

DEPARTMENT OF SCIENCE AND TECHNOLOGY

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**REGULATIONS ON THE PROTECTION OF THE KAROO CENTRAL ASTRONOMY
ADVANTAGE AREAS IN TERMS OF THE ASTRONOMY GEOGRAPHIC
ADVANTAGE ACT, 2007**

I, Grace Naledi Mandisa Pandor, Minister of Science and Technology, in accordance with sections 50 and 51 of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007) (hereinafter referred to as "the Act") and having obtained the concurrence of the Independent Communications Authority of South Africa (ICASA) and the Minister of Finance (to the extent that these Regulations have financial implications), hereby make Regulations for the protection of the Karoo Central Astronomy Advantage Areas, as set out in the attached Schedules listed hereunder:

Schedule A - Regulations to prohibit and restrict the use of certain radio frequency spectrum and certain radio activities in the Karoo central astronomy advantage areas declared for radio astronomy purposes;

Schedule B - Regulations on administrative matters regarding Schedule A for the Karoo central astronomy advantage areas declared for radio astronomy purposes;

Schedule C - Regulations on financial compensation procedures for the Karoo central astronomy advantage areas; and

Schedule D - Regulations restricting interference due to electrical activities within the Karoo central astronomy advantage area 1.

These Regulations apply to the Karoo Central Astronomy Advantage Areas declared for the purpose of radio astronomy and related scientific endeavours in terms of section

9(1) and (2) of the Act under Notice Number 198 published on 12 March 2014, in Government Gazette number 37434.

These Regulations shall become operational on a date to be determined by the Minister by notice in the Gazette, which date shall not be later than 365 calendar days after the date that these Regulations are published. The notice determining the date shall be published 90 calendar days before the date so determined.



MRS GNM PANDOR, MP
MINISTER OF SCIENCE AND TECHNOLOGY

REGULATIONS FOR THE PROTECTION OF THE KAROO CENTRAL ASTRONOMY ADVANTAGE AREAS

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SCHEDULE A OF THESE REGULATIONS

Regulations to prohibit and restrict the use of certain radio frequency spectrum and certain radio activities in the Karoo central astronomy advantage areas declared for radio astronomy purposes.

1. Definitions

For purposes of these Schedule A Regulations unless the context indicates otherwise –

“the Act” means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

“assessment point” means the SKA Virtual Centre or another geographical location or point defined in terms of these regulations, which location is used as the assessment point for the applicable protection measures as prescribed in these regulations;

“dBm” means the radio frequency power level expressed in decibels relative to one milliwatt;

“designated service” means a radio communications service used in the Karoo central astronomy advantage areas that is classified as a designated service in terms of the criteria and procedures prescribed in regulation 7 of Schedule B of these Regulations;

“Electronic Communications Act” means the Electronic Communications Act, 2005 (Act No. 36 of 2005);

“effective radiated power” means the product of the power level supplied to the antenna and the antenna gain relative to a half-wave dipole in the relevant direction;

“ICASA” means the Independent Communication Authority of South Africa, an independent regulatory body established in terms of the Independent Communication Authority of South Africa Act, 2000 (Act No. 13 of 2000),

responsible for regulating broadcasting, postal services and electronic communications in the Republic;

"ICASA Spectrum Regulations 2015" means the radio frequency spectrum regulations published by ICASA on 30 March 2015 in *Government Gazette* No. 38641, under Notice No. 279;

"Karoo central astronomy advantage areas" means the Karoo central astronomy advantage areas declared on 12 March 2014 in *Government Gazette* No. 37434, under Notice No. 198;

"Karoo core astronomy advantage area" means the Karoo core astronomy advantage area declared on 20 August 2010 in *Government Gazette* No. 33462, under Notice No. 723;

"licence exempt operator" means a person who provides a service pursuant to an exemption granted by ICASA in terms of section 6 of the Electronic Communications Act, 2005 or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005 and regulations made in terms thereof, and includes the users of the radio equipment;

"licensee" as defined in the Electronic Communications Act, 2005, means a person issued with a licence to provide services in terms of Chapter 3 or to use the radio frequency spectrum in terms of Chapter 5 of the Electronic Communications Act, 2005;

"management authority" means the organ of state to which the Minister has assigned the management of the Karoo central astronomy advantage areas in terms of section 15 of the Act and includes any party with whom the management authority has entered into a co-management agreement for the co-management of the Karoo central astronomy advantage areas in terms of section 18 of the Act;

