Member States.

Section II – Measures to be taken in the radio astronomy service

29.6 § 3 The locations of radio astronomy stations shall be selected with due regard to the possibility of harmful interference to these stations.

29.7 § 4 All practicable technical means shall be adopted at radio astronomy stations to reduce their susceptibility to interference. The development of improved techniques for reducing susceptibility to interference shall be pursued, including participation in cooperative studies through the Radiocommunication Sector.

Section III – Protection of the radio astronomy service

29.8 § 5 The status of the radio astronomy service in the various frequency bands is specified in the Table of Frequency Allocations (Article 5). Administrations shall provide protection from interference to stations in the radio astronomy service in accordance with the status of this service in those bands (see also Nos. 4.6, 22.22 to 22.24 and 22.25).

29.9 § 6 In providing protection from interference to the radio astronomy service on a permanent or temporary basis, administrations shall use appropriate means such as geographical separation, site shielding, antenna directivity and the use of time-sharing and the minimum practicable transmitter power.

29.10 § 7 In bands adjacent to those in which observations are carried out in the radio astronomy service, operating in accordance with these Regulations, administrations are urged, when assigning frequencies to stations of other services, to take all practicable steps to protect the radio astronomy service from harmful interference in accordance with No. 4.5. In addition to the measures referred to in No. 29.9, technical means for minimizing the power radiated at frequencies within the band used for radio astronomy should be given special consideration (see also No. 4.6).

29.11 § 8 When assigning frequencies to stations in other bands, administrations are urged, as far as practicable, to take into consideration the need to avoid spurious emissions which could cause harmful interference to the radio astronomy service operating in accordance with these Regulations (see also No. 4.6).

29.12 § 9 In applying the measures outlined in this Section, administrations should bear in mind that the radio astronomy service is extremely susceptible to interference from space and airborne transmitters (for further information, see the most recent version of Recommendation ITU-R RA.769). (WRC-03)

29.13 § 10 Administrations shall take note of the relevant ITU-R Recommendations with the aim of limiting interference to the radio astronomy service from other services.

ARTICLE 29A

Radio services related to Earth observation

29A.1 § 1 Radio services related to Earth observations include the Earth exploration-satellite service (EESS), meteorological-satellite service (MetSat), meteorological aids service (MetAids) and specific applications of the radiolocation service (e.g. meteorological or oceanographic radars, wind profiler radars). In this respect, see Resolution **673 (Rev.WRC-12)***. (WRC-12)

* Note by the Secretariat: This Resolution was revised by WRC-23.

ARTICLE 29B

Radio service related to space weather observations

29B.1 § 1 Space weather sensors may operate under the meteorological aids service in the subset MetAids (space weather) allocations. (WRC-23)

29B.2 § 2 The importance of space weather observations and their service designation are highlighted in Resolution **675 (WRC-23)**. (WRC-23)

CHAPTER VII

Distress and safety communications¹

¹ **C.VII** For the purposes of this Chapter, distress and safety communications include distress, urgency and safety calls and messages.

ARTICLE 30

General provisions

Section I – Introduction

30.1 § 1 This Chapter contains the provisions for the operational use of the global maritime distress and safety system (GMDSS), whose functional requirements, system elements and equipment carriage requirements are set forth in the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. This Chapter also contains provisions for initiating distress, urgency and safety communications by means of radiotelephony on the frequency 156.8 MHz (VHF channel 16). (WRC-07)

30.2 § 2 No provision of these Regulations prevents the use by a mobile station or a mobile earth station in distress of any means at its disposal to attract attention, make known its position, and obtain help (see also No. 4.9).

30.3 § 3 No provision of these Regulations prevents the use by stations on board aircraft, ships engaged in search and rescue operations, land stations, or coast earth stations, in exceptional circumstances, of any means at their disposal to assist a mobile station or a mobile earth station in distress (see also Nos. 4.9 and 4.16).

Section II – Maritime provisions

30.4 § 4 The provisions specified in this Chapter are obligatory in the maritime mobile service and the maritime mobile-satellite service for all stations using the frequencies and techniques prescribed for the functions set out herein (see also No. 30.5). (WRC-07)

30.5 § 5 The International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, prescribes which ships and which of their survival craft shall be provided with radio equipment, and which ships shall carry portable radio equipment for use in survival craft. It also prescribes the requirements which shall be met by such equipment.

30.6 § 6 Ship earth stations located at rescue coordination centres¹ may be authorized by an administration to communicate for distress and safety purposes with any other station using bands allocated to the maritime mobile-satellite service, when special circumstances make it essential, notwithstanding the methods of working provided for in these Regulations.

¹ **30.6.1** The term “rescue coordination centre”, as defined in the International Convention on Maritime Search and Rescue (1979) refers to a unit responsible for promoting the efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

30.7 § 7 Mobile stations² of the maritime mobile service may communicate, for safety purposes, with stations of the aeronautical mobile service. Such communications shall normally be made on the frequencies authorized, and under the conditions specified in Section I of Article 31 (see also No. 4.9).

Section III – Aeronautical provisions

30.8 § 8 The procedure specified in this Chapter is obligatory for communications between stations on board aircraft and stations of the maritime mobile-satellite service, wherever this service or stations of this service are specifically mentioned.

30.9 § 9 Certain provisions of this Chapter are applicable to the aeronautical mobile service, except in the case of special arrangements between the governments concerned.

30.10 § 10 Mobile stations of the aeronautical mobile service may communicate, for distress and safety purposes, with stations of the maritime mobile service in conformity with the provisions of this Chapter.

30.11 § 11 Any station on board an aircraft required by national or international regulations to communicate for distress, urgency or safety purposes with stations of the maritime mobile service that comply with the provisions of this Chapter, shall be capable of transmitting and receiving class J3E emissions when using the carrier frequency 2 182 kHz, or class J3E emissions when using the carrier frequency 4 125 kHz, or class G3E emissions when using the frequency 156.8 MHz and, optionally, the frequency 156.3 MHz.

30.11A § 11A Aircraft, when conducting search and rescue operations, are also permitted to operate digital selective calling (DSC) equipment on the VHF DSC frequency 156.525 MHz, and automatic identification system (AIS) equipment on the AIS frequencies 161.975 MHz and 162.025 MHz. (WRC-07)

Section IV – Land mobile provisions

30.12 § 12 Stations of the land mobile service in uninhabited, sparsely populated or remote areas may, for distress and safety purposes, use the frequencies provided for in this Chapter.

30.13 § 13 The procedure specified in this Chapter is obligatory for stations of the land mobile service when using frequencies provided in these Regulations for distress and safety communications.

² **30.7.1** Mobile stations communicating with the stations of the aeronautical mobile (R) service in bands allocated to the aeronautical mobile (R) service shall conform to the provisions of the Regulations which relate to that service and, as appropriate, to any special arrangements between the governments concerned by which the aeronautical mobile (R) service is regulated.

ARTICLE 31

Frequencies for the global maritime distress and safety system (GMDSS)

Section I – General

31.1 § 1 The frequencies to be used for the transmission of distress and safety information under the GMDSS are contained in Appendix 15. In addition to the frequencies listed in Appendix 15, ship stations and coast stations should use other appropriate frequencies for the transmission of safety messages and general radiocommunications to and from shore-based radio systems or networks. (WRC-07)

31.2 § 2 Any emission causing harmful interference to distress and safety communications on any of the discrete frequencies identified in Appendix 15 is prohibited. (WRC-07)

31.3 § 3 The number and duration of test transmissions shall be kept to a minimum on the frequencies identified in Appendix 15; they should be coordinated with a competent authority, as necessary, and, wherever practicable, be carried out on artificial antennas or with reduced power. However, testing on the distress and safety calling frequencies should be avoided, but where this is unavoidable, it should be indicated that these are test transmissions.

31.4 § 4 Before transmitting for other than distress purposes on any of the frequencies identified in Appendix 15 for distress and safety, a station shall, where practicable, listen on the frequency concerned to make sure that no distress transmission is being sent.

31.5 Not used.

Section II – Survival craft stations

31.6 § 5 1) Equipment for radiotelephony use in survival craft stations shall, if capable of operating on any frequency in the bands between 156 MHz and 174 MHz, be able to transmit and receive on 156.8 MHz and at least one other frequency in these bands.

31.7 2) Equipment for transmitting locating signals from survival craft stations shall be capable of operating in the frequency band 9 200-9 500 MHz or on 161.975 MHz (AIS 1 of Appendix 18) and 162.025 MHz (AIS 2 of Appendix 18). (WRC-23)

31.8 3) Equipment with digital selective calling facilities for use in survival craft shall, if capable of operating:

31.9 a) in the bands between 1 606.5 kHz and 2 850 kHz, be able to transmit on 2 187.5 kHz; (WRC-03)

31.10 b) in the bands between 4 000 kHz and 27 500 kHz, be able to transmit on 8 414.5 kHz;

31.11 c) in the bands between 156 MHz and 174 MHz, be able to transmit on 156.525 MHz.

Section III – Watchkeeping

31.12

A – Coast stations

31.13 § 6 Those coast stations assuming a watch-keeping responsibility in the GMDSS shall maintain an automatic digital selective calling watch on frequencies and for periods of time as indicated in the information published in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

31.14

B – Coast earth stations

31.15 § 7 Those coast earth stations assuming a watch-keeping responsibility in the GMDSS shall maintain a continuous automatic watch for appropriate distress alerts relayed by space stations.

31.16

C – Ship stations

31.17 § 8 1) Ship stations, where so equipped, shall, while at sea, maintain an automatic digital selective calling watch on the appropriate distress and safety calling frequencies in the frequency bands in which they are operating. Ship stations, where so equipped, shall also maintain watch on the appropriate frequencies for the automatic reception of transmissions of meteorological and navigational warnings and other urgent information to ships. (WRC-07)

31.18 2) Ship stations complying with the provisions of this Chapter should, where practicable, maintain a watch on the frequency 156.8 MHz (VHF channel 16). (WRC-07)

31.19

D – Ship earth stations

31.20 § 9 Ship earth stations complying with the provisions of this Chapter shall, while at sea, maintain watch except when communicating on a working channel.

ARTICLE 32

Operational procedures for distress communications in the global maritime distress and safety system (GMDSS) (WRC-07)

Section I – General

32.1 § 1 Distress communications rely on the use of terrestrial MF, HF and VHF radiocommunications and communications using satellite techniques. Distress communications shall have absolute priority over all other transmissions. The following terms apply:

- a) The distress alert is a digital selective call (DSC) using a distress call format, in the bands used for terrestrial radiocommunication, or a distress message format, in which case it is relayed through space stations.
- b) The distress call is the initial voice or text procedure.
- c) The distress message is the subsequent voice or text procedure.
- d) The distress alert relay is a DSC transmission on behalf of another station.
- e) The distress call relay is the initial voice or text procedure for a station not itself in distress. (WRC-07)

32.2 § 2 1) The distress alert shall be sent through a satellite either with absolute priority in general communication channels, on exclusive distress and safety frequencies reserved for satellite EPIRBs in the Earth-to-space direction or on the distress and safety frequencies designated in the MF, HF and VHF bands for digital selective calling (see Appendix 15). (WRC-07)

32.2A 1A) The distress call shall be sent on the distress and safety frequencies designated in the MF, HF and VHF bands for radiotelephony. (WRC-07)

32.3 2) The distress alert or call and subsequent messages shall be sent only on the authority of the person responsible for the ship, aircraft or other vehicle carrying the mobile station or the mobile earth station. (WRC-07)

32.4 § 3 All stations which receive a distress alert or call transmitted on the distress and safety frequencies in the MF, HF and VHF bands shall immediately cease any transmission capable of interfering with distress traffic and prepare for subsequent distress traffic. (WRC-07)

32.5 § 4 Distress alerts or distress alert relays using DSC should use the technical structures and content set forth in the most recent version of Recommendations ITU-R M.493 and ITU-R M.541. (WRC-07)

32.5A § 4A Each administration shall ensure that suitable arrangements are made for assigning and registering identities used by ships participating in the GMDSS, and shall make registration information available to rescue coordination centres on a 24-hour day, 7-day week basis. Where appropriate, administrations shall notify responsible organizations immediately of additions, deletions and other changes in these assignments (see Nos. 19.39, 19.96 and 19.99). Registration information submitted shall be in accordance with Resolution 340 (WRC-97)*. (WRC-07)

32.5B § 4B Any GMDSS shipboard equipment which is capable of transmitting position coordinates as part of a distress alert and which does not have an integral electronic position-fixing system receiver shall be interconnected to a separate navigation receiver, if one is installed, to provide that information automatically. (WRC-07)

32.6 § 5 Transmissions by radiotelephony shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

32.7 § 6 The phonetic alphabet and figure code in Appendix 14 and the abbreviations and signals in accordance with the most recent version of Recommendation ITU-R M.1172 should be used where applicable¹. (WRC-03)

Section II – Distress alerting and distress calling (WRC-07)

32.8

A – General

32.9 § 7 1) The transmission of a distress alert or a distress call indicates that a mobile unit² or person³ is threatened by grave and imminent danger and requires immediate assistance. (WRC-07)

32.10 2) The distress alert shall provide⁴ the identification of the station in distress and its position.

* Note by the Secretariat: This Resolution was abrogated by WRC-07.

¹ **32.7.1** The use of the Standard Marine Communication Phrases (SMCP) and, where language difficulties exist, the International Code of Signals, both published by the International Maritime Organization (IMO), is also recommended. It should be noted that the pronunciations for figures in Appendix 14 and IMO SMCP are different. (WRC-23)

² **32.9.1** Mobile unit: a ship, aircraft or other vehicle.

³ **32.9.2** In this Article, where the case is of a person in distress, the application of the procedures may require adaptation to meet the needs of the particular circumstances.

^{32.9.3} (SUP - WRC-07)

⁴ **32.10.1** The distress alert may also contain information regarding the nature of the distress, the type of assistance required, the course and speed of the mobile unit, the time that this information was recorded and any other information which might facilitate rescue.

32.10A § 7A 1) A distress alert is false if it was transmitted without any indication that a mobile unit or person was in distress and required immediate assistance (see No. 32.9). Administrations receiving a false distress alert shall report this infringement in accordance with Section V of Article 15, if that alert:

- a) was transmitted intentionally;
- b) was not cancelled in accordance with No. 32.53A and Resolution 349 (Rev.WRC-23);
- c) could not be verified as a result of either the ship's failure to keep watch on appropriate frequencies in accordance with Nos. 31.16 to 31.20, or its failure to respond to calls from an authorized rescue authority;
- d) was repeated; or
- e) was transmitted using a false identity.

Administrations receiving such a report shall take appropriate steps to ensure that the infringement does not recur. No action should normally be taken against any ship or mariner for reporting and cancelling a false distress alert. (WRC-23)

32.10B 2) Administrations shall take practicable and necessary steps to ensure the avoidance of false distress alerts, including those transmitted inadvertently. (WRC-07)

32.11 *B – Transmission of a distress alert or a distress call* (WRC-07)

B1 – Transmission of a distress alert or a distress call by a ship station
or a ship earth station (WRC-07)

32.12 § 8 Ship-to-shore distress alerts or calls are used to alert rescue coordination centres via coast stations or coast earth stations that a ship is in distress. These alerts are based on the use of transmissions via satellites (from a ship earth station or a satellite emergency position-indicating radiobeacon (EPIRB)) and terrestrial services (from ship stations). (WRC-23)

32.13 § 9 1) Ship-to-ship distress alerts are used to alert other ships in the vicinity of the ship in distress and are based on the use of digital selective calling in the VHF and MF bands. Additionally, the HF band may be used. (WRC-07)

32.13A 2) Ship stations equipped for digital selective calling procedures may transmit a distress call and distress message immediately following the distress alert in order to attract attention from as many ship stations as possible. (WRC-07)

32.13B 3) Ship stations not equipped for digital selective calling procedures shall, where practical, initiate the distress communications by transmitting a radio telephony distress call and message on the frequency 156.8 MHz (VHF channel 16). (WRC-07)

32.13BA § 9A The radiotelephone distress signal consists of the word MAYDAY pronounced as the French expression “m'aider”. (WRC-07)

32.13C § 9B 1) The distress call sent on the frequency 156.8 MHz (VHF channel 16) shall be given in the following form, taking into account Nos. 32.6 and 32.7:

- the distress signal “MAYDAY”, spoken three times;
- the words “THIS IS”;
- the name of the vessel in distress, spoken three times;
- the call sign or other identification;
- the MMSI (if the initial alert has been sent by DSC). (WRC-12)

32.13D 2) The distress message which follows the distress call should be given in the following form, taking into account Nos. 32.6 and 32.7:

- the distress signal “MAYDAY”;
- the name of the vessel in distress;
- the call sign or other identification;
- the MMSI (if the initial alert has been sent by DSC);
- the position, given as the latitude and longitude, or if the latitude and longitude are not known or if time is insufficient, in relation to a known geographical location;
- the nature of the distress;
- the kind of assistance required;
- any other useful information. (WRC-12)

32.13E § 9C DSC procedures use a combination of automated functions and manual intervention to generate the appropriate distress call format in the most recent version of Recommendation ITU-R M.541. A distress alert sent by DSC consists of one or more distress alert attempts in which a message format is transmitted identifying the station in distress, giving its last recorded position and, if entered, the nature of the distress. In MF and HF bands, distress alert attempts may be sent as a single-frequency attempt or a multi-frequency attempt on up to six frequencies within one minute. In VHF bands, only single-frequency call attempts are used. The distress alert will repeat automatically at random intervals, a few minutes apart, until an acknowledgement sent by DSC is received. (WRC-07)