"protection corridors" means 10-km wide corridors of land, centred on a radio astronomical spiral arms configuration, within which SKA stations in the Karoo

Central Astronomy Advantage Area 1 are to be positioned, that also applies to the Karoo Central Astronomy Advantage areas 2 and 3 depending on the radio frequency spectrum used, as depicted and described in Annexure A of this Schedule A;

“Protection Levels Regulations 2012” means the regulations on radio astronomy protection levels to be applied in core and central astronomy advantage areas declared for the purposes of radio astronomy published on 10 February 2012, in *Government Gazette* No. 35007, under Notice No. R90;

“radio astronomy station” means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

“radio communication” means the emission, transmission or reception of information, including, without limitation, voice, sound, data, text, video, animation, visual images, moving images and pictures, signals or a combination thereof by means of radio or other electromagnetic waves without the aid of a tangible conductor;

“radio equipment” means a product or relevant component thereof, capable of communications by means of radio waves utilising spectrum allocated to terrestrial/space radio communication;

“radio frequency interference” means the detrimental effect of received radio communication signals that exceed the protection levels prescribed in the Protection Levels Regulations, 2012, for more than 5% of the time over a 24-hour period;

“radio station” means one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying an electronic communications service, broadcasting service or any electronic communications authorised by ICASA, and any radio equipment used at a specific geographical location;

“radio waves” means electromagnetic waves of frequencies from 8.3 kHz to 3000 GHz, propagated in space without an artificial guide;

“saturation level” means the total received power level of (minus) -100 dBm, or higher, within the transmission bandwidth of the radio communication producing the radio frequency interference level at which the saturation phenomenon occurs at a radio astronomy station or at a specified assessment point or points, or within a specified area;

“Schedule B Regulations 2017” means the regulations on administrative matters for the Karoo central astronomy advantage areas, which is Schedule B of these Regulations;

“Schedule C Regulations 2017” means the regulations on financial compensation procedures for the Karoo central astronomy advantage areas, which is Schedule C of these Regulations;

“SKA” means the Square Kilometre Array radio telescope consisting of an array of radio astronomy stations to be located within the Republic of South Africa and in participating African countries in accordance with the decision of the SKA Organisation; and

“SKA Virtual Centre” means the geographical point located at geographical coordinates 30.71292 degrees south and 21.44380 degrees East that relates to the SKA array of radio astronomy stations within the Karoo astronomy advantage areas and is specified as the assessment point for the application of the protection levels as defined in the Protection Levels Regulations, 2012.

2. Scope of the regulations in this Schedule A

- (1) These regulations apply to the Karoo central astronomy advantage areas 1, 2 and 3 according to the radio frequency spectrum declared for radio astronomy purposes in the declaration of the Karoo central astronomy advantage areas, as follows:
 - (a) Karoo central astronomy advantage area 1 with respect to the use of frequency spectrum from 100 to 2 170 MHz;
 - (b) Karoo central astronomy advantage area 2 with respect to the use of frequency spectrum from 2 170 to 6 000 MHz; and
 - (c) Karoo central astronomy advantage area 3 with respect to the use of frequency spectrum from 6 000 to 25 500 MHz.
- (2) With respect to aviation:
 - (a) These regulations are not applicable to aeronautical mobile, aeronautical radio-navigation and radiolocation services operating in the frequency bands allocated to these services in the National Radio Frequency Plan published by ICASA in terms of section 34(12) of the Electronic Communications Act, 2005.
 - (b) The measures necessary for the protection of the Karoo Core and Central Astronomy Advantage Areas, which shall be applicable to the aeronautical mobile, aeronautical radio-navigation and radiolocation services, and to the use of aircraft within the Karoo Core and Central Astronomy Advantage Areas, shall, after concurrence is reached between the Minister of Science and Technology and the Minister of Transport, be promulgated by the Minister of Transport and be administered and enforced by the Civil Aviation Authority established in terms of Chapter 6 of the Civil Aviation Act, 2009 (Act No. 13 of 2009).
- (3) If there are irreconcilable differences between the English and the Afrikaans texts of these regulations, the English text will take precedence.