B2 – Transmission of a shore-to-ship distress alert relay or a distress call relay (WRC-07)

32.14 § 10 1) A station or a rescue coordination centre which receives a distress alert or call and a distress message shall initiate the transmission of a shore-to-ship distress alert relay addressed, as appropriate, to all ships, to a selected group of ships, or to a specific ship, by satellite and/or terrestrial means. (WRC-07)

32.15 2) The distress alert relay and the distress call relay shall contain the identification of the mobile unit in distress, its position and all other information which might facilitate rescue. (WRC-07)

B3 – Transmission of a distress alert relay or a distress call relay by a station not itself in distress (WRC-07)

32.16 § 11 A station in the mobile or mobile-satellite service which learns that a mobile unit is in distress (for example, by a radio call or by observation) shall initiate and transmit a distress alert relay or a distress call relay on behalf of the mobile unit in distress once it has ascertained that any of the following circumstances apply: (WRC-07)

32.17 a) on receiving a distress alert or call which is not acknowledged by a coast station or another vessel within five minutes (see also Nos. **32.29A** and **32.31**); (WRC-07)

32.18 b) on learning that the mobile unit in distress is otherwise unable or incapable of participating in distress communications, if the master or other person responsible for the mobile unit not in distress considers that further help is necessary. (WRC-07)

32.19 § 12 1) The distress relay on behalf of a mobile unit in distress shall be sent in a form appropriate to the circumstances (see Nos. **32.19A** to **32.19D**) using either a distress call relay by radiotelephony (see Nos. **32.19D** and **32.19E**), an individually addressed distress alert relay by DSC (see No. **32.19B**), or a distress priority message through a ship earth station. (WRC-07)

32.19A 2) A station transmitting a distress alert relay or a distress call relay in accordance with Nos. **32.16** to **32.18** shall indicate that it is not itself in distress. (WRC-07)

32.19B 3) A distress alert relay sent by DSC should use the call format, as found in the most recent version of Recommendations ITU-R M.493 and ITU-R M.541, and should preferably be addressed to an individual coast station or rescue coordination centre⁵. (WRC-07)

32.19C 4) However, a ship shall not transmit a distress alert relay to all ships by digital selective calling on the VHF or MF distress frequencies following receipt of a distress alert sent by digital selective calling by the ship in distress. (WRC-07)

32.19D 5) When an aural watch is being maintained on shore and reliable ship-to-shore communications can be established by radiotelephony, a distress call relay is sent by radiotelephony and addressed to the relevant coast station or rescue coordination centre⁶ on the appropriate frequency. (WRC-07)

⁵ **32.19B.1** Vessels making a distress alert relay or a distress call relay should ensure that a suitable coast station or rescue coordination centre is informed of any distress communications previously exchanged. (WRC-07)

⁶ **32.19D.1** Vessels making a distress call relay should ensure that a suitable coast station or rescue coordination centre is informed of any distress communications previously exchanged. (WRC-07)

32.19E 6) The distress call relay sent by radiotelephony should be given in the following form, taking into account Nos. **32.6** and **32.7**:

- the distress signal “MAYDAY RELAY”, spoken three times;
- the words “ALL STATIONS” or coast station name, as appropriate, spoken three times;
- the words “THIS IS”;
- the name of the relaying station, spoken three times;
- the call sign or other identification of the relaying station;
- the MMSI (if the initial alert has been sent by DSC) of the relaying station (the vessel not in distress). (WRC-12)

32.19F 7) This call shall be followed by a distress message which shall, as far as possible, repeat the information⁷ contained in the original distress alert or distress message. (WRC-07)

32.19G 8) When no aural watch is being maintained on shore, or there are other difficulties in establishing reliable ship-to-shore communications by radiotelephony, an appropriate coast station or rescue coordination centre may be contacted by sending an individual distress alert relay by DSC, addressed solely to that station and using the appropriate call formats. (WRC-07)

32.19H 9) In the event of continued failure to contact a coast station or rescue coordination centre directly, it may be appropriate to send a distress call relay by radiotelephony addressed to all ships, or to all ships in a certain geographical area. See also No. **32.19C**. (WRC-07)

32.20 *C – Receipt and acknowledgement of distress alerts and distress calls* (WRC-07)

C1 – Procedure for acknowledgement of receipt of distress alerts or a distress call (WRC-07)

32.21 § 13 1) Acknowledgement of receipt of a distress alert, including a distress alert relay, shall be made in the manner appropriate to the method of transmission of the alert and within the time-scale appropriate to the role of the station in receipt of the alert. Acknowledgement by satellite shall be sent immediately. (WRC-07)

32.21A 2) When acknowledging receipt of a distress alert sent by DSC⁸, the acknowledgement in the terrestrial services shall be made by DSC or radiotelephony on the associated distress and safety frequency in the same band in which the distress alert was received, taking due account of the directions given in the most recent versions of Recommendations ITU-R M.493 and ITU-R M.541. (WRC-23)

⁷ **32.19F.1** If the station in distress cannot be identified, then it will be necessary to originate the distress message as well, using, for example, terms such as “Unidentified trawler” to refer to the mobile unit in distress. (WRC-07)

⁸ **32.21A.1** In order to ensure that no unnecessary delay occurs before the shore-based authorities become aware of a distress incident, the acknowledgement by DSC to a distress alert sent by DSC shall normally only be made by a coast station or a rescue coordination centre. An acknowledgement by DSC will cancel any further automated repetition of the distress alert using DSC. (WRC-07)

32.21B Acknowledgement by DSC of a distress alert sent by DSC addressed to stations in the maritime mobile service shall be addressed to all stations⁸. (WRC-07)

32.22 (SUP - WRC-07)

32.23 § 15 When acknowledging by radiotelephony the receipt of a distress alert or a distress call from a ship station or a ship earth station, the acknowledgement should be given in the following form, taking into account Nos. **32.6** and **32.7**:

- the distress signal “MAYDAY”;
- the name followed by the call sign, or the MMSI or other identification of the station sending the distress message;
- the words “THIS IS”;
- the name and call sign or other identification of the station acknowledging receipt;
- the word “RECEIVED”;
- the distress signal “MAYDAY”. (WRC-23)

32.24 (SUP - WRC-23)

32.25 (SUP - WRC-07)

C2 – Receipt and acknowledgement by a coast station, a coast earth station or a rescue coordination centre (WRC-07)

32.26 § 17 Coast stations and the appropriate coast earth stations in receipt of distress alerts or distress calls shall ensure that they are routed as soon as possible to a rescue coordination centre. In addition, receipt of a distress alert or a distress call is to be acknowledged as soon as possible by a coast station, or by a rescue coordination centre via a coast station or an appropriate coast earth station. A shore-to-ship distress alert relay or a distress call relay (see Nos. **32.14** and **32.15**) shall also be made when the method of receipt warrants a broadcast alert to shipping or when the circumstances of the distress incident indicate that further help is necessary. (WRC-07)

32.27 § 18 A coast station using DSC to acknowledge a distress alert shall transmit the acknowledgement on the distress calling frequency on which the distress alert was received and should address it to all ships. The acknowledgement shall include the identification of the ship whose distress alert is being acknowledged. (WRC-07)

C3 – Receipt and acknowledgement by a ship station or ship earth station (WRC-07)

32.28 § 19 1) Ship or ship earth stations in receipt of a distress alert or a distress call shall, as soon as possible, inform the master or person responsible for the ship of the contents of the distress alert. (WRC-07)

32.29 2) In areas where reliable communications with one or more coast stations are practicable, ship stations in receipt of a distress alert or a distress call from another vessel should defer acknowledgement for a short interval so that a coast station may acknowledge receipt in the first instance. (WRC-07)

32.29A 3) Ship stations in receipt of a distress call sent by radiotelephony on the frequency 156.8 MHz (VHF channel 16) shall, if the call is not acknowledged by a coast station or another vessel within five minutes, acknowledge receipt to the vessel in distress and use any means available to relay the distress call to an appropriate coast station or coast earth station (see also Nos. **32.16** to **32.19F**). (WRC-07)

32.30 § 20 1) Ship stations operating in areas where reliable communications with a coast station are not practicable which receive a distress alert or call from a ship station which is, beyond doubt, in their vicinity, shall, as soon as possible and if appropriately equipped, acknowledge receipt to the vessel in distress and inform a rescue coordination centre through a coast station or coast earth station (see also Nos. **32.16** to **32.19H**). (WRC-07)

32.31 2) However, in order to avoid making unnecessary or confusing transmissions in response, a ship station, which may be at a considerable distance from the incident, receiving an HF distress alert, shall not acknowledge it but shall observe the provisions of Nos. **32.36** and **32.37**, and shall, if the distress alert is not acknowledged by a coast station within five minutes, relay the distress alert, but only to an appropriate coast station or coast earth station (see also Nos. **32.16** to **32.19H**). (WRC-23)

32.32 § 21 A ship station acknowledging receipt of a distress alert sent by DSC should, in accordance with No. **32.29** or No. **32.30**: (WRC-07)

32.33 a) in the first instance, acknowledge receipt of the distress alert by using radiotelephony on the distress and safety traffic frequency in the band used for the alert, taking into account any instructions which may be issued by a responding coast station; (WRC-07)

32.34 b) if acknowledgement by radiotelephony of the distress alert received on the MF or VHF distress alerting frequency is unsuccessful, acknowledge receipt of the distress alert by responding with a digital selective call on the appropriate frequency.

32.34A § 21A However, unless instructed to do so by a coast station or a rescue coordination centre, a ship station may only send an acknowledgement by DSC in the event that:

- a) no acknowledgement by DSC from a coast station has been observed; and
- b) no other communication by radiotelephony to or from the vessel in distress has been observed; and
- c) at least five minutes have elapsed and the distress alert by DSC has been repeated (see No. **32.21A.1**). (WRC-23)

32.35 § 22 A ship station in receipt of a shore-to-ship distress alert relay or distress call relay (see No. **32.14**) should establish communication as directed and render such assistance as required and appropriate. (WRC-07)

32.36*D – Preparations for handling of distress traffic*

32.37 § 23 On receipt of a distress alert or a distress call, ship stations and coast stations shall set watch on the radiotelephone distress and safety traffic frequency associated with the distress and safety calling frequency on which the distress alert was received. (WRC-07)

32.38

(SUP - WRC-23)

Section III – Distress traffic**32.39***A – General and search and rescue coordinating communications*

32.40 § 25 Distress traffic consists of all messages relating to the immediate assistance required by the ship in distress, including search and rescue communications and on-scene communications. The distress traffic shall as far as possible be on the frequencies contained in Article 31.

32.41

(SUP - WRC-07)

32.42 § 26 For distress traffic by radiotelephony, when establishing communications, calls shall be prefixed by the distress signal MAYDAY.

32.43

(SUP - WRC-23)

32.44

(SUP - WRC-23)

32.45 § 28 1) The rescue coordination centre responsible for controlling a search and rescue operation shall also coordinate the distress traffic relating to the incident or may appoint another station to do so. (WRC-07)

32.46 2) The rescue coordination centre coordinating distress traffic, the unit coordinating search and rescue operations⁹ or the coast station involved may impose silence on stations which interfere with that traffic. This instruction shall be addressed to all stations or to one station only, according to circumstances. In either case, the following shall be used:

32.47 in radiotelephony, the signal SEELONCE MAYDAY, pronounced as the French expression “silence, m'aider”. (WRC-23)

32.48 (SUP - WRC-23)

32.49 § 29 Until they receive the message indicating that normal working may be resumed (see No. **32.51**), all stations which are aware of the distress traffic, and which are not taking part in it, and which are not in distress, are forbidden to transmit on the frequencies in which the distress traffic is taking place.

32.50 § 30 A station of the mobile service which, while following distress traffic, is able to continue its normal service, may do so when the distress traffic is well established and on condition that it observes the provisions of No. **32.49** and that it does not interfere with distress traffic.

32.51 § 31 When distress traffic has ceased on frequencies which have been used for distress traffic, the station controlling the search and rescue operation shall initiate a message for transmission on these frequencies indicating that distress traffic has finished. (WRC-07)

32.52 § 32 In radiotelephony, the message referred to in No. **32.51** should consist of the following taking into account Nos. **32.6** and **32.7**:

- the distress signal “MAYDAY”;
- the words “ALL STATIONS”, spoken three times;
- the words “THIS IS”;
- the name of the station sending that message, spoken three times;
- the call sign or other identification of the station sending the message;
- the time of handing in of the message;
- the MMSI (if the initial alert has been sent by DSC), the name and the call sign of the mobile station which was in distress;
- the words “SEELONCE FEENEE” pronounced as the French words “silence fini”. (WRC-23)

32.53 (SUP - WRC-23)

32.53A *Cancellation of an inadvertent distress alert* (WRC-07)

32.53B § 32A 1) A station transmitting an inadvertent distress alert or call shall cancel the transmission. (WRC-07)

⁹ **32.46.1** In accordance with the International Convention on Maritime Search and Rescue (1979) this is the on-scene commander (OSC) or the coordinator surface search (CSS).

32.53C 2) An inadvertent DSC alert shall be cancelled by DSC, if the DSC equipment is so capable. The cancellation should be in accordance with the most recent version of Recommendation ITU-R M.493. In all cases, cancellations shall also be transmitted by radiotelephone in accordance with **32.53E**. (WRC-07)

32.53D 3) An inadvertent distress call shall be cancelled by radiotelephone in accordance with the procedure in **32.53E**. (WRC-07)

32.53E 4) Inadvertent distress transmissions shall be cancelled orally on the associated distress and safety frequency in the same band on which the distress transmission was sent, using the following procedure, taking into account Nos. **32.6** and **32.7**:

- the words “ALL STATIONS”, spoken three times;
- the words “THIS IS”;
- the name of the vessel, spoken three times;
- the call sign or other identification;
- the MMSI (if the initial alert has been sent by DSC);
- the words “PLEASE CANCEL MY DISTRESS ALERT OF” followed by the time in UTC.

Monitor the same band on which the inadvertent distress transmission was sent and respond to any communications concerning that distress transmission as appropriate. (WRC-12)

32.54

B – On-scene communications

32.55 § 33 1) On-scene communications are those between the mobile unit in distress and assisting mobile units, and between the mobile units and the unit coordinating search and rescue operations¹⁰.

32.56 2) Control of on-scene communications is the responsibility of the unit coordinating search and rescue operations¹⁰. Simplex communications shall be used so that all on-scene mobile stations may share relevant information concerning the distress incident. (WRC-23)

32.57 § 34 1) The preferred frequencies in radiotelephony for on-scene communications are 156.8 MHz and 2 182 kHz. (WRC-23)

¹⁰ **32.55.1**, **32.56.1** and **32.59.1** In accordance with the International Convention on Maritime Search and Rescue (1979) this is the on-scene commander (OSC) or the coordinator surface search (CSS).

32.58 2) In addition to 156.8 MHz and 2 182 kHz, the frequencies 3 023 kHz, 4 125 kHz, 5 680 kHz, 123.1 MHz and 156.3 MHz may be used for ship-to-aircraft on-scene communications.

32.59 § 35 The selection or designation of on-scene frequencies is the responsibility of the unit coordinating search and rescue operations¹⁰. Normally, once an on-scene frequency is established, a continuous aural watch is maintained by all participating on-scene mobile units on the selected frequency. (WRC-23)

32.60

C – Locating and homing signals

32.61 § 36 1) Locating signals are radio transmissions intended to facilitate the finding of a mobile unit in distress or the location of survivors. These signals include those transmitted by searching units, and those transmitted by the mobile unit in distress, by survival craft, by satellite emergency position-indicating radiobeacons (EPIRBs), by radar search and rescue transmitters (SARTs) and by automatic identification system search and rescue transmitters (AIS-SARTs) to assist the searching units. (WRC-23)

32.62 2) Homing signals are those locating signals which are transmitted by mobile units in distress, or by survival craft, for the purpose of providing searching units with a signal that can be used to determine the bearing to the transmitting stations.

32.63 3) Locating signals may be transmitted in the following frequency bands:

117.975-137 MHz;

156-174 MHz;

406-406.1 MHz; and

9 200-9 500 MHz. (WRC-07)

32.64

(SUP - WRC-07)

ARTICLE 33

Operational procedures for urgency and safety communications in the global maritime distress and safety system (GMDSS)

Section I – General

- 33.1** § 1 1) Urgency and safety communications include: (WRC-07)
- 33.2** a) navigational and meteorological warnings and urgent information;
- 33.3** b) ship-to-ship safety or navigation communications;
- 33.4** c) ship reporting communications;
- 33.5** d) support communications for search and rescue operations;
- 33.6** e) other urgency and safety messages; and
- 33.7** f) communications relating to the navigation, movements and needs of ships and weather observation messages destined for an official meteorological service.
- 33.7A** 2) Urgency communications shall have priority over all other communications, except distress. (WRC-07)
- 33.7B** 3) Safety communications shall have priority over all other communications, except distress and urgency. (WRC-07)

Section II – Urgency communications

- 33.7C** § 1A The following terms apply:
- a) The urgency announcement is a digital selective call using an urgency call format¹, in the bands used for terrestrial radiocommunication, or an urgency message format, in which case it is relayed through space stations.
- b) The urgency call is the initial voice or text procedure.
- c) The urgency message is the subsequent voice or text procedure. (WRC-07)
- 33.8** § 2 1) In a terrestrial system, urgency communications consist of an announcement, transmitted using digital selective calling, followed by the urgency call and message transmitted using radiotelephony or data. The announcement of the urgency message shall be made on one or more of the distress and safety calling frequencies specified in Section I of Article 31 using either digital selective calling and the urgency call format, or if not available, radio telephony procedures and the urgency signal. Announcements using digital selective calling should use the technical structure and content set forth in the most recent version of Recommendations ITU-R M.493 and ITU-R M.541. A separate announcement need not be made if the urgency message is to be transmitted through the maritime mobile-satellite service. (WRC-23)

¹ **33.7C.1** The format of urgency calls and urgency messages should be in accordance with the relevant ITU-R Recommendations. (WRC-07)

33.8A 2) Ship stations not equipped for digital selective calling procedures may announce an urgency call and message by transmitting the urgency signal by radiotelephony on the frequency 156.8 MHz (channel 16), while taking into account that other stations outside VHF range may not receive the announcement. (WRC-07)

33.8B 3) In the maritime mobile service, urgency communications may be addressed either to all stations or to a particular station. When using digital selective calling techniques, the urgency announcement shall indicate which frequency is to be used to send the subsequent message and, in the case of a message to all stations, shall use the “All Ships” format setting. (WRC-07)

33.8C 4) Urgency announcements from a coast station may also be directed to a group of vessels or to vessels in a defined geographical area. (WRC-07)

33.9 § 3 1) The urgency call and message shall be transmitted on one or more of the distress and safety traffic frequencies specified in Section I of Article 31. (WRC-07)

33.9A 2) However, in the maritime mobile service, the urgency message shall be transmitted on a working frequency:

- a) in the case of a long message or a medical call; *or*
- b) in areas of heavy traffic when the message is being repeated.

An indication to this effect shall be included in the urgency announcement or call. (WRC-07)

33.9B 3) In the maritime mobile-satellite service, a separate urgency announcement or call does not need to be made before sending the urgency message. However, if available, the appropriate network priority access settings should be used for sending the message. (WRC-07)

33.10 § 4 The urgency signal consists of the words PAN PAN. In radiotelephony each word of the group shall be pronounced as the French word “panne”.

33.11 § 5 1) The urgency call format and the urgency signal indicate that the calling station has a very urgent message to transmit concerning the safety of a mobile unit or a person. (WRC-07)

33.11A 2) Communications concerning medical advice may be preceded by the urgency signal. Mobile stations requiring medical advice may obtain it through any of the land stations shown in the List of Coast Stations and Special Service Stations. (WRC-07)

33.11B 3) Urgency communications to support search and rescue operations need not be preceded by the urgency signal. (WRC-07)

33.12 § 6 The urgency call should consist of the following, taking into account Nos. 32.6 and 32.7:

- the urgency signal “PAN PAN”, spoken three times;
- the name of the called station or “ALL STATIONS”, spoken three times;
- the words “THIS IS”;

- the name of the station transmitting the urgency message, spoken three times;
- the call sign or any other identification;
- the MMSI (if the initial announcement has been sent by DSC),

followed by the urgency message or followed by the details of the channel to be used for the message in the case where a working channel is to be used.

In radiotelephony, on the selected working frequency, the urgency call and message consist of the following, taking into account Nos. 32.6 and 32.7:

- the urgency signal “PAN PAN”, spoken three times;
- the name of the called station or “ALL STATIONS”, spoken three times;
- the words “THIS IS”;
- the name of the station transmitting the urgency message, spoken three times;
- the call sign or any other identification;
- the MMSI (if the initial announcement has been sent by DSC);
- the text of the urgency message. (WRC-23)

33.13 (SUP - WRC-23)

33.14 § 7 1) The urgency call format or urgency signal shall be sent only on the authority of the person responsible for the ship, aircraft or other vehicle carrying the mobile station or mobile earth station. (WRC-07)

33.15 2) The urgency call format or the urgency signal may be transmitted by a land station or a coast earth station with the approval of the responsible authority.

33.15A § 7A 1) Ship stations in receipt of an urgency announcement or call addressed to all stations shall not acknowledge. (WRC-07)

33.15B 2) Ship stations in receipt of an urgency announcement or call of an urgency message shall monitor the frequency or channel indicated for the message for at least five minutes. If, at the end of the five-minute monitoring period, no urgency message has been received, a coast station should, if possible, be notified of the missing message. Thereafter, normal working may be resumed. (WRC-07)

33.15C 3) Coast and ship stations which are in communication on frequencies other than those used for the transmission of the urgency signal or the subsequent message may continue their normal work without interruption, provided that the urgency message is not addressed to them nor broadcast to all stations. (WRC-07)

33.16 § 8 When an urgency announcement or call and message has been transmitted to more than one station and action is no longer required, an urgency cancellation should be sent by the station responsible for its transmission.

The urgency cancellation should consist of the following, taking into account Nos. **32.6** and **32.7**:

- the urgency signal “PAN PAN”, spoken three times;
- the words “ALL STATIONS”, spoken three times;
- the words “THIS IS”;
- the name of the station transmitting the urgency message, spoken three times;
- the call sign or any other identification;
- the MMSI (if the initial announcement has been sent by DSC);
- the words “PLEASE CANCEL URGENCY MESSAGE OF” followed by the time in UTC. (WRC-12)

33.17 (SUP - WRC-23)

33.18 (SUP - WRC-23)

Section III – Medical transports

33.19 § 10 The term “medical transports”, as defined in the 1949 Geneva Conventions and Additional Protocols, refers to any means of transportation by land, water or air, whether military or civilian, permanent or temporary, assigned exclusively to medical transportation and under the control of a competent authority of a party to a conflict or of neutral States and of other States not parties to an armed conflict, when these ships, craft and aircraft assist the wounded, the sick and the shipwrecked.

33.20 § 11 1) For the purpose of announcing and identifying medical transports which are protected under the above-mentioned Conventions, the procedure of Section II of this Article is used. The urgency call shall be followed by the addition of the single word MAY-DEE-CAL pronounced as in French “médical”, in radiotelephony. (WRC-23)

33.20A 2) When using digital selective calling techniques, the urgency announcement on the appropriate Digital Selective Calling distress and safety frequencies shall always be addressed to all stations on VHF and to a specified geographical area on MF and HF and shall indicate “Medical transport” in accordance with the most recent version of Recommendations ITU-R M.493 and ITU-R M.541. (WRC-07)

33.20B 3) Medical transports may use one or more of the distress and safety traffic frequencies specified in Section I of Article **31** for the purpose of self-identification and to establish communications. As soon as practicable, communications shall be transferred to an appropriate working frequency. (WRC-07)

33.21 § 12 The use of the signals described in Nos. **33.20** and **33.20A** indicates that the message which follows concerns a protected medical transport. The message shall convey the following data: (WRC-07)

- 33.22** a) call sign or other recognized means of identification of the medical transport;
- 33.23** b) position of the medical transport;
- 33.24** c) number and type of vehicles in the medical transport;

- 33.25** *d)* intended route;
- 33.26** *e)* estimated time en route and of departure and arrival, as appropriate;
- 33.27** *f)* any other information, such as flight altitude, radio frequencies guarded, languages used and secondary surveillance radar modes and codes.
- 33.28** (SUP - WRC-07)
- 33.29** (SUP - WRC-07)
- 33.30** § 13 The use of radiocommunications for announcing and identifying medical transports is optional; however, if they are used, the provisions of these Regulations and particularly of this Section and of Articles **30** and **31** shall apply.

Section IV – Safety communications

- 33.30A** § 14 The following terms apply:
- a)* the safety announcement is a digital selective call using a safety call format in the bands used for terrestrial radiocommunication or a safety message format, in which case it is relayed through space stations;
 - b)* the safety call is the initial voice or text procedure;
 - c)* the safety message is the subsequent voice or text procedure. (WRC-07)
- 33.31** § 15 1) In a terrestrial system, safety communications consist of a safety announcement, transmitted using digital selective calling, followed by the safety call and message transmitted using radiotelephony or data. The announcement of the safety message shall be made on one or more of the distress and safety calling frequencies specified in Section I of Article **31** using either digital selective-calling techniques and the safety call format, or radiotelephony procedures and the safety signal. (WRC-23)
- 33.31A** 2) However, in order to avoid unnecessary loading of the distress and safety calling frequencies specified for use with digital selective calling techniques:
- a)* safety messages transmitted by coast stations in accordance with a predefined timetable should not be announced by digital selective calling techniques;
 - b)* safety messages which only concern vessels sailing in the vicinity should be announced using radiotelephony procedures. (WRC-07)
- 33.31B** 3) In addition, ship stations not equipped for digital selective calling procedures may announce a safety message by transmitting the safety call by radiotelephony. In such cases the announcement shall be made using the frequency 156.8 MHz (VHF channel 16), while taking into account that other stations outside VHF range may not receive the announcement. (WRC-07)

33.31C 4) In the maritime mobile service, safety messages shall generally be addressed to all stations. In some cases, however, they may be addressed to a particular station. When using digital selective calling techniques, the safety announcement shall indicate which frequency is to be used to send the subsequent message and, in the case of a message to all stations, shall use the “All Ships” format setting. (WRC-07)

33.32 § 16 1) In the maritime mobile service, the safety message shall, where practicable, be transmitted on a working frequency in the same band(s) as those used for the safety announcement or call. A suitable indication to this effect shall be made at the end of the safety call. In the case that no other option is practicable, the safety message may be sent by radiotelephony on the frequency 156.8 MHz (VHF channel 16). (WRC-07)

33.32A 2) In the maritime mobile-satellite service, a separate safety announcement or call does not need to be made before sending the safety message. However, if available, the appropriate network priority access settings should be used for sending the message. (WRC-07)

33.33 § 17 The safety signal consists of the word SECURITE. In radiotelephony, it shall be pronounced as in French.

33.34 § 18 1) The safety call format or the safety signal indicates that the calling station has an important navigational or meteorological warning to transmit. (WRC-07)

33.34A 2) Messages from ship stations containing information concerning the presence of cyclones shall be transmitted, with the least possible delay, to other mobile stations in the vicinity and to the appropriate authorities through a coast station, or through a rescue coordination centre via a coast station or an appropriate coast earth station. These transmissions shall be preceded by the safety announcement or call. (WRC-07)

33.34B 3) Messages from ship stations, containing information on the presence of dangerous ice, dangerous wrecks, or any other imminent danger to marine navigation, shall be transmitted as soon as possible to other ships in the vicinity, and to the appropriate authorities through a coast station, or through a rescue coordination centre via a coast station or an appropriate coast earth station. These transmissions shall be preceded by the safety announcement or call. (WRC-07)

33.35 § 19 The complete safety call should consist of the following, taking into account Nos. 32.6 and 32.7:

- the safety signal “SECURITE”, spoken three times;
- the name of the called station or “ALL STATIONS”, spoken three times;
- the words “THIS IS”;
- the name of the station transmitting the safety message, spoken three times;
- the call sign or any other identification;
- the MMSI (if the initial announcement has been sent by DSC),

followed by the safety message or followed by the details of the channel to be used for the message in the case where a working channel is to be used.

In radiotelephony, on the selected working frequency, the safety call and message should consist of the following, taking into account Nos. 32.6 and 32.7:

- the safety signal “SECURITE”, spoken three times;
- the name of the called station or “ALL STATIONS”, spoken three times;

- the words “THIS IS”;
- the name of the station transmitting the safety message, spoken three times;
- the call sign or any other identification;
- the MMSI (if the initial alert has been sent by DSC);
- the text of the safety message. (WRC-23)

33.36 (SUP - WRC-23)

33.37 (SUP - WRC-23)

33.38 (SUP - WRC-23)

33.38A § 20A 1) Ship stations in receipt of a safety announcement using digital selective calling techniques and the “All Ships” format setting, or otherwise addressed to all stations, shall not acknowledge. (WRC-07)

33.38B 2) Ship stations in receipt of a safety announcement or safety call and message shall monitor the frequency or channel indicated for the message and shall listen until they are satisfied that the message is of no concern to them. They shall not make any transmission likely to interfere with the message. (WRC-07)

Section V – Transmission of maritime safety information²

33.39 *A – General*

33.39A (SUP - WRC-07)

33.39B (SUP - WRC-07)

33.40 (SUP - WRC-07)

33.40A § 21 The transmission of maritime safety information using the NAVTEX system and/or the NAVDAT system is the responsibility of the administration, which shall inform the International Maritime Organization (IMO) in order to update the IMO Master Plan of shore-based facilities for the global maritime distress and safety system (GMDSS) (GMDSS Master Plan). (WRC-23)

33.41 § 22 The mode and format of the transmissions mentioned in Nos. **33.43**, **33.45**, **33.46**, **33.46B** and **33.48** should be in accordance with the relevant ITU-R Recommendations. (WRC-23)

33.42 *B – International NAVTEX system*

33.43 § 23 Where maritime safety information is transmitted using the international NAVTEX system, taking into account No. **33.40A**, by means of narrow-band direct-printing telegraphy with forward error correction, the frequency 518 kHz shall be used (see Appendix **15**). (WRC-23)

² **33.V.1** Maritime safety information includes navigation and meteorological warnings, meteorological forecasts and other urgent messages pertaining to safety transmitted from coast stations or coast earth stations. (WRC-07)

33.44 *C – 490 kHz and 4 209.5 kHz*

33.45 § 24 1) The frequency 490 kHz may be used for the transmission of maritime safety information by means of narrow-band direct-printing telegraphy with forward error correction (see Appendix 15). (WRC-03)

33.46 2) The frequency 4 209.5 kHz is used exclusively for NAVTEX-type transmission by means of narrow-band direct-printing telegraphy with forward error correction.

33.46A *D – International NAVDAT system* (WRC-23)

33.46B § 24A Where maritime safety information is transmitted using the international NAVDAT system, taking into account No. 33.40A, the frequency 500 kHz and/or the frequency 4 226 kHz shall be used (see Appendix 15). (WRC-23)

33.47 *E – High seas maritime safety information* (WRC-23)

33.48 § 25 The transmission of maritime safety information by means of narrow-band direct-printing telegraphy with forward error correction uses the frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz. The transmission of maritime safety information by means of the NAVDAT system uses the frequencies 6 337.5 kHz, 8 443 kHz, 12 663.5 kHz, 16 909.5 kHz and 22 450.5 kHz. (WRC-23)

33.49 *F – Maritime safety information via satellite* (WRC-23)

33.50 § 26 Maritime safety information may be transmitted via satellite in the maritime mobile-satellite service using the frequency bands 1 530-1 545 MHz, 1 621.35-1 626.5 MHz and 2 483.59-2 499.91 MHz (see Appendix 15). For the maritime mobile-satellite service in the frequency band 2 483.59-2 499.91 MHz, Resolution 365 (WRC-23) applies when used for the global maritime distress and safety system (GMDSS). (WRC-23)

Section VI – Intership navigation safety communications

33.51 § 27 1) Intership navigation safety communications are those VHF radiotelephone communications conducted between ships for the purpose of contributing to the safe movement of ships.

33.52 2) The frequency 156.650 MHz is used for intership navigation safety communications (see also Appendix 15 and note k) in Appendix 18).

Section VII – Use of other frequencies for safety (WRC-07)

33.53 § 28 Radiocommunications for safety purposes concerning ship reporting communications, communications relating to the navigation, movements and needs of ships and weather observation messages may be conducted on any appropriate communications frequency, including those used for public correspondence. In terrestrial systems, the frequency bands 415-535 kHz (see Article 52), 1 606.5-4 000 kHz (see Article 52), 4 000-27 500 kHz (see Appendix 17) and 156-174 MHz (see Appendix 18) are used for this function. In the maritime mobile-satellite service, frequencies in the frequency bands 1 530-1 544 MHz, 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz (Earth-to-space) (see *resolves 5* of Resolution 365 (WRC-23)), 1 621.35-1 626.5 MHz, 1 626.5-1 645.5 MHz and 2 483.59-2 499.91 MHz (space-to-Earth) are used for this function as well as for distress alerting purposes (see No. 32.2). For the frequency bands 1 614.4225-1 618.725 MHz or 1 616.3-1 620.38 MHz (Earth-to-space) (see *resolves 5* of Resolution 365 (WRC-23)) and 2 483.59-2 499.91 MHz (space-to-Earth) when used for the GMDSS, Resolution 365 (WRC-23) applies. (WRC-23)

33.54 (SUP - WRC-07)

33.55 (SUP - WRC-07)

ARTICLE 34

Alerting signals in the global maritime distress and safety system (GMDSS)

Section I – Satellite emergency position-indicating radiobeacon signals (WRC-23)

34.1 § 1 The emergency position-indicating radiobeacon signal in the frequency band 406–406.1 MHz shall be in accordance with Recommendation ITU-R M.633-5. (WRC-23)

Section II – Digital selective calling

34.2 § 2 The characteristics of the “distress call” (see No. **32.9**) in the digital selective calling system should be in accordance with the most recent version of Recommendation ITU-R M.493. (WRC-12)

CHAPTER VIII
Aeronautical services

ARTICLE 35

Introduction

35.1 § 1 With the exception of Articles 36, 37, 39, 42, 43 and No. 44.2, the other provisions of this Chapter may be governed by special arrangements concluded pursuant to Article 42 of the Constitution of the International Telecommunication Union (Geneva, 1992), or by intergovernmental agreements¹ provided their implementation does not cause harmful interference to the radio services of other countries.

¹ **35.1.1** For example, the International Civil Aviation Organization (ICAO) has agreed upon standards and recommended practices adapted to the needs of aircraft operation which have been proven in practice and are well established in current use.

ARTICLE 36

Authority of the person responsible for the station

36.1 § 1 The service of a mobile station is placed under the supreme authority of the person responsible for the aircraft or other vehicle carrying the mobile station.

36.2 § 2 The person holding this authority shall require that each operator comply with these Regulations and that the mobile station for which the operator is responsible is used, at all times, in accordance with these Regulations.