3. Prohibition and restrictions on radio frequency spectrum use and transmissions

- (1) The prohibition of radio frequency spectrum use and radio communication transmissions therein, as provided for in this regulation 3, shall apply to the radio frequency spectrum and to radio transmissions within that spectrum according to the radio frequency spectrum allocations made in terms of sub-regulation 2(1) to the respective geographical areas.
- (2) From one (1) year after the date that these regulations become operational, no licensee or licence exempt operator shall use, or continue to use, the radio frequency spectrum from 100 MHz to 25.5 GHz as allocated in sub-regulation 2(1) to the respective areas, and conduct radio transmissions within that spectrum and within the Karoo central astronomy advantage areas, unless –
 - (a) it is required for the purposes of radio astronomy and related scientific endeavours declared to be so in terms of section 28(1) of the Act; or
 - (b) the following conditions are complied with:
 - (i) that the spectrum to be used has been exempted from this prohibition in terms of regulation 3 of Schedule B of these Regulations; and
 - (ii) the management authority has considered possible radio frequency interference when considering the licensee or licence exempt operator's application for a permit in terms of regulation 4 of Schedule B of these Regulations, and has subsequently issued to that person a permit with relevant specifications and limitations to be complied with;
- or
- (c) the exemptions on this requirement in terms of regulation 5 of this Schedule A, are applicable.

- (3) From the date that these regulations come into operation, no licensee or licence exempt operator shall use radio frequency spectrum and conduct radio communication transmissions therein for any new construction, upgrade, or expansion of a radio station or use of new radio equipment, within the Karoo central astronomy advantage areas unless sub-regulation 3(2)(b) of this Schedule A has been complied with, or sub-regulation 3(2)(c) applies.
- (4) Any radio frequency spectrum use and radio communication transmissions contemplated in sub-regulations 3(2)(b) and 3(3) shall comply with the conditions for radio frequency spectrum use and radio communication transmissions prescribed in regulation 4 of this Schedule A.
- (5) From one (1) year after the date that these regulations come into operation, no television broadcasting service licensee or broadcasting signal distribution licensee shall transmit a television broadcasting service in analogue format from a terrestrial transmitting station within the Karoo central astronomy advantage areas.

4. Conditions for radio frequency spectrum use and transmissions

- (1) In order for the permit contemplated in sub-regulation 3(2)(b)(ii) to be issued, the radio frequency interference caused by spectrum use and radio communication transmissions shall not exceed –
 - (a) the saturation level within the protection corridors in the Karoo central astronomy advantage area 1, as defined in Annexure A of this Schedule A or within a circle with a radius of 20 kilometres around the SKA Virtual Centre; and
 - (b) the protection levels prescribed in the Protection Levels Regulations 2012, as applied at the SKA Virtual Centre, unless the use or activity is for a designated service for which a specified interference level in excess of the prescribed protection level has been specified in a permit issued in terms of regulation 4 in Schedule B of these Regulations, to the person using that spectrum and making that transmission.

- (2) A compliance assessment shall be carried out by the management authority or alternatively by the applicant for a permit prior to the issuing of any permit in terms of regulation 4 in Schedule B of these Regulations, that shall include the following aspects to the extent that they are applicable –
- (a) The calculation of the radio frequency interference levels to determine whether the applicable protection level is exceeded at the SKA Virtual Centre and whether the saturation level is exceeded within the protection corridors in the Karoo central astronomy advantage area 1 as defined in Annexure A of this Schedule A, or within a radius of 20 km around the SKA Virtual Centre.
 - (b) The determination of radio frequency interference referred to in sub-regulation 4(2)(a) shall be carried out on the base (fixed) radio stations or radio equipment located at a fixed geographical location.
 - (c) If radio frequency interference or saturation level interference is likely to be caused by mobile or portable radio stations or radio equipment used in conjunction with the base station or radio equipment at a fixed location, the worst-case radio frequency interference conditions shall be determined with respect to the mobile or portable radio equipment.
 - (d) The determination and assessment of radio frequency interference may also be required by the management authority for radio equipment exempted by ICASA from radio frequency spectrum licensing in Part III, regulation 4 of the ICASA Spectrum Regulations 2015, that produces a radiated power level of greater than 250 milliwatt.
- (3) Conditions, which may include limitations on the geographical area in which mobile or portable radio stations or radio equipment may be used or any other method that will restrict the interference to the protection level, shall be added to any permit already granted in the event that-

- (a) a mobile or portable radio station or radio equipment used in conjunction with a base radio station for which a permit had been granted causes radio frequency interference at the SKA Virtual Centre; or
 - (b) saturation level radio frequency interference occurs within the protection corridors in the Karoo central astronomy advantage areas described in Annexure A of this Schedule A, or within 20 km of the SKA Virtual Centre.
- (4) Any person who operates radio equipment for which radio frequency spectrum licence exemptions have been prescribed by ICASA, in Part III, regulation 4 of the ICASA Spectrum Regulations, 2015, shall not operate or use such equipment within 50 km of the SKA Virtual Centre unless a permit has been granted by the management authority.