36.3 § 3 Except as otherwise provided for in these Regulations, the person responsible, as well as all the persons who may have knowledge of any information whatever obtained by means of the radiocommunication service, are placed under the obligation of observing and ensuring the secrecy of correspondence.

36.4 § 4 The provisions of Nos. **36.1, 36.2** and **36.3** shall also apply to personnel of aircraft earth stations.

ARTICLE 37

Operator's certificates

Section I – General provisions

37.1 § 1 1) The service of every aircraft station and every aircraft earth station shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject. Provided the station is so controlled, other persons besides the holder of the certificate may use the radiotelephone equipment.

37.2 2) In order to meet special needs, special agreements between administrations may fix the conditions to be fulfilled in order to obtain a radiotelephone operator's certificate intended to be used in aircraft radiotelephone stations and aircraft earth stations complying with certain technical conditions and certain operating conditions. These agreements, if made, shall be on the condition that harmful interference to international services shall not result therefrom. These conditions and agreements shall be mentioned in the certificates issued to such operators.

37.3 3) The service of automatic communication devices¹ installed in an aircraft station or aircraft earth station shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject. Provided the devices are so controlled, they may be used by other persons.

37.4 4) Nevertheless, in the service of aircraft stations and aircraft earth stations operating radiotelephony solely on frequencies above 30 MHz, each government shall decide for itself whether a certificate is necessary and, if so, shall define the conditions for obtaining it.

37.5 5) The provisions of No. **37.4** shall not, however, apply to any aircraft station or aircraft earth station working on frequencies assigned for international use.

37.6 § 2 1) In the case of complete unavailability of the operator in the course of a flight, and solely as a temporary measure, the person responsible for the station may authorize an operator holding a certificate issued by the government of another Member State to perform the radiocommunication service.

37.7 2) When it is necessary to employ a person without a certificate or an operator not holding an adequate certificate as a temporary operator, his performance as such must be limited solely to signals of distress, urgency and safety, messages relating thereto, messages relating directly to the safety of life and essential messages relating to the navigation and safe movement of the aircraft.

37.8 3) In all cases, such temporary operators must be replaced as soon as possible by operators holding the certificate prescribed in § 1 of this Article.

¹ **37.3.1** The term "automatic communication devices" is intended to include such equipment as teleprinters, data transfer systems, etc.

37.9 § 3 1) Each administration shall take the necessary steps to prevent, to the maximum extent possible, the fraudulent use of certificates. For this purpose, such certificates shall bear the holder's signature and shall be authenticated by the issuing administration. Administrations may employ, if they wish, other means of identification such as photographs, fingerprints, etc.

37.10 2) To facilitate verification of certificates, these may carry, if necessary, in addition to the text in the national language, a translation of this text in a working language of the Union.

37.11 § 4 Each administration shall take the necessary steps to place operators under the obligation to preserve the secrecy of correspondence as provided for in No. **18.4**.

Section II – Classes and categories of certificates

37.12 § 5 1) There are two categories of radiotelephone operators' certificates, general and restricted.

37.13 2) The holder of a radiotelephone operator's general certificate may carry out the radiotelephone service of any aircraft station or of any aircraft earth station.

37.14 3) The holder of a radiotelephone operator's restricted certificate may carry out the radiotelephone service of any aircraft station or aircraft earth station operating on frequencies allocated exclusively to the aeronautical mobile service or the aeronautical mobile-satellite service, provided that the operation of the transmitter requires only the use of simple external switching devices.

Section III – Conditions for the issue of operators' certificates

A – General

37.16 § 6 1) The conditions to be imposed for obtaining the various certificates are contained in the following paragraphs and represent the minimum requirements.

37.17 2) Each administration is free to fix the number of examinations necessary to obtain each certificate.

37.18 § 7 1) The administration which issues a certificate may, before authorizing an operator to carry out the service on board aircraft, require the fulfilment of other conditions (for example: experience with automatic communication devices; further technical and professional knowledge relating particularly to navigation; physical fitness; the completion as an operator of a certain number of flying hours; etc.).

37.19 2) Administrations should take whatever steps they consider necessary to ensure the continued proficiency of operators after prolonged absences from operational duties.

37.20*B – Radiotelephone operators' certificates*

37.21 § 8 The radiotelephone operator's general certificate is issued to candidates who have given proof of the knowledge and professional qualifications enumerated below (see also No. **37.13**):

- 37.22** *a)* a knowledge of the elementary principles of radiotelephony;
 - 37.23** *b)* detailed knowledge of the practical operation and adjustment of radiotelephone apparatus;
 - 37.24** *c)* ability to send correctly and to receive correctly by radiotelephone in one of the working languages of the Union;
 - 37.25** *d)* detailed knowledge of the Regulations applying to radiotelephone communications and specifically of that part of those Regulations relating to the safety of life.
- 37.26** § 9 1) The radiotelephone operator's restricted certificate is issued to candidates who have given proof of the knowledge and professional qualifications enumerated below:
- 37.27** *a)* practical knowledge of radiotelephone operation and procedure;
 - 37.28** *b)* ability to send correctly and to receive correctly by radiotelephone in one of the working languages of the Union;
 - 37.29** *c)* general knowledge of the Regulations applying to radiotelephone communications and specifically of that part of those Regulations relating to the safety of life.
- 37.30** 2) For aircraft radiotelephone stations and aircraft earth stations operating on frequencies allocated exclusively to the aeronautical mobile service or the aeronautical mobile-satellite service, each administration may itself fix the conditions for obtaining a radiotelephone operator's restricted certificate, provided that the operation of the transmitter requires only the use of simple external switching devices. The administration shall ensure that the operator has an adequate knowledge of radiotelephone operation and procedure particularly as far as distress, urgency and safety are concerned. This in no way contravenes the provisions of No. **37.2**.

37.31 § 10 A radiotelephone operator's certificate shall show whether it is a general certificate or a restricted certificate and, in the latter case, if it has been issued in conformity with the provisions of No. **37.30**.

ARTICLE 38

Personnel

38.1 Administrations shall ensure that the staff on duty in aeronautical stations and in aeronautical earth stations shall be adequately qualified to operate the stations efficiently.

ARTICLE 39

Inspection of stations

39.1 § 1 1) The inspectors of governments or appropriate administrations of countries who visit an aircraft station or aircraft earth station may require the production of the licence for examination. The operator of the station, or the person responsible for the station, shall facilitate this examination. The licence shall be kept in such a way that it can be produced upon request.

39.2 2) The inspectors shall have in their possession an identity card or badge, issued by the competent authority, which they shall show on request of the person responsible for the aircraft.

39.3 3) When the licence cannot be produced or when manifest irregularities are observed, governments or administrations may inspect the radio installations in order to satisfy themselves that these conform to the conditions imposed by these Regulations.

39.4 4) In addition, inspectors have the right to require the production of the operators' certificates, but proof of professional knowledge may not be demanded.

39.5 § 2 1) When a government or administration has found it necessary to adopt the course indicated in No. **39.3**, or when the operator's certificates cannot be produced, the government or administration to which the aircraft station or aircraft earth station is subject shall be so informed without delay. In addition, the procedure specified in Section V of Article **15** is followed when necessary.

39.6 2) Before leaving, the inspector shall report the result of his inspection to the person responsible for the aircraft. If any breach of the conditions imposed by these Regulations is observed, the inspector shall make this report in writing.

39.7 § 3 Member States undertake not to impose upon foreign aircraft stations or aircraft earth stations which are temporarily within their territorial limits or which make a temporary stay in their territory, technical and operating conditions more severe than those contemplated in these Regulations. This undertaking in no way affects arrangements which are made under international agreements relating to air navigation, and which are therefore not covered by these Regulations.

39.8 § 4 The frequencies of emissions of aircraft stations shall be checked by the inspection service to which these stations are subject.

ARTICLE 40

Working hours of stations

40.1 § 1 Every station of the aeronautical mobile service and the aeronautical mobile-satellite service shall have an accurate clock correctly regulated to Coordinated Universal Time (UTC).

40.2 § 2 The service of an aeronautical station or an aeronautical earth station shall be continuous throughout the period during which it bears responsibility for the radiocommunication service to aircraft in flight.

40.3 § 3 Aircraft stations and aircraft earth stations in flight shall maintain service to meet the essential communications needs of the aircraft with respect to safety and regularity of flight and shall maintain watch as required by the competent authority and shall not cease watch, except for reasons of safety, without informing the aeronautical station or aeronautical earth station concerned.

ARTICLE 41

Communications with stations in the maritime services

41.1 Stations on board aircraft may communicate, for purposes of distress, and for public correspondence¹, with stations of the maritime mobile or maritime mobile-satellite services. For these purposes, they shall conform to the relevant provisions of Chapter **VII** and Chapter **IX**, Articles **51** (Section III), **53**, **54**, **55**, **57** and **58** (see also Nos. **4.19**, **4.20** and **43.4**). (WRC-07)

¹ **41.1.1** Stations on board aircraft may communicate, for public correspondence purposes as long as watch is maintained on the frequencies provided for safety and regularity of flight.

ARTICLE 42

Conditions to be observed by stations

42.1 § 1 The energy radiated by receiving apparatus shall be reduced to the lowest practical value and shall not cause harmful interference to other stations.

42.2 § 2 Administrations shall take all practicable steps necessary to ensure that the operation of any electrical or electronic apparatus installed in mobile stations and mobile earth stations does not cause harmful interference to the essential radio services of stations which are operating in accordance with the provisions of these Regulations.

42.3 § 3 Mobile stations and mobile earth stations other than survival craft stations shall be provided with the documents enumerated in the appropriate section of Appendix **16** (Section IV, “Stations on board aircraft”).

42.4 § 4 The operation of a broadcasting service (see No. **1.38**) by an aircraft station at sea and over the sea is prohibited (see also No. **23.2**).

ARTICLE 43

Special rules relating to the use of frequencies

43.1 § 1 Frequencies in any band allocated to the aeronautical mobile (R) service and the aeronautical mobile-satellite (R) service are reserved for communications relating to safety and regularity of flight between any aircraft and those aeronautical stations and aeronautical earth stations primarily concerned with flight along national or international civil air routes.

43.2 § 2 Frequencies in any band allocated to the aeronautical mobile (OR) service and the aeronautical mobile-satellite (OR) service are reserved for communications between any aircraft and aeronautical stations and aeronautical earth stations other than those primarily concerned with flight along national or international civil air routes.

43.3 § 3 Frequencies in the bands allocated to the aeronautical mobile service between 2 850 kHz and 22 000 kHz (see Article 5) shall be assigned in conformity with the provisions of Appendices 26 and 27 and the other relevant provisions of these Regulations.

43.4 § 4 Administrations shall not permit public correspondence in the frequency bands allocated exclusively to the aeronautical mobile service or to the aeronautical mobile-satellite service.

43.5 § 5 In order to reduce interference, aircraft stations shall, within the means at their disposal, endeavour to select for calling the band with the most favourable propagational characteristics for effecting reliable communication. In the absence of more precise data, an aircraft station shall, before making a call, listen for the signals of the station with which it desires to communicate. The strength and intelligibility of such signals are useful as a guide to propagational conditions and indicate which is the preferable band for calling.

43.6 § 6 Governments may, by agreement, decide the frequencies to be used for call and reply in the aeronautical mobile service and the aeronautical mobile-satellite service.

ARTICLE 44

Order of priority of communications

44.1 § 1 The order of priority for communications¹ in the aeronautical mobile service and the aeronautical mobile-satellite service shall be as follows, except where impracticable in a fully automated system in which, nevertheless, Category 1 shall receive priority:

- 1 Distress calls, distress messages and distress traffic.
- 2 Communications preceded by the urgency signal.
- 3 Communications relating to radio direction-finding.
- 4 Flight safety messages.
- 5 Meteorological messages.
- 6 Flight regularity messages.
- 7 Messages relating to the application of the United Nations Charter.
- 8 Government messages for which priority has been expressly requested.
- 9 Service communications relating to the working of the telecommunication service or to communications previously exchanged.
- 10 Other aeronautical communications.

44.2 § 2 Categories 1 and 2 shall receive priority over all other communications irrespective of any agreement under the provisions of No. **35.1**.

¹ **44.1.1** The term *communications* as used in this Article includes radiotelegrams, radiotelephone calls and radiotelex calls.

ARTICLE 45

General communication procedure

45.1 § 1 As a general rule, it rests with the aircraft station to establish communication with the aeronautical station. For this purpose, the aircraft station may call the aeronautical station only when it comes within the designated operational coverage¹ area of the latter.

45.2 § 2 An aeronautical station having traffic for an aircraft station may call this station if it has reason to believe that the aircraft station is keeping watch and is within the designated operational coverage area (see No. 45.1.1) of the aeronautical station.

45.3 § 3 When an aeronautical station receives calls in close succession from several aircraft stations, it decides on the order in which these stations may transmit their traffic. Its decision shall be based on the priority in Article 44.

45.4 § 4 If an aeronautical station finds it necessary to intervene in communications between aircraft stations, these stations shall comply with the instructions given by the aeronautical station.

45.5 § 5 Before transmitting, a station shall take precautions to ensure that it will not interfere with a communication already in progress and that the station called is not in communication with another station.

45.6 § 6 When a radiotelephone call has been made to an aeronautical station, but no answer has been received, a period of at least ten seconds should elapse before a subsequent call is made to that station.

45.7 § 7 Aircraft stations shall not radiate carrier waves between calls.

¹ 45.1.1 Designated operational coverage is that volume of airspace needed operationally in order to provide a particular service and within which the facility is afforded frequency protection.

CHAPTER IX
Maritime services

ARTICLE 46

Authority of the master

46.1 § 1 The service of a ship station is placed under the supreme authority of the master or of the person responsible for the ship or other vessel carrying the station.

46.2 § 2 The person holding this authority shall require that each operator comply with these Regulations and that the ship station for which the operator is responsible is used, at all times, in accordance with these Regulations.

46.3 § 3 The master or the person responsible, as well as all persons who may have knowledge of the text or even of the existence of a radiotelegram, or of any information whatever obtained by means of the radiocommunication service, are placed under the obligation of observing and ensuring the secrecy of correspondence.

46.4 § 4 The provisions of Nos. **46.1**, **46.2** and **46.3** shall also apply to personnel of ship earth stations.

ARTICLE 47

Operator's certificates

Section I – General provisions

47.1 (SUP - WRC-03)

47.2 § 1 1) The service of every ship radiotelephone station, ship earth station and ship station using the frequencies and techniques for GMDSS, as prescribed in Chapter VII, shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject. Provided the station is so controlled, other persons besides the holder of the certificate may use the equipment. (WRC-07)

47.3 (SUP - WRC-03)

47.4 2) Nevertheless, in the service of radiotelephone stations operating solely on frequencies above 30 MHz, each government shall decide for itself whether a certificate is necessary and, if so, shall define the conditions for obtaining it.

47.5 3) The provisions of No. 47.4 shall not, however, apply to any ship station working on frequencies assigned for international use.

47.6 (SUP - WRC-07)

47.7 (SUP - WRC-07)

47.8 (SUP - WRC-07)

47.9 § 3 1) Each administration shall take the necessary steps to prevent, to the maximum extent possible, the fraudulent use of certificates. For this purpose, such certificates shall bear the holder's signature and shall be authenticated by the issuing administration. Administrations may employ, if they wish, other means of identification such as photographs, fingerprints, etc.

47.10 2) In the maritime mobile service the certificates issued after 1 January 1978 shall bear the photograph of the holder and the holder's date of birth.

47.11 3) To facilitate verification of certificates, these may carry, if necessary, in addition to the text in the national language, a translation of this text in a working language of the Union.

47.12 4) In the maritime mobile service all certificates not in one of the working languages of the Union and issued after 1 January 1978 shall carry at least the following information in one of these working languages:

47.13 a) the name and date of birth of the holder;

47.14 b) the title of the certificate and its date of issue;

47.15 c) if applicable, the number and period of validity of the certificate;

47.16 d) the issuing administration.

47.17 § 4 Each administration shall take the necessary steps to place operators under the obligation to preserve the secrecy of correspondence as provided for in No. **18.4**.

47.18 (SUP - WRC-12)

47.18A (SUP - WRC-12)

Section II – Categories of operator's certificates

A – GMDSS (SOLAS Convention) certificates (WRC-12)

47.19 § 6 1) There are four categories of certificates, shown in descending order of requirements, for personnel of ship stations and ship earth stations using the frequencies and techniques prescribed in Chapter **VII**. An operator meeting the requirements of a certificate automatically meets all of the requirements of lower order certificates. (WRC-12)

47.20 a) First-class radio electronic certificate.

47.21 b) Second-class radio electronic certificate.

47.22 c) General operator's certificate.

47.23 d) Restricted operator's certificate.

47.23A (SUP - WRC-12)

47.23B (SUP - WRC-12)

47.24 2) The holder of one of the certificates specified in Nos. **47.20** to **47.23** may carry out the service of ship stations or ship earth stations using the frequencies and techniques prescribed in Chapter **VII**.

B – GMDSS (non-SOLAS Convention) certificates (WRC-12)

47.24A There are two categories of certificates, shown in descending order of requirements. An operator meeting the requirements of a certificate automatically meets all of the requirements of the lower order certificate. (WRC-12)

47.24B a) Long-range certificate (WRC-12)

47.24C b) Short-range certificate (WRC-12)

C – Other maritime radio operator certificates (WRC-12)

47.25 § 7 1) There are six categories of certificates. Maritime radio operator certificates of the categories listed in Nos. **47.26A** to **47.26F** may continue to be used for the purposes they were issued for. (WRC-12)

- 47.26** § 8 The following maritime radio operator's certificates are still valid: (WRC-12)
- 47.26A** a) Radiocommunication operator's general certificate. (WRC-12)
- 47.26B** b) First-class radio telegraph operator's certificate. (WRC-12)
- 47.26C** c) Second-class radio telegraph operator's certificate. (WRC-12)
- 47.26D** d) Radiotelegraph operator's special certificate. (WRC-12)
- 47.26E** e) Radiotelephone operator's general certificate. (WRC-12)
- 47.26F** f) Restricted radiotelephone operator's certificate. (WRC-12)

Section III – Conditions for the issuing of certificates

47.27 § 9 1) The requirements for the certificates listed in Nos. **47.20** to **47.23**, for which candidates must show proof of technical and professional knowledge and qualification, are shown in Table **47-1**. (WRC-12)

47.27A 2) The conditions for the issuing of long-range and short-range certificates listed in Nos. **47.24B** and **47.24C** are contained in Resolution **343 (Rev.WRC-12)**. (WRC-12)

47.27B 3) Each administration may determine the conditions, in addition to those identified in No. **47.27**, under which GMDSS (SOLAS Convention) certificates specified in Nos. **47.20** to **47.23** may be granted. (WRC-12)

47.27C § 10 Each administration may determine the conditions, in addition to those identified in No. **47.27A**, under which GMDSS (non-SOLAS Convention) certificates specified in Nos. **47.24B** to **47.24C** may be granted. (WRC-12)

47.27D Each administration may determine the conditions under which other maritime radio operator certificates specified in Nos. **47.26A** to **47.26F** may be granted. (WRC-12)

47.28 (SUP - WRC-07)

47.29 (SUP - WRC-07)

TABLE 47-1 (WRC-23)

Requirements for radio electronic and operator's certificates

The relevant certificate is issued to a candidate who has given proof of the technical and professional knowledge and qualifications enumerated below, as indicated by an asterisk in the appropriate box	1st-class radio electronic certificate	2nd-class radio electronic certificate	General operator's certificate	Restricted operator's certificate
Knowledge of the principles of electricity and the theory of radio and of electronics sufficient to meet the requirements specified below:	*	*		
Theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective-calling equipment, ship earth stations, satellite emergency position-indicating radiobeacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radionavigation, with particular reference to maintaining equipment in service.	*			
General theoretical knowledge of GMDSS radiocommunication equipment, including narrow-band direct-printing telegraph and radiotelephone transmitters and receivers, digital selective-calling equipment, ship earth stations (including telegraphy), satellite emergency position-indicating radio beacons, marine antenna systems, radio equipment for survival craft together with all auxiliary items, including power supplies, as well as general knowledge of the principles of other equipment generally used for radionavigation, with particular reference to maintaining equipment in service.		*		
Practical knowledge of the operation and knowledge of the preventive maintenance of the equipment indicated above.	*	*		
Practical knowledge necessary for the location and repair (using appropriate testing equipment and tools) of faults in the equipment mentioned above which may occur during a voyage.	*			
Practical knowledge necessary for effecting repairs in the case of faults in the equipment indicated above, using the means available on board and, if necessary, replacing modular units.		*		

TABLE 47-1 (end) (WRC-23)

The relevant certificate is issued to a candidate who has given proof of the technical and professional knowledge and qualifications enumerated below, as indicated by an asterisk in the appropriate box	1st-class radio electronic certificate	2nd-class radio electronic certificate	General operator's certificate	Restricted operator's certificate
Detailed practical knowledge of the operation of all the GMDSS sub-systems and equipment.	*	*	*	
Practical knowledge of the operation of all the GMDSS sub-systems and equipment which is required while the ship is within the range of VHF coast stations (see NOTE 1).				*
Ability to send and to receive correctly by radiotelephony and telegraphy to and from ship earth stations.	*	*	*	
Ability to send and to receive correctly by radiotelephony.	*	*	*	*
Detailed knowledge of the regulations applying to radiocommunications, knowledge of the documents relating to charges for radiocommunications and knowledge of those provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended which relate to radio.	*	*	*	
Knowledge of the regulations applying to radiotelephone communications and specifically of that part of those regulations relating to the safety of life.				*
Sufficient knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing.	*	*	*	
An elementary knowledge of one of the working languages of the Union. Candidates should be able to express themselves satisfactorily in that language, both orally and in writing. Administrations may waive the above language requirements for holders of a restricted operator's certificate when the ship station is confined to a limited area specified by the administration concerned. In such cases the certificate shall be suitably endorsed.				*

NOTE 1 – A restricted operator's certificate covers only the operation of GMDSS equipment required for GMDSS sea areas A1, and does not cover the operation of GMDSS A2/A3/A4 equipment fitted on a ship over and above the basic A1 requirements, even if the ship is in a sea area A1. GMDSS sea areas A1, A2, A3 and A4 are identified in the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended.

NOTE 2 – (SUP - WRC-12)

ARTICLE 48

Personnel

Section I – Personnel of coast stations and coast earth stations

48.1 § 1 Administrations shall ensure that the staff on duty in coast stations and in coast earth stations are adequately qualified to operate the stations efficiently.

Section II – Class and minimum number of personnel for ship stations and ship earth stations

48.2 § 2 Administrations shall ensure that the personnel of ship stations and ship earth stations are adequately qualified to enable efficient operation of the station, and shall take steps to ensure the operational availability and maintenance of equipment for distress and safety communications in accordance with the relevant international agreements.

48.3 § 3 An adequately qualified person shall be available to act as a dedicated communications operator in cases of distress.

48.4 § 4 The personnel of ship stations and ship earth stations for which a radio installation is compulsory under international agreements and which use the frequencies and techniques prescribed in Chapter VII shall, with respect to the provisions of Article 47, include:

48.5 *a)* for stations on board ships which sail beyond the range of VHF coast stations, taking into account the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended: a holder of a first- or second-class radio electronic certificate or a general operator's certificate;

48.6 *b)* for stations on board ships which sail solely within the range of VHF coast stations, taking into account the provisions of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended: a holder of a first- or second-class radio electronic certificate or a general operator's certificate or a restricted operator's certificate.

48.7 § 5 The personnel of ship stations and ship earth stations for which a radio installation is not compulsory either under international agreements or national regulations and which use the frequencies and techniques prescribed in Chapter VII shall be adequately qualified and certificated in accordance with the administration's requirements. Guidance concerning appropriate qualifications and certification is provided in Resolution 343 (Rev.WRC-12). That Resolution describes two appropriate certificates for use by personnel of ship stations and ship earth stations for which a radio installation is not compulsory. (WRC-23)

ARTICLE 49

Inspection of stations

49.1 § 1 1) The governments or appropriate administrations of countries which a ship station or ship earth station visits may require the production of the licence for examination. The operator of the station, or the person responsible for the station, shall facilitate this examination. The licence shall be kept in such a way that it can be produced upon request. As far as possible, the licence, or a copy certified by the authority which has issued it, should be permanently exhibited in the station.

49.2 2) The inspectors shall have in their possession an identity card or badge, issued by the competent authority, which they shall show on request of the master or person responsible for the ship or other vessel carrying the ship station or the ship earth station.

49.3 3) When the licence cannot be produced or when manifest irregularities are observed, governments or administrations may inspect the radio installations in order to satisfy themselves that these conform to the conditions imposed by these Regulations.

49.4 4) In addition, inspectors have the right to require the production of the operators' certificates, but proof of professional knowledge may not be demanded.

49.5 § 2 1) When a government or an administration has found it necessary to adopt the course indicated in No. **49.3**, or when the operators' certificates cannot be produced, the government or administration to which the ship station or ship earth station is subject shall be so informed without delay. In addition, the procedure specified in Article **15** is followed when necessary.

49.6 2) Before leaving, the inspector shall report the result of his inspection to the master, or the person responsible for the ship or other vessel carrying the ship station or ship earth station. If any breach of the conditions imposed by these Regulations is observed, the inspector shall make this report in writing.

49.7 § 3 Member States undertake not to impose upon foreign ship stations or upon foreign ship earth stations, which are temporarily within their territorial waters or which make a temporary stay in their territory, technical and operating conditions more severe than those contemplated in these Regulations. This undertaking in no way affects arrangements which are made under international agreements relating to maritime navigation, and which are therefore not covered by these Regulations.

49.8 § 4 The frequencies of emissions of ship stations shall be checked by the inspection service to which these stations are subject.

ARTICLE 50

Working hours of stations

50.1 § 1 In order to permit the application of the following rules on the subject of hours of watch, every station of the maritime mobile service and the maritime mobile-satellite service shall have an accurate clock correctly regulated to Coordinated Universal Time (UTC).

50.2 § 2 Coordinated Universal Time (UTC), reckoned from 0000 to 2359 h beginning at midnight, shall be used for all entries in the radiocommunication service log and in all similar documents of ships compulsorily equipped with radiocommunication apparatus in compliance with an international agreement; this same provision will apply, as far as possible, to other ships.

50.3 § 3 1) The services of coast stations and coast earth stations are, as far as possible, continuous (day and night). Certain coast stations, however, may have a service of limited duration. Each administration or recognized private operating agency duly authorized to that effect fixes the hours of service for coast stations under its jurisdiction.

50.4 2) These hours of service shall be notified to the Radiocommunication Bureau, who shall publish them in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

50.5 § 4 Coast stations whose service is not continuous shall not close before finishing all operations resulting from a distress call or from an urgency or safety signal. (WRC-07)

50.6 (SUP - WRC-07)

50.7 (SUP - WRC-07)

50.8 (SUP - WRC-07)

50.9 (SUP - WRC-07)

ARTICLE 51

Conditions to be observed in the maritime services

Section I – Maritime mobile service

51.1*A – General*

51.2 § 1 The energy radiated by receiving apparatus shall be reduced to the lowest practical value and shall not cause harmful interference to other stations.

51.3 § 2 Administrations shall take all practicable steps necessary to ensure that the operation of any electrical or electronic apparatus installed in ship stations does not cause harmful interference to the essential radio services of stations which are operating in accordance with the provisions of these Regulations.

51.4 § 3 1) Changes of frequency in the sending and receiving apparatus of any ship station shall be capable of being made as rapidly as possible.

51.5 2) Installations of any ship station shall be capable, once communication is established, of changing from transmission to reception and vice versa in as short a time as possible.

51.5A 3) The operation of a broadcasting service (see No. **1.38**) by a ship station at sea is prohibited (see also No. **23.2**).

51.6 § 4 Ship stations and ship earth stations other than survival craft stations shall be provided with the documents enumerated in the appropriate section of Appendix **16**.

51.7 § 5 When any ship station transmitter itself cannot be controlled in such a way that its frequency satisfies the tolerance specified in Appendix **2**, the ship station shall be provided with a device, having a precision equal to at least one-half of this tolerance, for measuring the frequency of the emission.

51.8 to 51.23 (SUP - WRC-07)

51.24 *C – Ship stations using digital selective calling*

51.25 § 12 The characteristics of the digital selective calling equipment should be in accordance with the most recent version of Recommendation ITU-R M.493. (WRC-12)

51.26 C1 – Bands between 415 kHz and 535 kHz

51.27 § 13 All ship stations equipped with apparatus for digital selective calling to work in the authorized bands between 415 kHz and 535 kHz shall be able to send and receive class F1B or J2B emissions on at least two digital selective calling channels necessary for their service.

51.28 C2 – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

51.29 § 14 All ship stations equipped with digital selective calling apparatus to work in the authorized bands between 1 606.5 kHz and 4 000 kHz shall be able to: (WRC-03)

51.30 a) send and receive class F1B or J2B emissions on the frequency 2 187.5 kHz;

51.31 b) in addition, send and receive class F1B or J2B emissions on other digital selective calling frequencies in this band necessary to carry out their service.

51.32 C3 – Bands between 4 000 kHz and 27 500 kHz

51.33 § 15 All ship stations equipped with digital selective calling apparatus to work in the authorized bands between 4 000 kHz and 27 500 kHz shall be able to:

51.34 a) send and receive class F1B or J2B emissions on the frequencies designated for digital selective distress calling in each of the maritime HF bands in which they are operating (see also No. 32.9);

51.35 b) send and receive class F1B or J2B emissions on an international calling channel (specified in Recommendation ITU-R M.541-11) in each of the HF maritime mobile bands necessary for their service; (WRC-23)

51.36 c) send and receive class F1B or J2B emissions on other digital selective calling channels in each of the HF maritime mobile bands necessary for their service.

51.37 C4 – Bands between 156 MHz and 174 MHz

51.38 § 16 All ship stations equipped with apparatus for digital selective calling to work in the authorized bands between 156 MHz and 174 MHz shall be able to send and receive class G2B emissions on the frequency 156.525 MHz.

51.39 CA – *Ship stations using narrow-band direct-printing telephony*

51.40 § 17 1) All ship stations using narrow-band direct-printing telephony equipment for general traffic should be able to send and receive on frequencies designated for narrow-band direct-printing telephony in the frequency bands in which they are operating. (WRC-23)

51.41 2) The characteristics of the narrow-band direct-printing equipment should be in accordance with the most recent versions of Recommendations ITU-R M.476, ITU-R M.625 and ITU-R M.627. (WRC-23)

51.42 CA1 – Bands between 415 kHz and 535 kHz

51.43 § 18 All ship stations equipped with narrow-band direct-printing telegraphy apparatus to work in the authorized bands between 415 kHz and 535 kHz shall be able to:

51.44 a) send and receive class F1B or J2B emissions for general traffic on the working frequencies necessary to carry out their service; (WRC-23)

51.45 b) receive class F1B emissions on 518 kHz, if complying with the provisions of Chapter VII.

51.46 CA2 – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

51.47 § 19 All ship stations equipped with narrow-band direct-printing telegraphy apparatus to work in the authorized bands between 1 606.5 kHz and 4 000 kHz shall be able to send and receive class F1B or J2B emissions on working frequencies necessary to carry out their service. (WRC-03)

51.48 CA3 – Bands between 4 000 kHz and 27 500 kHz

51.49 § 20 All ship stations equipped with narrow-band direct-printing telegraphy apparatus for general traffic to work in the authorized bands between 4 000 kHz and 27 500 kHz should be able to send and receive class F1B or J2B emissions on working frequencies in each of the HF maritime mobile bands necessary to carry out their service.

All ship stations equipped with narrow-band direct-printing telegraphy apparatus for receiving maritime safety information (MSI) to work in the authorized bands between 4 000 kHz and 27 500 kHz shall be able to receive class F1B or J2B emissions on working frequencies in each of the HF maritime mobile bands necessary to carry out their service. (WRC-23)

51.49A *Cbis – Ship stations using the automatic connection system* (WRC-23)

51.49B The characteristics of the automatic connection system should be in accordance with the most recent versions of Recommendations ITU-R M.493 and ITU-R M.541. (WRC-23)

51.50 *D – Ship stations using radiotelephony***51.51** D1 – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

51.52 § 21 All ship stations equipped with radiotelephony apparatus to work in the authorized bands between 1 606.5 kHz and 2 850 kHz shall be able to: (WRC-03)

51.53 a) send class J3E emissions on a carrier frequency of 2 182 kHz and receive class J3E emissions on a carrier frequency of 2 182 kHz, except for such apparatus as is referred to in No. **51.56**; (WRC-07)

51.54 b) send, in addition, J3E emissions on at least two working frequencies¹;

51.55 c) receive, in addition, J3E emissions on all other frequencies necessary for their service.

51.56 § 22 The provisions of Nos. **51.54** and **51.55** do not apply to apparatus provided solely for distress, urgency and safety purposes.

51.57 D2 – Bands between 4 000 kHz and 27 500 kHz

51.58 § 23 All ship stations equipped with radiotelephony to work in the authorized bands between 4 000 kHz and 27 500 kHz and which do not comply with the provisions of Chapter **VII** should be able to send and receive on the carrier frequencies 4 125 kHz and 6 215 kHz. However, all ship stations which comply with the provisions of Chapter **VII** shall be able to send and receive on the carrier frequencies designated in Article **31** for distress and safety traffic by radiotelephony for the frequency bands in which they are operating. (WRC-07)

51.59 D3 – Bands between 156 MHz and 174 MHz

51.60 § 24 All ship stations equipped with radiotelephony to work in the authorized bands between 156 MHz and 174 MHz (see No. **5.226** and Appendix **18**) shall be able to send and receive class G3E emissions on:

51.61 a) the distress, safety and calling frequency 156.8 MHz;

51.62 b) the primary intership frequency 156.3 MHz;

51.63 c) the intership navigation safety frequency 156.65 MHz;

51.64 d) all the frequencies necessary for their service.

51.64A *E – Ship stations receiving data transmissions* (WRC-23)

51.64B E1 – Bands between 415 kHz and 535 kHz (WRC-23)

51.64C § 24A All ship stations equipped with NAVDAT apparatus for receiving digital data transmissions in the authorized bands between 415 kHz and 535 kHz shall be capable of receiving class W7D emissions on 500 kHz, if complying with the provisions of Chapter **VII**. (WRC-23)

¹ **51.54.1** In certain areas, administrations may reduce this requirement to one working frequency.

51.64D E2 – Bands between 4 000 kHz and 27 500 kHz (WRC-23)

51.64E § 24B All ship stations equipped with NAVDAT apparatus for receiving digital data transmissions in the authorized bands between 4 000 kHz and 27 500 kHz shall be capable of receiving class W7D emissions, if complying with the provisions of Chapter VII. (WRC-23)

Section II – Maritime mobile-satellite service

51.65 § 25 The energy radiated by receiving apparatus shall be reduced to the lowest practical value and shall not cause harmful interference to other stations.