5. Exemptions to the prohibition, restrictions and conditions

- (1) The prohibition in sub-regulation 3(2) does not apply to existing radio communication transmissions within the spectrum from 100 MHz to 200 MHz which were lawful immediately before the promulgation of these Regulations: subject thereto that the spectrum being used, must be exempted in terms of regulation 3 of Schedule B of these Regulations and a permit must be acquired by that person in relation to the use of that spectrum and those radio communication transmissions, in terms of regulations 3 and 4 of Schedule B of these Regulations.
- (2) Radio equipment, for which radio frequency spectrum licence exemptions have been prescribed in Part III, regulation 4 of the ICASA Spectrum Regulations, 2015, is exempted from the restrictions prescribed in sub-regulations 3(2) and 3(3) on the use of the related radio frequency spectrum and the transmissions, and from the requirement for the possession of a permit, provided that:
 - (a) the frequency spectrum use has been exempted from the prohibition in sub-regulation 3(2) in terms of regulation 3 of Schedule B of these Regulations;

- (b) the radio equipment produces a radio frequency effective isotropically radiated power (e.i.r.p.) level of less than or equal to 250 milliwatt;
 - (c) the radio equipment in sub-regulation 5(2)(b) complies with the relevant requirements and conditions that are stated in Annexure B of the ICASA Spectrum Regulations 2015;
 - (d) the radio equipment is used individually in accordance with the specifications in the ICASA Spectrum Regulations 2015 and not in conjunction with multiple units linked into networks or the radiated radio frequency power is not increased in any way;
 - (e) radio frequency interference exceeding the relevant protection level, as prescribed in the Protection Levels Regulations 2012, is not caused by the radio equipment at the SKA Virtual Centre or saturation level interference is not caused within the protection corridors or within a 20-km radius from the SKA Virtual Centre.
- (3) Radio equipment, such as cell phones, portable and mobile two-way radio communication stations, that is used in conjunction with fixed radio base stations licensed by ICASA and are included in the relevant ICASA radio frequency spectrum licences, is exempted from the restrictions prescribed in these regulations on use of the related radio frequency spectrum and radio communication transmissions, and from the requirement of having an individual permit, provided that the radio equipment complies with the applicable technical standards prescribed by ICASA and that the fixed radio stations to which it connects, complies with Schedule A of these Regulations.
- (4) Should any of the radio equipment contemplated in sub-regulations 5(2), and 5(3) cause radio frequency interference or saturation level interference, then –
- (a) a compliance assessment, as contemplated in sub-regulations 4(5) and 4(6) of Schedule B of these Regulations, shall be carried out to determine the extent of the radio frequency interference and an

application for a permit shall be filed with the management authority; or

(b) the relevant management authority may investigate the radio frequency interference or saturation level interference caused and determine permit conditions for the use of that category of radio equipment; or

(c) the Minister may declare a core astronomy advantage area within which all the exempted radio equipment may not be used as prescribed in the Core Astronomy Advantage Areas Regulations for Radio Astronomy published on 22 June 2012, in *Government Gazette* No. 35450, under Notice No. R.465.

(5) The granting or amendment of a permit contemplated in sub-regulation 5(4)(b) shall be subject to the procedures and criteria prescribed in Schedule B of these Regulations.

6. Extension of the one-year period

The Minister may, by notice in the *Gazette*, extend the one-year period contemplated in sub-regulations 3(2) and 3(5).

7. Financial compensation

Any financial compensation contemplated in terms of section 23(3)(a) of the Act with respect to a restriction on radio communication transmissions that were lawful within the Karoo central astronomy advantage areas before the publication of these Regulations shall be subject to Schedule C of these Regulations.

8. Contraventions and penalties

(1) Contraventions for which a prosecution may be instituted in a Court of Law, are the following:

(a) failure to be in possession of a permit within the time specified for obtaining a permit as required in terms of sub-regulations 3(2) and 3(3);

- (b) failure to comply with the conditions of a permit as required in sub-regulation 3(2)(b)(ii);
 - (c) failure by a user of radio equipment exempted in terms of sub-regulations 5(2) or 5(3), that is causing radio frequency interference to comply with permit conditions determined in terms of sub-regulation 5(4)(b) to avoid the interference;
 - (d) failure in radio frequency spectrum use and conducting radio communication transmission, contemplated in sub-regulations 3(2)(b) and 3(3), to abide by the conditions for such spectrum use or radio communication transmission as specified in regulation 4 of this Schedule A;
 - (e) failure by a television broadcasting licensee or a broadcasting signal distributor licensee to abide by sub-regulation 3(5) of this Schedule A;
 - (f) failure by a permit holder not to exceed the conditions provided for in sub-regulations 4(1) or 4(3); and
 - (g) failure by a user of a radio equipment to act within the conditions stated in sub-regulation 4(4).
- (2) The maximum fine for an intentional contravention of sub-regulation 8(1)(a), 8(1)(b), 8(1)(d), 8(1)(e), 8(1)(f), or 8(1)(g) is R200 000 and for a negligent contravention is R100 000.
- (3) The maximum fine for an intentional contravention of sub-regulation 8(1)(c) is R20 000 and for a negligent contravention R5000.
- (4) The fines referred to in sub-regulations 8(2) and 8(3) may be suspended as a whole or in part subject to a condition that the person convicted is not found guilty of the same offence within a maximum period of three years.

Annexure A to Schedule A – Map of protection corridors**Map of protection corridors containing the SKA radio astronomy stations within the Karoo Central Astronomy Advantage Area 1**

- (1) The map on the next page depicts the 20-km radius circle around the SKA Virtual Centre, within which approximately 173 SKA radio astronomy stations will be located. The map also depicts three protection corridors required for approximately 24 SKA radio astronomy stations located within the Karoo Central Astronomy Advantage Area 1.
- (2) Although the geographical area for the protection corridors is related to that for the Karoo Central Astronomy Advantage Area 1, any radio frequency interference and the applicable restrictions must be attended to in terms of the radio frequency spectrum allocations to the geographical areas as set out in sub-regulation 2(1) of this Schedule A.
- (3) A smaller scale version of the map on the next page and/or a GIS-shape file is available on request from the management authority. The perimeters of the corridors are 5 km distant on either side of the spiral arms.
- (4) Applicants for a permit, who are determining radio frequency interference levels in terms of sub-regulation 4(2)(a), may request the management authority to provide the applicable geographical locations on the periphery of the protection corridors or on the 20-km circle around the SKA Virtual Centre for the radio frequency interference sources under consideration.



SCHEDULE B OF THESE REGULATIONS**Regulations on administrative matters regarding Schedule A for the Karoo central astronomy advantage areas declared for radio astronomy purposes****1. Definitions**

For purposes of these Schedule B Regulations, unless the context indicates otherwise –

"the Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"assessment point" means the geographical location or any relevant point within an area defined in Schedule A of these Regulations, which location or point is used as the assessment point for the applicable protection measures prescribed in Schedule A of these Regulations;

"competent person" means a person who meets each of the criteria prescribed in regulation 8 of these Schedule B Regulations;

"compliance assessment" means the process that includes the activities prescribed in sub-regulation 4(3) of these Schedule B Regulations;

"dBm" means the radio frequency power level expressed in decibels relative to one milliwatt;

"designated service" means a radio communications service used in the Karoo central astronomy advantage areas that is classified as a designated service in terms of the criteria and procedures prescribed in regulation 7 of these Schedule B Regulations;

"Electronic Communications Act" means the Electronic Communications Act, 2005 (Act No. 36 of 2005);

"effective radiated power" means the product of the power level supplied to the antenna and the antenna gain relative to a half-wave dipole in the relevant direction;

"ICASA" means the Independent Communication Authority of South Africa, an independent regulatory body established in terms of the Independent Communication Authority of South Africa Act, 2000 (Act No. 13 of 2000), responsible for regulating broadcasting, postal services and electronic communications in the Republic;

"ICASA Spectrum Regulations 2015" means the radio frequency spectrum regulations published by ICASA on 30 March 2015, in *Government Gazette* No. 38641, under Notice No. 279;

"ITU" means the International Telecommunication Union;