51.66 § 26 Administrations shall take all practicable steps necessary to ensure that the operation of any electrical or electronic apparatus installed in ship earth stations does not cause harmful interference to the essential radio services of stations which are operating in accordance with the provisions of these Regulations.

Section III – Stations on board aircraft communicating with stations of the maritime mobile service and the maritime mobile-satellite service

51.67 *A – General provisions*

51.68 § 27 1) Stations on board aircraft may communicate with stations of the maritime mobile or maritime mobile-satellite services. They shall conform to those provisions of these Regulations which relate to these services.

51.69 2) For this purpose stations on board aircraft should use the frequencies allocated to the maritime mobile or maritime mobile-satellite services.

51.70 3) Stations on board aircraft, when handling public correspondence with stations of the maritime mobile service or of the maritime mobile-satellite service, shall comply with all the provisions applicable to the handling of public correspondence in the maritime mobile or maritime mobile-satellite services (see particularly Articles 53, 54, 55, 57 and 58).

51.71 § 28 In the case of communication between stations on board aircraft and stations of the maritime mobile service, radiotelephone calling may be renewed as specified in the most recent version of Recommendation ITU-R M.1171 and radiotelegraph calling may be renewed after an interval of five minutes, notwithstanding the procedure contained in the most recent version of Recommendation ITU-R M.1170. (WRC-07)

51.72 *B – Provisions relating to the use of frequencies between 156 MHz and 174 MHz*

51.73 § 29 1) Having regard to interference which may be caused by aircraft stations at high altitudes, frequencies in the maritime mobile bands above 30 MHz shall not be used by aircraft stations, with the exception of those frequencies between 156 MHz and 174 MHz specified in Appendix 18 which may be used provided that the following conditions are observed:

51.74 a) the altitude of aircraft stations shall not exceed 300 m (1 000 feet), except for reconnaissance aircraft participating in ice-breaking operations, where an altitude of 450 m (1 500 feet) is allowed;

51.75 b) the mean power of aircraft station transmitters shall not exceed 5 W; however, a power of 1 W or less shall be used to the maximum extent possible;

51.76 c) aircraft stations shall use the channels designated for this purpose in Appendix 18;

51.77 d) except as provided in No. 51.75, aircraft station transmitters shall comply with the technical characteristics given in Recommendation ITU-R M.489-2;

51.78 e) the communications of an aircraft station shall be brief and limited to operations in which stations of the maritime mobile service are primarily involved and where direct communication between the aircraft and the ship or coast station is required.

51.79 2) The frequency 156.3 MHz may be used by stations on board aircraft for safety purposes. It may also be used for communication between ship stations and stations on board aircraft engaged in coordinated search and rescue operations (see Appendix 15). (WRC-07)

51.80 3) The frequency 156.8 MHz may be used by stations on board aircraft for safety purposes only (see Appendix 15). (WRC-07)

ARTICLE 52

Special rules relating to the use of frequencies

Section I – General provisions

52.1 A – Single-sideband radiotelegraph transmissions

52.2 § 1 1) Where these provisions specify A1A emission, class A1B or J2A emissions shall be considered equivalent.

52.3 2) Where these provisions specify class F1B emission, class J2B and J2D emissions shall be considered equivalent. However, class J2D emission shall not be used with the HF distress and safety frequencies listed in Appendix 15.

52.4 B – Bands between 415 kHz and 535 kHz

52.5 (SUP - WRC-07)

52.6 § 3 1) In the maritime mobile service, no assignments shall be made on the frequency 518 kHz other than for transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of automatic narrow-band direct-printing telephony (international NAVTEX system). In the maritime mobile service, no assignments shall be made on the frequency 500 kHz other than for transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of the international NAVDAT system. (WRC-23)

52.7 2) In the maritime mobile service, the frequency 490 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing telephony. (WRC-03)

52.8 C – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

52.9 § 4 1) In Region 1, frequencies assigned to stations operating in the bands between 1 850 kHz and 3 800 kHz (see Article 5) should, whenever possible, be in accordance with the following subdivision:

- 1 850-1 950 kHz: Coast stations, single-sideband radiotelephony.
- 1 950-2 045 kHz: Ship stations, single-sideband radiotelephony.
- 2 194-2 262.5 kHz: Ship stations, single-sideband radiotelephony.
- 2 262.5-2 498 kHz: Intership, single-sideband radiotelephony.
- 2 502-2 578 kHz: Ship stations, narrow-band direct-printing telephony.

- 2 578-2 850 kHz: Coast stations, narrow-band direct-printing telegraphy and single-sideband radiotelephony.
- 3 155-3 200 kHz: Ship stations, narrow-band direct-printing telegraphy.
- 3 200-3 340 kHz: Ship stations, single-sideband radiotelephony.
- 3 340-3 400 kHz: Intership, single-sideband radiotelephony.
- 3 500-3 600 kHz: Intership, single-sideband radiotelephony.
- 3 600-3 800 kHz: Coast stations, single-sideband radiotelephony.

52.10 2) In Region 1, frequencies assigned to stations operating in the bands listed below shall be in accordance with the following subdivision:

- 1 606.5-1 625 kHz: Coast stations, narrow-band direct-printing telegraphy, digital selective calling.
- 1 635-1 800 kHz: Coast stations, single-sideband radiotelephony.
- 2 045-2 141.5 kHz: Ship stations, single-sideband radiotelephony.
- 2 141.5-2 160 kHz: Ship stations, narrow-band direct-printing telegraphy, digital selective calling.

52.11 § 5 In Regions 2 and 3, the carrier frequencies 2 635 kHz (assigned frequency 2 636.4 kHz) and 2 638 kHz (assigned frequency 2 639.4 kHz) are used as single-sideband intership radiotelephony working frequencies in addition to the frequencies prescribed for common use in certain services. The carrier frequencies 2 635 kHz and 2 638 kHz should be used with class J3E emissions only. In Region 3 these frequencies are protected by a guardband between 2 634 kHz and 2 642 kHz.

52.12 *D – Bands between 4 000 kHz and 27 500 kHz*

52.13 § 6 Bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz (see Article 5) are subdivided into categories and sub-bands as indicated in Appendix 17.

52.13A § 6A In the maritime mobile service, no assignments shall be made on the frequency 4 226 kHz other than for transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of the international NAVDAT system. (WRC-23)

52.14 *E – Bands between 156 MHz and 174 MHz*

52.15 § 7 The ship movement service should be operated only on frequencies allocated to the maritime mobile service in the band 156-174 MHz.

Section II – (Number not used)

52.16 to 52.93 (SUP - WRC-07)

Section III – Use of frequencies for narrow-band direct-printing telegraphy**52.94***A – General*

52.95 § 44 Frequencies assigned to coast stations for narrow-band direct-printing telegraphy shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-07)

52.96*B – Bands between 415 kHz and 535 kHz*

52.97 § 45 All ship stations equipped with narrow-band direct-printing apparatus for general traffic to work in the authorized bands between 415 kHz and 535 kHz should be able to send and receive class F1B or J2B emissions as specified in No. **51.44**. Additionally, ship stations complying with the provisions of Chapter **VII** shall be able to receive class F1B emissions on 518 kHz (see No. **51.45**). (WRC-23)

52.98

(SUP - WRC-03)

52.99*C – Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

52.100 § 46 1) All ship stations equipped with narrow-band direct-printing telegraph apparatus to work in the authorized bands between 1 606.5 kHz and 4 000 kHz shall be able to send and receive class F1B or J2B emissions on at least two working frequencies. (WRC-03)

52.101

2) Narrow-band direct-printing telegraphy is forbidden in the frequency band 2 170-2 194 kHz. (WRC-23)

52.102*D – Bands between 4 000 kHz and 27 500 kHz*

52.103 § 47 All ship stations equipped with narrow-band direct-printing telegraph apparatus for general traffic to work in the authorized bands between 4 000 kHz and 27 500 kHz should be able to send and receive class F1B or J2B emissions as specified in No. **51.49**. All ship stations equipped with narrow-band direct-printing telegraph apparatus for receiving MSI to work in the authorized frequency bands between 4 000 kHz and 27 500 kHz shall be able to receive class F1B or J2B emissions as specified in No. **51.49**. The assignable frequencies are indicated in Appendices **15** and **17**. (WRC-23)

52.104 § 48 Coast stations employing class F1B emissions and operating in the bands exclusively allocated to the maritime mobile service between 4 000 kHz and 27 500 kHz shall at no time use mean powers in excess of the following:

<i>Band</i>	<i>Maximum mean power</i>
4 MHz	5 kW
6 MHz	5 kW
8 MHz	10 kW
12 MHz	15 kW
16 MHz	15 kW
18/19 MHz	15 kW
22 MHz	15 kW
25/26 MHz	15 kW

52.105 1) In all bands, the working frequencies for ship stations using narrow-band direct-printing telegraphy at speeds not exceeding 100 Bd for FSK and 200 Bd for PSK, including those paired with the working frequencies assignable to coast stations (see Appendix 17), are spaced 0.5 kHz apart. The frequencies assignable to ship stations which are paired with those used by coast stations are shown in Appendix 17. The frequencies assignable to ship stations which are not paired with those used by coast stations are shown in Appendix 17.

52.106 (SUP - WRC-03)

52.107 2) Each administration shall, if necessary, assign to each ship station under its jurisdiction and employing non-paired narrow-band direct-printing telegraphy one or more frequencies reserved for this purpose and shown in Appendix 17.

52.108 *E – Bands between 156 MHz and 174 MHz*

52.109 § 49 All ship stations equipped with direct-printing telegraph apparatus may work in the authorized bands between 156 MHz and 174 MHz and shall conform to the provisions of Appendix 18.

Section IV – Use of frequencies for digital selective-calling

52.110 *A – General*

52.111 § 50 The provisions described in this Section are applicable to calling and acknowledgement, when digital selective-calling techniques are used, except in cases of distress, urgency and safety, to which the provisions of Chapter VII apply. When an automatic connection system (ACS) is used, the provisions of Section IVA should apply. (WRC-23)

52.112 § 51 The characteristics of the digital selective-calling equipment shall be in accordance with Recommendation ITU-R M.541-11 and should be in accordance with the most recent version of Recommendation ITU-R M.493. (WRC-23)

52.113 § 52 The frequencies on which coast stations provide services using digital selective-calling techniques shall be indicated in the List of Coast Stations and Special Service Stations (List IV), which shall also supply any other useful information concerning such services. (WRC-07)

52.114

B – Bands between 415 kHz and 526.5 kHz

B1 – Mode of operation

52.115 § 53 1) The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 415 kHz and 526.5 kHz shall be F1B.

52.116 2) When transmitting digital selective calls and acknowledgements in the bands between 415 kHz and 526.5 kHz, coast stations should use the minimum power necessary to cover their service area.

52.117 § 54 Transmissions of digital selective calls and acknowledgements by ship stations shall be limited to a mean power of 400 W.

B2 – Call and acknowledgement

52.118 § 55 For call and acknowledgement by digital selective-calling techniques, an appropriate channel shall be used.

52.119 § 56 The international digital selective-calling frequency 455.5 kHz may be assigned to any coast station. In order to reduce interference on this frequency, it may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within these bands the ship station is maintaining watch.

52.120 § 57 The international digital selective-calling frequency 458.5 kHz may be used by any ship station. In order to reduce interference on this frequency, it shall only be used when calling cannot be made on national frequencies assigned to the coast station.

52.121 § 58 The frequency to be used for transmission of an acknowledgement shall normally be the frequency paired with the calling frequency used.

B3 – Watch

52.122 § 59 1) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 415 kHz and 526.5 kHz should, during its hours of service, maintain automatic digital selective-calling watch on appropriate national or international calling frequencies. The hours and frequencies shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.123 2) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 415 kHz and 526.5 kHz should, when within the coverage area of coast stations providing services using digital selective-calling techniques in these bands, maintain an automatic digital selective-calling watch on one or more appropriate digital selective-calling frequencies within these bands, taking into account the digital selective-calling frequencies operated by the coast stations.

52.124 *C – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)*

C1 – Mode of operation

52.125 § 60 1) The class of emission to be used for digital selective-calling and acknowledgement in the bands between 1 606.5 kHz and 4 000 kHz shall be F1B. (WRC-03)

52.126 2) Coast stations should, when transmitting digital selective calls and acknowledgements in the bands between 1 606.5 kHz and 4 000 kHz, use the minimum power necessary to cover their service area. (WRC-03)

52.127 3) In Region 1, transmissions of digital selective calls and acknowledgements by ship stations shall be limited to a mean power of 400 W.

C2 – Call and acknowledgement

52.128 § 61 1) When calling a coast station by digital selective-calling techniques, ship stations should use for the call, in order of preference:

52.129 a) a national digital selective-calling channel on which the coast station is maintaining watch;

52.130 b) subject to the provisions of No. **52.131**, the international digital selective-calling frequency 2 189.5 kHz.

52.131 2) The international digital selective-calling frequency 2 189.5 kHz may be assigned to any ship station. In order to reduce interference on this frequency, it may be used as a general rule by ship stations to call coast stations of another nationality.

52.132 3) A ship station calling another ship station by digital selective-calling techniques should use the frequency 2 177 kHz for the call. Acknowledgements of such calls should also be made on this frequency.

52.133 § 62 1) When calling ship stations by digital selective-calling techniques, coast stations should use for the call, in the order of preference:

52.134 a) a national digital selective-calling channel on which the coast station is maintaining watch;

52.135 b) subject to the provisions of No. **52.136**, the international digital selective-calling frequency 2 177 kHz.

52.136 2) The international digital selective-calling frequency 2 177 kHz may be assigned to any coast station. In order to reduce interference on this frequency, it may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within the bands between 1 606.5 kHz and 4 000 kHz the ship station is maintaining watch. (WRC-03)

52.137 § 63 The frequency to be used for transmission of an acknowledgement shall normally be the frequency paired with the frequency used for the call received, as indicated in the List of Coast Stations and Special Service Stations (List IV) (see also No. **52.113**). (WRC-07)

C3 – Watch

52.138 § 64 1) The provisions detailed in this Sub-section are applicable to watch-keeping by digital selective-calling, except for distress, urgency and safety purposes, to which the provisions of Section III of Article 31 apply.

52.139 2) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 1 606.5 kHz and 4 000 kHz should, during its hours of service, maintain automatic digital selective-calling watch on appropriate national or international calling frequencies. The hours and frequencies shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.140 3) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 1 606.5 kHz and 4 000 kHz should, when within the coverage area of coast stations providing services using digital selective-calling techniques in these bands, maintain an automatic digital selective-calling watch on one or more appropriate digital selective-calling frequencies within these bands, taking into account the digital selective-calling frequencies operated by the coast stations. (WRC-03)

52.141 *D – Bands between 4 000 kHz and 27 500 kHz*

D1 – Mode of operation

52.142 § 65 1) The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 4 000 kHz and 27 500 kHz shall be F1B.

52.143 2) When transmitting digital selective calls and acknowledgements in the bands between 4 000 kHz and 27 500 kHz, coast stations shall at no time use a mean power in excess of the following values:

<i>Band</i>	<i>Maximum mean power</i>
4 MHz	5 kW
6 MHz	5 kW
8 MHz	10 kW
12 MHz	15 kW
16 MHz	15 kW
18/19 MHz	15 kW
22 MHz	15 kW
25/26 MHz	15 kW

52.144 3) Transmissions of digital selective calls and acknowledgements by ship stations in the bands between 4 000 kHz and 27 500 kHz shall be limited to a mean power of 1.5 kW.

D2 – Call and acknowledgement

52.145 § 66 A station calling another station by digital selective-calling techniques within the authorized bands between 4 000 kHz and 27 500 kHz should choose an appropriate digital selective-calling frequency, taking into account propagation characteristics.

52.146 § 67 1) When calling a coast station by digital selective-calling techniques on frequencies within the authorized bands between 4 000 kHz and 27 500 kHz, ship stations should use for the call, in order of preference:

52.147 a) a national digital selective-calling channel on which the coast station is maintaining watch;

52.148 b) subject to the provisions of No. **52.149**, one of the international digital selective-calling frequencies. (WRC-07)

52.149 2) The international digital selective-calling frequencies shall be as indicated in Recommendation ITU-R M.541-11 and may be used by any ship station. In order to reduce interference on these frequencies, they shall only be used when calling cannot be made on nationally assigned frequencies. (WRC-23)

52.150 § 68 1) When calling ship stations by digital selective-calling techniques on frequencies within the bands between 4 000 kHz and 27 500 kHz coast stations should use for the call, in order of preference:

52.151 a) a national digital selective-calling channel on which the coast station is maintaining watch;

52.152 b) subject to the provisions of No. **52.153**, one of the international digital selective-calling frequencies. (WRC-07)

52.153 2) The international digital selective-calling frequencies shall be as indicated in Recommendation ITU-R M.541-11 and may be assigned to any coast station. In order to reduce interference on these frequencies, they may be used as a general rule by coast stations to call ships of another nationality, or in cases where it is not known on which digital selective-calling frequencies within the frequency bands concerned the ship station is maintaining watch. (WRC-23)

D3 – Watch

52.154 § 69 1) The provisions detailed in this Sub-section are applicable to watch-keeping by digital selective-calling, except for distress, urgency and safety purposes, to which the provisions of Section III of Article **31** apply.

52.155 2) A coast station providing international public correspondence service using digital selective-calling techniques within the bands between 4 000 kHz and 27 500 kHz should, during its hours of service, maintain automatic digital selective-calling watch on the appropriate digital selective-calling frequencies as indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.156 3) Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 4 000 kHz and 27 500 kHz should maintain automatic digital selective-calling watch on appropriate digital selective-calling frequencies within these bands, taking into account propagation characteristics and the calling frequencies for coast stations providing service using digital selective-calling techniques.