"Karoo central astronomy advantage areas" means the Karoo central astronomy advantage areas declared on 12 March 2014 in *Government Gazette* No. 37434, under Notice No. 198;

"licence exempt operator" means a person who provides a service pursuant to an exemption granted by ICASA in terms of section 6 of the Electronic Communications Act, 2005, or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005, and regulations made in terms thereof;

"licensee" as defined in the Electronic Communications Act, 2005) means a person issued with a licence to provide services in terms of Chapter 3 or to use the radio frequency spectrum in terms of Chapter 5 of the Electronic Communications Act, 2005;

"management authority" means the organ of state to which the Minister has assigned the management of the Karoo central astronomy advantage areas in terms of section 15 of the Act and includes any party with whom the management authority has entered into a co-management agreement for the co-

management of the Karoo central astronomy advantage areas in terms of section 18 of the Act;

"Protection Levels Regulations 2012" means the regulations on radio astronomy protection levels applicable in astronomy advantage areas declared for the purposes of radio astronomy published on 10 February 2012 in *Government Gazette* No. 35007, under Notice No. R.90;

"radio astronomy station" means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

"radio communication" means the emission, transmission or reception of information, including without limitation, voice, sound, data, text, video, animation, visual images, moving images and pictures, signals or a combination thereof by means of radio or other electromagnetic waves without the aid of a tangible conductor;

"radio communications network service licensee" means an electronic communications network service licensee to whom ICASA has issued an electronic communications network service licence in terms of section 5(2) or 5(4) of the Electronic Communications Act, 2005;

"radio communications service" means an electronic communications service provided to the public, sections of the public, the State, or the subscribers to such service, which consists wholly or mainly of the conveyance by any means of radio communications over a radio communications network;

"radio equipment" means a product or relevant component thereof, capable of communication by means of radio waves utilising spectrum allocated to terrestrial/space radio communication;

"radio frequency interference" means the detrimental effect of received radio communication signals that exceed the protection levels prescribed in the Protection Levels Regulations 2012, for more than 5% of the time over a 24-hour period;

"radio station" means one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying an electronic communications service, broadcasting service or any electronic communications authorised by ICASA, and any radio equipment used at a specific geographical location;

"radio waves" means electromagnetic waves of frequencies from 8.3 kHz to 3000 GHz, propagated in space without an artificial guide";

"restricted radio frequency spectrum" means radio frequency spectrum the use of which is prohibited or restricted by the Minister in terms of section 22 of the Act as determined in Schedule A of these Regulations;

"saturation level" means the total received power level of (minus) -100 dBm, or higher, within the transmission bandwidth of the radio communication producing the radio frequency interference level at which the saturation phenomenon occurs at a radio astronomy station or at a specified assessment point or points, or within a specified area;

"Schedule A Regulations" means the regulations to prohibit and restrict the use of certain radio frequency spectrum in terms of section 22 of the Act and certain declared activities in terms of section 23 of the Act, within the Karoo central astronomy advantage areas, which is Schedule A of these Regulations; and

"Transmission characteristics" means the geographical features of a radio station site, including the geographical location, and the effective height and terrain roughness as defined by the ITU, or another internationally recognised standard, and the technical features of the radio transmission, including the radio frequency, effective radiated power and wave polarisation, as required to calculate the radio frequency interference level at a specified geographical location.

2. Scope of the regulations in this Schedule B

- (1) These regulations apply to the Karoo central astronomy advantage areas declared for radio astronomy purposes as contemplated in section 9 of the Act.
- (2) If there are irreconcilable differences between the English and the Afrikaans texts of these regulations, the English text will take precedence.

3. Exemption of restricted radio frequency spectrum

- (1) Read with Schedule A of these Regulations, the Minister will give notice in the *Gazette*, after these Regulations have been published, of a list of the radio frequency spectrum to be considered for exemption from the prohibition on its use for transmissions located within the Karoo central astronomy advantage areas.
- (2) The notice contemplated in sub-regulation (1) –
 - (a) may also provide for the clustering of radio frequency spectrum assignments within any spectrum allocation to an application that is already being used in the Karoo central astronomy advantage areas; and
 - (b) will invite interested or affected parties to submit written representations on the notice within sixty (60) days from the date of the notice.
- (3) Before gazetting the notice contemplated in sub-regulation (1), the Minister will –
 - (a) request concurrence from ICASA on the radio frequency spectrum to be considered for exemption and on clustering of spectrum used in the allocated frequency bands; and
 - (b) in the manner contemplated in section 22(4) of the Act, notify all existing licensees and licence exempt operators who operate radio stations in the Karoo central astronomy advantage areas and who are listed in the permanent register of interested or affected parties for that area, of the notice to be gazetted.

- (4) The Minister will give consideration to the presentations or objections received and may request additional information from any person who made a written presentation and will, by notice in the *Gazette*, publish the list of exempted radio frequency spectrum within six (6) months after the date that these Regulations are made operational.
- (5) One year after the publication of the notice contemplated in sub-regulation 3(4), ICASA may submit to the Minister, a list of additional radio frequency spectrum to be exempted for use within the Karoo central astronomy advantage areas. Upon concurrence between the Minister and ICASA on additional radio frequency spectrum to be exempted, the Minister will publish the additional exemptions by notice in the *Gazette*.

4. Requirements and procedures for compliance assessment and permit applications

- (1) Prior to the issuing of any permit for frequency spectrum use and the transmission of a radio communication signal from a radio station within the Karoo central astronomy advantage areas, a compliance assessment shall be performed on each such transmission by the management authority, or alternatively by the licensee or licence exempt operator carrying out, or intending to carry out, the transmission. The applicant for a permit must indicate in the permit application whether he will perform the compliance assessment, or arrange for it to be done by a contractor, or request the management authority to do it.
- (2) The compliance assessment shall be performed by a competent person, as contemplated in regulation 8 of these Schedule B Regulations, who is employed or contracted by the management authority or the licensee or the licence exempt operator transmitting or intending to transmit the signal.
- (3) The compliance assessment must determine:
 - (a) The radio frequency interference level at the SKA Virtual Centre as prescribed in Schedule A of these Regulations and the comparison thereof with the applicable protection level for radio astronomy observations prescribed in the Protection Levels Regulations, 2012,

according to the criteria prescribed in regulation 6 of these Schedule B Regulations; and

- (b) The radio frequency interference level within the areas prescribed for the prohibition of saturation level interference in Schedule A of these Regulations and the comparison thereof with the saturation level, all according to the criteria prescribed in regulation 6 of these Schedule B Regulations; and
- (c) Whether there is compliance with all the applicable regulations made in terms of the Act.

[A list of the regulations that must be complied with in the compliance assessment for a permit application is provided in Annexure A to these Schedule B Regulations to assist applicants: provided that this list shall not be considered as exhaustive as there may be further or different aspects involved in a particular application.]

- (4) The report for compliance assessment based on computer modelling shall include all the information and data required as listed and described in a schedule to be obtained from the management authority.
- (5) In the event of a dispute between the applicant and the management authority, about:
 - (a) the validity of the radio frequency interference levels determined by means of computer modelling, or
 - (b) the accuracy of the determined radio frequency interference levels, that are considered to be unacceptable by the management authority,

then appropriate and feasible measurements of the interference level at a measurement point to be determined by the management authority, with acceptance of the location by the applicant, must be carried out in accordance with the relevant provisions in regulation 6 of these Schedule B Regulations. The party raising the dispute will be liable for the costs of the measurements to be done, provided that, if the results of the measurements proves that the dispute raised was valid, then the costs must be shared between the parties as agreed to in advance according to an estimate.

- (6) The results of the measurements, contemplated in sub-regulation 4(5), shall be reported in a separate detailed measurement report. The report shall include a description of the measurement process and standards used, the list of measuring and ancillary equipment used with calibration certificates, full information on measurement parameters (including location, height, date, time, and weather conditions) and the measurement results.
- (7) An application for a permit shall be done on a form obtained from the management authority and include all the information and data required therein. The application shall indicate whether the applicant chose to arrange for the compliance assessment to be performed or whether it is requested that the assessment must be performed by the management authority.
- (8) The completed application form and the compliance assessment report, if applicable, must be submitted by the licensee or licence exempt operator to the management authority for consideration and evaluation.

5. Evaluation of compliance assessments and permit applications

- (1) The management authority must evaluate each compliance assessment report and application for a permit submitted to it.
- (2) If an incomplete compliance assessment report or permit application is received –
 - (a) the applicant will be notified thereof in writing within fourteen (14) days of receiving the application;
 - (b) the incomplete report and/or application may be replaced with a complete version; and
 - (c) the evaluation process will only commence when the complete versions of the report and the application are available.
- (3) The management authority must, within thirty (30) days from the date the permit application and the assessment report, if applicable, was received by it, excluding the time taken for responses to external consultations required in terms of these regulations or responses to requests for

information to the applicant, inform the applicant in writing of the outcome, with reasons given, of its consideration of the application and if applicable, the evaluation of the compliance assessment report.