52.157*E – Bands between 156 MHz and 174 MHz*

E1 – Mode of operation

52.158 § 70 The class of emission to be used for digital selective-calling and acknowledgement in the authorized bands between 156 MHz and 174 MHz shall be G2B.

E2 – Call and acknowledgement

52.159 § 71 1) The frequency 156.525 MHz is an international frequency in the maritime mobile service used for distress, urgency, safety and calling by digital selective-calling techniques (see Nos. **33.8** and **33.31** and Appendix **15**). (WRC-07)

52.160 2) Calling by digital selective-calling techniques within the authorized bands between 156 MHz and 174 MHz, from ship to coast station, from coast station to ship and from ship to ship should, as a general rule, be made on the digital selective-calling frequency 156.525 MHz.

E3 – Watch

52.161 § 72 Information concerning watch-keeping by automatic digital selective-calling on the frequency 156.525 MHz by coast stations shall be given in the List of Coast Stations and Special Service Stations (List IV) (see also No. **31.13**). (WRC-07)

52.162 § 73 Ship stations equipped with apparatus for digital selective-calling to work in the authorized bands between 156 MHz and 174 MHz should, while at sea, maintain an automatic digital selective-calling watch on the frequency 156.525 MHz (see also No. **31.17**).

Section IVA – Use of frequencies for the automatic connection system (WRC-23)**52.162A***A – General* (WRC-23)

52.162B § 73A An automatic connection system (ACS) is an automatic connection function using digital selective calling (DSC) for shore-to-ship, ship-to-shore or ship-to-ship communication with the most appropriate working frequency (or channel) in the MF and HF bands of the maritime mobile service.

The procedure for ACS shall not interrupt a reliable watch on a 24-hour basis on appropriate DSC distress alerting frequencies unless the equipment is transmitting.

When an ACS is utilized, it should be in accordance with the most recent versions of Recommendations ITU-R M.493 and ITU-R M.541. (WRC-23)

52.162C *B – Bands between 1 606.5 kHz and 4 000 kHz* (WRC-23)

52.162D § 73B The automatic connection system (ACS) frequency used for transmitting and receiving for both ship stations and coast stations is 2 174.5 kHz. (WRC-23)

52.162E *C – Bands between 4 000 kHz and 27 500 kHz* (WRC-23)

52.162F § 73C The automatic connection system (ACS) frequencies used for transmitting and receiving for both ship stations and coast stations are 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz. (WRC-23)

Section V – Use of frequencies for wide-band telegraphy, facsimile, special transmission systems and oceanographic data transmissions

52.163 *A – Wide-band telegraphy, facsimile and special transmission systems*

52.164 A1 – Bands between 1 606.5 kHz and 4 000 kHz (WRC-03)

52.165 § 74 In Region 2, the frequencies in the band 2 068.5-2 078.5 kHz are assigned to ship stations using wide-band telegraphy, facsimile and special transmission systems. The provisions of No. **52.171** apply.

52.166 A2 – Bands between 4 000 kHz and 27 500 kHz

52.167 § 75 In all bands, the working frequencies for ship stations equipped to use wide-band telegraphy, facsimile and special transmission systems are spaced 4 kHz apart. The assignable frequencies are shown in Appendix 17.

52.168 § 76 1) Each administration shall assign to each ship station under its jurisdiction and employing wide-band telegraphy, facsimile and special transmission systems one or more series of the working frequencies reserved for this purpose shown in Appendix 17. The total number of series assigned to each ship station shall be determined by traffic requirements.

52.169 2) When ship stations employing wide-band telegraphy, facsimile and special transmission systems are assigned less than the total number of working frequencies in a band, the administration concerned shall assign working frequencies to such ships in accordance with an orderly system of rotation that will ensure approximately the same number of assignments on any one working frequency.

52.170 3) However, within the limits of the bands given in Appendix 17, administrations may, to meet the needs of specific systems, assign frequencies in a different manner from that shown in Appendix 17. Nevertheless administrations shall take into account, as far as possible, the provisions of Appendix 17, concerning channelling and the 4 kHz spacing.

52.171 § 77 Ship stations equipped for wide-band telegraphy, facsimile and special transmission systems may, in the frequency bands reserved for such use, employ any class of emission provided that such emissions can be contained within the wide-band channels indicated in Appendix 17. However, the use of A1A Morse telegraphy and telephony is excluded except for circuit alignment purposes.

52.172 § 78 Coast radiotelegraph stations employing multichannel telegraph emissions and operating in the bands allocated exclusively to the maritime mobile service between 4 000 kHz and 27 500 kHz shall at no time use a mean power in excess of 2.5 kW per 500 Hz bandwidth.

52.173 *B – Oceanographic data transmission systems*

52.174 § 79 In all bands, the assignable frequencies for oceanographic data transmissions are spaced 0.3 kHz apart. The assignable frequencies are shown in Appendix 17.

52.175 § 80 The frequency bands for oceanographic data transmission systems (see Appendix 17) may also be used by buoy stations for oceanographic data transmission and by stations interrogating these buoys.

Section VI – Use of frequencies for radiotelephony

52.176 *A – General*

52.177 § 81 Except with regard to the provisions of Article 11 concerning notification and recording of frequencies, when designating frequencies for single-sideband radiotelephony the carrier frequency is always to be designated. The assigned frequency shall be 1 400 Hz higher than the carrier frequency.

52.178 § 82 Coast stations shall not occupy idle radiotelephone channels by emitting identification signals, such as those generated by call slips or tapes. Exceptionally, a coast station, when requested by a ship station for the purpose of establishing a radiotelephone call, may emit a receiver tuning signal of not more than 10 s duration.

52.179 § 83 However, coast stations in automatic service in the UHF band may emit marking signals. The emission power of the signals shall however be limited to the minimum value necessary for effective operation of the signalling. Such emissions shall not cause harmful interference to the maritime mobile service in other countries.

52.180 § 84 The frequencies of transmission (and reception when these frequencies are in pairs as in the case of duplex radiotelephony) assigned to each coast station shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-07)

52.181 § 85 Single-sideband apparatus in radiotelephone stations of the maritime mobile service operating in the frequency bands allocated to this service between 1 606.5 kHz and 4 000 kHz and in the frequency bands allocated exclusively to this service between 4 000 kHz and 27 500 kHz shall satisfy the technical and operational conditions specified in Recommendation ITU-R M.1173-1. (WRC-15)

52.182 *B – Bands between 1 606.5 kHz and 4 000 kHz* (WRC-03)

B1 – Mode of operation of stations

52.183 § 86 1) Unless otherwise specified in the Radio Regulations (see Nos. **51.53**, **52.188**, **52.189** and **52.199**), the class of emission to be used in the bands between 1 606.5 kHz and 4 000 kHz shall be J3E. (WRC-07)

52.184 2) The peak envelope power of coast radiotelephone stations operating in the authorized bands allocated between 1 606.5 kHz and 4 000 kHz shall not exceed: (WRC-03)

52.185 – 5 kW for coast stations located north of latitude 32° N;

52.186 – 10 kW for coast stations located south of latitude 32° N.

52.187 3) The normal mode of operation for each coast station shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.188 4) Transmissions in the bands 2 170-2 173.5 kHz and 2 190.5-2 194 kHz with the carrier frequency 2 170.5 kHz and the carrier frequency 2 191 kHz, respectively, are limited to class J3E emissions and are limited to a peak envelope power of 400 W. (WRC-07)

B2 – Call and reply

52.189 § 87 1) The frequency 2 182 kHz¹ is an international distress frequency for radiotelephony (see Appendix **15** and Resolution **354 (Rev.WRC-23)**). (WRC-23)

52.190 2) The frequency 2 182 kHz may also be used:

52.191 a) for call and reply in accordance with the provisions of Article **57**;

52.192 b) by coast stations to announce the transmission, on another frequency, of traffic lists as specified in Recommendation ITU-R M.1171-1. (WRC-23)

52.193 3) In addition, an administration may assign to its stations other frequencies for call and reply.

¹ **52.189.1** Where administrations provide at their coast stations a watch on 2 182 kHz for receiving class J3E emissions as well as class A3E and H3E emissions, ship stations may call those coast stations for safety purposes using class H3E or J3E emissions.

52.194 § 88 To facilitate use of the frequency 2 182 kHz for distress purposes, all transmissions on 2 182 kHz shall be kept to a minimum.

52.195 § 89 1) Before transmitting on the carrier frequency 2 182 kHz, a station shall, in accordance with Recommendation ITU-R M.1171-1, listen on this frequency for a reasonable period to make sure that no distress traffic is being sent. (WRC-23)

52.196 2) The provisions of No. **52.195** do not apply to stations in distress.

B3 – Traffic

52.197 § 90 1) Coast stations which use 2 182 kHz for calling shall be able to use at least one other frequency in the authorized bands between 1 606.5 kHz and 2 850 kHz. (WRC-03)

52.198 2) Coast stations authorized to use radiotelephony on one or more frequencies other than 2 182 kHz in the authorized bands between 1 606.5 kHz and 2 850 kHz shall use class J3E emissions on those frequencies (see also No. **52.188**). (WRC-03)

52.199 3) Coast stations open to the public correspondence service on one or more frequencies between 1 606.5 kHz and 2 850 kHz shall also be capable of transmitting class H3E and J3E emissions with a carrier frequency of 2 182 kHz, and of receiving class A3E, H3E and J3E emissions with a carrier frequency of 2 182 kHz. (WRC-03)

52.200 (SUP - WRC-23)

52.201 5) Working frequencies of coast stations shall be chosen in such a manner as to avoid interference with other stations.

B4 – Additional provisions applying to Region 1

52.202 § 91 The peak envelope power of ship radiotelephone stations operating in the authorized bands between 1 606.5 kHz and 2 850 kHz shall not exceed 400 W. (WRC-03)

52.203 § 92 1) All stations on ships making international voyages should be able to use:

52.204 a) the following ship-to-shore working frequency, if required by their service:

52.205 – carrier frequency 2 045 kHz (assigned frequency 2 046.4 kHz) for class J3E emissions;

52.206 b) the following intership frequency, if required by their service:

52.207 – carrier frequency 2 048 kHz (assigned frequency 2 049.4 kHz) for class J3E emissions;

52.208 This frequency may be used as an additional ship-to-shore frequency.

52.209 (SUP - WRC-07)

52.210 § 93 1) Ships frequently exchanging correspondence with a coast station of a nationality other than their own may use the same frequencies as ships of the nationality of the coast station:

52.211 – where mutually agreed by the administrations concerned; or

52.212 – where the facility is open to ships of all nationalities by virtue of a note against each of the frequencies concerned in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.213 2) In exceptional circumstances, if frequency usage according to Nos. **52.208** to **52.208** or No. **52.210** is not possible, a ship station may use one of its own assigned national ship-to-shore frequencies for communication with a coast station of another nationality, under the express condition that the coast station as well as the ship station shall take precautions, in accordance with Recommendation ITU-R M.1171-1, to ensure that the use of such a frequency will not cause harmful interference to the service for which the frequency in question is authorized. (WRC-23)

52.214 § 94 The following ship-to-shore frequencies:

- carrier frequency 2 051 kHz (assigned frequency 2 052.4 kHz),
- carrier frequency 2 054 kHz (assigned frequency 2 055.4 kHz), and
- carrier frequency 2 057 kHz (assigned frequency 2 058.4 kHz),

may be assigned to coast stations as receiving frequencies.

B5 – Additional provisions applying to Regions 2 and 3

52.215 § 95 All stations on ships making international voyages should, if required by their service, be able to use the intership carrier frequencies:

2 635 kHz (assigned frequency 2 636.4 kHz) or

2 638 kHz (assigned frequency 2 639.4 kHz).

The conditions of use of these frequencies are specified in No. **52.11**.

52.216 *C – Bands between 4 000 kHz and 27 500 kHz*

C1 – Mode of operation of stations

52.217 § 96 1) The class of emission to be used for analogue radiotelephony in the bands between 4 000 kHz and 26 175 kHz shall be J3E; for digital telecommunications in those bands, the class of emission shall be J2D. (WRC-03)

52.218 2) The normal mode of operation of each coast station is indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.219 3) Coast stations employing class J3E or J2D emissions in accordance with No. **52.217** in the bands between 4 000 kHz and 27 500 kHz shall use the minimum power necessary to cover their service area and shall at no time use a peak envelope power in excess of 10 kW per channel.

52.220 4) Ship stations employing class J3E or J2D emissions in accordance with No. **52.217** in the bands between 4 000 kHz and 27 500 kHz shall at no time use a peak envelope power in excess of 1.5 kW per channel.

C2 – Call and reply

52.220A 5) Administrations should encourage the coast stations and ship stations under their jurisdiction to use digital selective calling techniques for call and reply. (WRC-2000)

52.220B § 96A When calling by radiotelephony is necessary, it should be done (in order of preference): (WRC-2000)

52.220C 1) on the working frequencies assigned to the coast stations; or (WRC-2000)

52.220D 2) when this is not possible, on the calling frequencies listed under No. **52.221** or **52.221A** below. (WRC-2000)

52.221 § 97 1) Ship stations may use the following carrier frequencies for calling in radiotelephony:

4 125 kHz^{2, 3, 4}

6 215 kHz^{3, 4}

8 255 kHz

8 291 kHz⁴ (see also No. **52.221A**)

12 290 kHz⁴ (see also No. **52.221A**)

16 420 kHz⁴ (see also No. **52.221A**)

18 795 kHz

22 060 kHz

25 097 kHz

(WRC-15)

² **52.221.1** In the United States, the carrier frequency 4 125 kHz is also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided the peak envelope power of such stations does not exceed 1 kW (see also No. **52.222.2**).

³ **52.221.2** The carrier frequencies 4 125 kHz and 6 215 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for call and reply purposes, provided that the peak envelope power of such stations does not exceed 1 kW. The use of these frequencies for working purposes is not permitted (see also No. **52.221.1**). (WRC-07)

⁴ **52.221.3** The carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz and 16 420 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for distress and safety traffic.

52.221A 2) The carrier frequency 8 291 kHz is authorized on a simplex basis for distress and safety traffic only (see also Appendix 15). Calling on the carrier frequencies 12 290 kHz and 16 420 kHz shall be permitted only to and from rescue coordination centres (see No. 30.6.1), subject to the safeguards of Resolution 352 (WRC-03). The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW. (WRC-15)

52.222 3) Coast stations may use the following carrier frequencies for calling in radiotelephony:

4 417 kHz⁵

6 516 kHz⁵

8 779 kHz

13 137 kHz (see No. 52.222A)

17 302 kHz (see No. 52.222A)

19 770 kHz

22 756 kHz

26 172 kHz

(WRC-2000)

52.222A 4) The carrier frequencies 13 137 kHz and 17 302 kHz shall not be used as calling frequencies after 31 December 2003. The alternative carrier frequencies 12 359 kHz and 16 537 kHz may be used by ship stations and coast stations for calling on a simplex basis, provided that the peak envelope power does not exceed 1 kW. (WRC-2000)

52.223 § 98 The hours of service of coast stations open to public correspondence and the frequency or frequencies on which watch is maintained shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.224 § 99 1) Before transmitting on the carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz or 16 420 kHz, a station shall, in accordance with Recommendation ITU-R M.1171-1, listen on the frequency for a reasonable period to make sure that no distress traffic is being sent (see No. 52.221A). (WRC-23)

52.225 2) The provisions of No. 52.224 do not apply to stations in distress.

52.222.1 (SUP - WRC-07)

⁵ **52.222.2** The carrier frequencies 4 417 kHz and 6 516 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided that the peak envelope power of such stations does not exceed 1 kW. The use of 6 516 kHz for this purpose should be limited to daytime operation (see also No. 52.221.1).

C3 – Traffic

52.226 § 100 1) For the conduct of duplex telephony, the transmitting frequencies of the coast stations and of the corresponding ship stations shall be associated in pairs, as indicated in Appendix 17, except temporarily in cases where working conditions prohibit the use of paired frequencies in order to meet operational needs.

52.227 2) The frequencies to be used for the conduct of simplex radiotelephony are shown in Appendix 17, Section B. In these cases, the peak envelope power of the coast station transmitter shall not exceed 1 kW.

52.228 3) The frequencies indicated in Appendix 17 for ship station transmissions may be used by ships of any category according to traffic requirements.

52.229 4) Transmitters used for radiotelephony in the frequency bands between 4 000 kHz and 27 500 kHz shall comply with technical characteristics specified in Recommendation ITU-R M.1173-1. (WRC-15)

52.230 *D – Bands between 156 MHz and 174 MHz*

D1 – Call and reply

52.231 § 101 1) The frequency 156.8 MHz is the international frequency for distress traffic and for calling by radiotelephony when using frequencies in the authorized bands between 156 MHz and 174 MHz. The class of emission to be used for radiotelephony on the frequency 156.8 MHz shall be G3E (as specified in Recommendation ITU-R M.489-2). (WRC-07)

52.232 2) The frequency 156.8 MHz may also be used:

52.233 a) by coast and ship stations for call and reply in accordance with the provisions of Articles 54 and 57;

52.234 b) by coast stations to announce the transmission on another frequency of traffic lists, in accordance with Recommendation ITU-R M.1171-1, and important maritime information. (WRC-23)

52.235 (SUP - WRC-07)

52.236 3) Any one of the channels designated in Appendix 18 for public correspondence may be used as a calling channel if an administration so desires. Such use shall be indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.237 5) Ship and coast stations in the public correspondence service may use a working frequency, for calling purposes, as provided in Articles 54 and 57.

52.238 6) All emissions in the band 156.7625-156.8375 MHz capable of causing harmful interference to the authorized transmissions of stations of the maritime mobile service on 156.8 MHz are forbidden.

52.239 7) To facilitate the reception of distress calls and distress traffic, all transmissions on 156.8 MHz shall be kept to a minimum and shall not exceed one minute.

52.240 8) Before transmitting on the frequency 156.8 MHz, a station shall, in accordance with Recommendation ITU-R M.1171-1, listen on this frequency for a reasonable period to make sure that no distress traffic is being sent. (WRC-23)

52.241 9) The provisions of No. **52.240** do not apply to stations in distress.

52.241A 10) The frequency 156.525 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service using digital selective calling (DSC) when using frequencies in the authorized bands between 156 MHz and 174 MHz. (WRC-07)

52.241B 11) All emissions in the band 156.4875-156.5625 MHz capable of causing harmful interference to the authorized transmissions of stations of the maritime mobile service on 156.525 MHz are forbidden. (WRC-07)

52.241C 12) To facilitate the reception of distress calls and distress traffic, all transmissions on 156.525 MHz shall be kept to a minimum. (WRC-07)

D2 – Watch

52.242 § 102 1) A coast station open to the international public correspondence service should, during its hours of service, maintain watch on its receiving frequency or frequencies indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-07)

52.243 2) The method of watch on a working frequency shall be no less efficient than watch by an operator.

52.244 3) Ship stations should, where practicable, maintain watch on 156.8 MHz when within the service area of a coast station providing international maritime mobile radiotelephone service in the band 156-174 MHz. Ship stations fitted only with VHF radiotelephone equipment operating in the authorized bands between 156 MHz and 174 MHz should maintain watch on 156.8 MHz when at sea.

52.245 4) Ship stations, when in communication with a port station, may, on an exceptional basis and subject to the agreement of the administration concerned, continue to maintain watch on the appropriate port operations frequency only, provided that watch on 156.8 MHz is being maintained by the port station.

52.246 5) Ship stations, when in communication with a coast station in the ship movement service and subject to the agreement of the administration concerned, may continue to maintain watch on the appropriate ship movement service frequency only, provided that watch on 156.8 MHz is being maintained by that coast station.

52.247 § 103 A coast station in the port operations service in an area where 156.8 MHz is being used for distress, urgency or safety shall, during its working hours, keep an additional watch on 156.6 MHz or another port operations frequency indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-23)

52.248 § 104 A coast station in the ship movement service in an area where 156.8 MHz is being used for distress, urgency and safety shall, during its working hours, keep an additional watch on the ship movement frequencies indicated in the List of Coast Stations and Special Service Stations (List IV). (WRC-23)

D3 – Traffic

52.249 § 105 1) Where practicable, coast stations open to the international public correspondence service shall be capable of working with ship stations equipped for duplex or semi-duplex operation.

52.250 2) The method of working (single-frequency or two-frequency) specified in Appendix 18 for each channel should be used in the international services.

52.251 § 106 Communications in the port operations service shall be restricted to those relating to operational handling, the movement and the safety of ships and, in emergency, to the safety of persons. Messages of a public correspondence nature shall be excluded from this service.

52.252 § 107 Communications in the ship movement service shall be restricted to those relating to the movement of ships. Messages of a public correspondence nature shall be excluded from this service.

52.253 § 108 1) Coast stations which use 156.8 MHz for calling shall be able to use at least one other authorized channel in the international maritime mobile radiotelephone service in the band 156-174 MHz.

52.254 2) In the band 156-174 MHz administrations shall, where practicable, assign frequencies to coast and ship stations in accordance with the Table of transmitting frequencies given in Appendix 18 for such international services as administrations consider necessary.

52.255 (SUP - WRC-03)

52.256 3) In assigning frequencies to their coast stations, administrations should collaborate in cases where harmful interference might occur.

52.257 4) Channels are designated by numbers in the Table of transmitting frequencies given in Appendix 18.

52.258 § 109 1) In assigning frequencies to stations of authorized services, other than maritime mobile, administrations shall avoid the possibility of interference to international maritime services in the bands between 156 MHz and 174 MHz.

52.259 2) The use of channels for maritime mobile purposes other than those indicated in the Table of transmitting frequencies given in Appendix 18 shall not cause harmful interference to services which operate in accordance with that table and shall not prejudice the future development of such services.

52.260 § 110 The carrier power of ship station transmitters shall not exceed 25 W.

Section VII – Use of frequencies for data transmissions (WRC-12)

52.261

A – General (WRC-12)

52.262

Frequencies assigned to coast stations for data transmissions shall be indicated in the List of Coast Stations and Special Service Stations (List IV). This List shall also indicate any other useful information concerning the service performed by each coast station. (WRC-12)

52.262A

B – Bands between 415 kHz and 526.5 kHz (WRC-23)

B1 – Mode of operation of stations (WRC-23)

52.262B

The class of emission to be used for data transmissions in the frequency bands between 415 kHz and 526.5 kHz should be in accordance with the most recent version of Recommendation ITU-R M.2010. Coast stations and ship stations should use radio systems specified in the most recent version of Recommendation ITU-R M.2010. (WRC-23)

52.263

C – Bands between 4 000 kHz and 27 500 kHz (WRC-23)

C1 – Mode of operation of stations (WRC-23)

52.264

The class of emission to be used for data transmissions in the frequency bands between 4 000 kHz and 27 500 kHz should be in accordance with the most recent versions of Recommendations ITU-R M.1798 or ITU-R M.2058. Coast stations and ship stations should use radio systems specified in the most recent versions of Recommendations ITU-R M.1798 or ITU-R M.2058. (WRC-23)

52.265

Coast stations employing the class of emissions in accordance with No. **52.264** in the frequency bands between 4 000 kHz and 27 500 kHz shall not exceed a peak envelope power of 10 kW. (WRC-12)

52.265A

Coast stations employing the class of emission in accordance with the most recent version of Recommendation ITU-R M.2058 in the frequency bands between 4 000 kHz and 27 500 kHz shall not exceed a mean power in the following values:

<i>Band</i>	<i>Maximum mean power</i>	(WRC-23)
4 MHz	5 kW	
6 MHz	5 kW	
8 MHz	10 kW	
12 MHz	10 kW	
16 MHz	10 kW	
18/19 MHz	10 kW	
22 MHz	10 kW	

52.266

Ship stations employing the class of emissions in accordance with No. **52.264** in the frequency bands between 4 000 kHz and 27 500 kHz shall not exceed a peak envelope power of 1.5 kW. (WRC-12)

ARTICLE 53

Order of priority of communications

53.1 § 1 All stations in the maritime mobile service and the maritime mobile-satellite service shall be capable of offering four levels of priority in the following order:

- 1) Distress calls, distress messages, and distress traffic.
- 2) Urgency communications.
- 3) Safety communications.
- 4) Other communications.

53.2 § 2 In a fully automated system, where it is impracticable to offer all four levels of priority, category 1 shall receive priority until such time as intergovernmental agreements¹ remove exemptions granted for such systems from offering the complete order of priority.

¹ **53.2.1** Requirements and performance standards for radio systems and equipment for maritime distress and safety radiocommunications are developed and adopted by the International Maritime Organization (IMO).

ARTICLE 54

Selective calling

54.1 § 1 1) Selective calling is designed for automatic station calling and distress alerting or the transmission of information for the organization of traffic.

54.2 2) Selective calling is carried out using a digital selective-calling system which shall be in accordance with Recommendation ITU-R M.541-11, and may be in accordance with the most recent version of Recommendation ITU-R M.493. (WRC-23)

ARTICLE 54A

Automatic connection system

54A.1 § 1 1) An automatic connection system (ACS) using digital selective calling in MF and HF bands is designed to ensure reliable access to required radio links for mariners. (WRC-23)

54A.2 2) Automatic connection system (ACS) should be in accordance with the most recent versions of Recommendations ITU-R M.541 and ITU-R M.493. (WRC-23)

ARTICLE 55

Morse radiotelegraphy

55.1 The recommended procedure for conducting Morse radiotelegraph communications is detailed in the most recent version of Recommendation ITU-R M.1170. (WRC-07)

ARTICLE 56

Narrow-band direct-printing telegraphy

56.1 § 1 Stations using narrow-band direct-printing telegraphy shall comply with the provisions of Articles 51 and 52.

56.2 § 2 The procedures specified in Recommendation ITU-R M.492-6 shall be employed except in cases of distress, urgency, or safety, in which case alternate or non-standard procedures may be used. (WRC-07)

56.3 § 3 Before transmitting, a station shall take precautions to ensure that its emissions will not interfere with transmissions already in progress; if such interference is likely, the station shall await an appropriate break in the communications in progress. This obligation does not apply to stations where unattended operation is possible through automatic means.

56.4 § 4 1) For communication between two stations the ARQ mode should be used when available.

56.5 2) For transmissions from one coast or ship station to two or more other stations the forward-error-correcting mode should be used when available.

56.6 § 5 The services provided by each station open to public correspondence shall be indicated in the List of Coast Stations and Special Service Stations (List IV) and in the List of Ship Stations and Maritime Mobile Service Identity Assignments (List V), together with information on charging. (WRC-07)

56.7 § 6 Where transmission over the telecommunication channels open to public correspondence (excluding the telecommunication channels of the mobile service and of the mobile-satellite service and its feeder links) is involved, the provisions of the International Telecommunication Regulations and the relevant ITU-T Recommendations should be taken into account.

ARTICLE 57

Radiotelephony

57.1 § 1 The procedure detailed in Recommendation ITU-R M.1171-1 shall be applicable to radiotelephone stations, except in cases of distress, urgency or safety. (WRC-23)

57.2 § 2 The radiotelephone public correspondence service provided on ships should, if possible, be operated on a duplex basis.

57.3 § 3 1) Devices providing for the emission of a signal to indicate that a call is in progress on a channel may be used in this service on a non-interference basis to the service provided by coast stations.

57.4 2) The use of devices for continuous or repetitive calling or identification in a manually operated radiotelephony service is not permitted.

57.5 3) A station may not transmit identical information simultaneously on two or more frequencies when communicating with only one other station.

57.6 4) A station shall not emit any carrier wave between calls. However, stations in an automatically operated radiotelephone system may emit marking signals under the conditions provided for in No. **52.179**.

57.7 5) When it is necessary to spell out certain expressions, difficult words, service abbreviations, figures, etc., the phonetic spelling tables in Appendix **14** shall be used.

57.8 § 4 Calling, and signals preparatory to traffic, shall not exceed one minute when made on the carrier frequency 2 182 kHz or on 156.8 MHz, except in cases of distress, urgency or safety. (WRC-07)

57.9 § 5 When it is necessary for a ship station to send signals for testing or adjustments which are liable to interfere with the working of neighbouring coast stations, the consent of these stations shall be obtained before such signals are sent.

57.10 § 6 When it is necessary for a station to make test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals shall be kept to a minimum but in any event, shall not exceed ten seconds, and shall include the call sign or other identification of the station emitting the test signals. This call sign or other identification shall be spoken slowly and distinctly.

ARTICLE 58

Charging and accounting for maritime radiocommunications

58.1 The provisions of the International Telecommunications Regulations, taking into account ITU-T Recommendations, shall apply. (WRC-23)

CHAPTER X

Provisions for entry into force of the Radio Regulations (WRC-12)

ARTICLE 59

Entry into force and provisional application of the Radio Regulations (WRC-12)

59.1 These Regulations, which complement the provisions of the Constitution and Convention of the International Telecommunication Union, and as revised and contained in the Final Acts of WRC-95, WRC-97, WRC-2000, WRC-03, WRC-07, WRC-12, WRC-15, WRC-19 and WRC-23, shall be applied, pursuant to Article 54 of the Constitution, on the following basis. (WRC-23)

59.2 The provisions of these Regulations, as revised by WRC-95, concerning new or modified frequency allocations (including any new or modified conditions applying to existing allocations) and the related provisions of Articles **S21¹** and **S22¹**, and Appendix **S4¹**, apply provisionally as of 1 January 1997.

59.3 The other provisions of these Regulations, as revised by WRC-95 and WRC-97, apply provisionally as of 1 January 1999, with the following exceptions: (WRC-2000)

59.4 – the revised provisions for which other effective dates of application are stipulated in Resolutions:

**49 (WRC-97)², 51 (WRC-97)³, 52 (WRC-97)⁴, 54 (WRC-97)⁴,
130 (WRC-97)⁴, 533 (WRC-97)⁵, 534 (WRC-97)⁴ and 538 (WRC-97)⁴.**

59.5 The other provisions of these Regulations, as revised by WRC-2000, shall enter into force on 1 January 2002, with the following exceptions: (WRC-2000)

59.6 – the revised provisions for which other effective dates of application are stipulated in Resolutions:

**49 (Rev.WRC-2000)², 51 (Rev.WRC-2000)³, 53 (Rev.WRC-2000)⁶,
55 (WRC-2000)⁷, 56 (WRC-2000)⁸, 58 (WRC-2000)³, 59 (WRC-2000)⁶,
77 (WRC-2000)⁶, 84 (WRC-2000)⁶, 122 (Rev.WRC-2000)⁹,
128 (Rev.WRC-2000)⁶, 533 (Rev.WRC-2000)⁵, 539 (WRC-2000)¹⁰,
540 (WRC-2000)⁶, 541 (WRC-2000)⁶, 542 (WRC-2000)⁶,
604 (WRC-2000)⁶ and 605 (WRC-2000)⁶. (WRC-2000)**

¹ Note by the Secretariat: In view of the changes in the numbering scheme, these references correspond now to Articles 21 and 22, and to Appendix 4, as appropriate.

² Note by the Secretariat: This Resolution was revised by WRC-2000, WRC-03, WRC-12, WRC-15, WRC-19 and WRC-23.

³ Note by the Secretariat: This Resolution was abrogated by WRC-15.

⁴ Note by the Secretariat: This Resolution was abrogated by WRC-2000.

⁵ Note by the Secretariat: This Resolution was abrogated by WRC-12.

⁶ Note by the Secretariat: This Resolution was abrogated by WRC-03.

⁷ Note by the Secretariat: This Resolution was revised by WRC-07, WRC-12, WRC-15, WRC-19 and WRC-23.

⁸ Note by the Secretariat: This Resolution was abrogated by WRC-07.

⁹ Note by the Secretariat: This Resolution was revised by WRC-03, WRC-07 and WRC-19.

¹⁰ Note by the Secretariat: This Resolution was revised by WRC-03, WRC-15 and WRC-19.

59.7 The other provisions of these Regulations, as revised by WRC-03, shall enter into force on 1 January 2005, with the following exceptions: (WRC-03)

59.8 – the revised provisions for which other effective dates of application are stipulated in Resolutions:

**56 (Rev.WRC-03)⁸, 85 (WRC-03)¹⁷, 87 (WRC-03)⁸, 96 (WRC-03)⁸,
122 (Rev.WRC-03)⁹, 142 (WRC-03)³, 145 (WRC-03)¹¹, 146 (WRC-03)⁸,
221 (Rev.WRC-03)¹², 413 (WRC-03)¹³, 539 (Rev.WRC-03)¹⁰,
546 (WRC-03)⁵, 743 (WRC-03) and 902 (WRC-03)¹⁷.** (WRC-23)

59.9 The other provisions of these Regulations, as revised by WRC-07, shall enter into force on 1 January 2009, with the following exceptions: (WRC-07)

59.10 – the revised provisions for which other effective dates of application are stipulated in Resolutions:

55 (Rev.WRC-07)⁷, 97 (WRC-07)⁵, 149 (WRC-07)¹⁴, 355 (WRC-07)⁵ and 905 (WRC-07)⁵. (WRC-12)

59.11 The other provisions of these Regulations, as revised by WRC-12, shall enter into force on 1 January 2013, with the following exceptions: (WRC-12)

59.12 – the revised provisions for which other effective dates of application are stipulated in Resolution:

98 (WRC-12)³ (WRC-15)

59.13 The other provisions of these Regulations, as revised by WRC-15, shall enter into force on 1 January 2017, with the following exceptions: (WRC-15)

59.14 – the revised provisions for which other effective dates of application are stipulated in Resolutions:

31 (WRC-15)¹⁵ and 99 (WRC-15)¹⁶ (WRC-19)

59.15 The other provisions of these Regulations, as revised by WRC-19, shall enter into force on 1 January 2021, with the following exceptions: (WRC-19)

59.16 – the revised provisions for which other effective dates of application are stipulated in Resolution:

99 (Rev.WRC-19)¹⁶ (WRC-23)

¹¹ Note by the Secretariat: This Resolution was revised by WRC-07, WRC-12 and WRC-19.

¹² Note by the Secretariat: This Resolution was revised by WRC-07 and WRC-23.

¹³ Note by the Secretariat: This Resolution was revised by WRC-07, WRC-12 and WRC-23.

¹⁴ Note by the Secretariat: This Resolution was revised by WRC-12.

¹⁵ Note by the Secretariat: This Resolution was abrogated by WRC-19.

¹⁶ Note by the Secretariat: This Resolution was revised by WRC-19 and WRC-23.

¹⁷ Note by the Secretariat: This Resolution was revised by WRC-23.

59.17 The other provisions of these Regulations, as revised by WRC-23, shall enter into force on 1 January 2025, with the following exceptions: (WRC-23)

59.18 – the revised provisions for which other effective dates of application are stipulated in Resolution:

99 (Rev.WRC-23) (WRC-23)

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