- (4) A permit will only be issued if the following criteria have been met -
 - (a) the radio frequency spectrum to be used is exempted in terms of regulation 3 of these Schedule B Regulations; and
 - (b) the determined radio frequency interference levels do not exceed the applicable prescribed protection levels; and
 - (c) the permit application complies with all the applicable requirements as listed in Annexure A to these Schedule B Regulations and any other matters identified.
- (5) A licensee or licence exempt operator, who receives a written notification that the criteria prescribed in sub-regulation 5(4) have not been met, may investigate and consider methods to comply with the criteria, and resubmit the permit application.
- (6) If the management authority requires more time than the time specified, within which to make a decision in terms of sub-regulation 5(3), or it is decided that an extensive technical evaluation and/or measurements is required, it may, within the specified period of time, including any valid additional time, inform the licensee or operator that additional time, up to a maximum of one hundred and eighty (180) days, is required and provide reasons why it is required.
- (7) If the management authority fails to act within the period specified in sub-regulation 5(3), or where the authority, in terms of sub-regulation 5(6) has extended the period by a certain amount of time and fails to act within an extended period determined by the management authority, the authority is regarded as having granted the permit applied for.
- (8) A permit issued to a licensee or a licence exempt operator by the management authority must specify the frequencies or frequency band that may be used, together with the transmission characteristics and the conditions within which the licensee or licence exempt operator must

comply. The permit must also specify any time required, and agreed to by the management authority, to modify an existing radio station installation or radio equipment in order to comply with the permit conditions.

- (9) If the management authority receives a written complaint, after a permit has been issued that the radio frequency interference level measured is higher than the level recorded in the permit, and exceeds the applicable protection level, the compliance assessment report must be reviewed by the management authority, to determine the validity of the original assessment, taking the accuracy of the computer modelling or measurements done, into account. The results of the review will determine whether the transmission characteristics specified in the permit issued, need to be adjusted to avoid the applicable protection level being exceeded. The management authority shall inform the permit holder in writing that the matter will be attended to in terms of sub-regulation 5(12).
- (10) If a licensee or licence exempt operator, to whom a permit has been issued, seeks to amend the frequencies or frequency band that may be used, or the transmission characteristics or the conditions specified in its permit, then an application for a new permit shall be made to the management authority for such amendment.
- (11) Sub-regulations 4(1) to 4(9), read with the necessary changes, apply to such application for an amendment of a permit issued.
- (12) If the management authority finds, thirty (30) days after the issuing of a permit, taking into account any time provided for in the permit to modify an existing radio station installation or radio equipment, and having granted the permit holder seven days to respond to the allegation, that the conditions specified in the permit are not complied with, then the permit may immediately be withdrawn by the management authority. The holder of such permit must immediately cease any activity conducted under such permit and will be regarded as not possessing a permit as required in terms of Schedule A of these Regulations.

6. Criteria for determination of radio frequency interference levels

- (1) The radio frequency interference level produced by any radio communication transmission within the Karoo central astronomy advantage areas, shall be determined by using the transmission characteristics stated in the permit application according to the technical criteria prescribed in the sub-regulations that follow.
- (2) The determination of the radio frequency interference levels should in the first instance be carried out by means of computer modelling which employs scientific methods and standards listed in Annexure B to these Schedule B Regulations and which calculates the radio frequency interference levels related to the protection conditions prescribed in Schedule A of these Regulations and the criteria set out in sub-regulation 6(4).
- (3) If computer modelling is not feasible or appropriate, or if greater accuracy is required than computer modelling can provide, then –
 - (a) the radio frequency interference levels must be determined by means of measurements by a person or persons regarded as competent and who has the required measurement equipment available; and
 - (b) the measurement standards and techniques to be used must be described in writing by the competent person who is performing the measurements; and
 - (c) an agreement must be reached between the management authority and the applicant for a permit or the holder of a permit on the designated person or persons to perform the measurements and the measurement equipment, standards and techniques to be used; and
 - (d) if an agreement cannot be reached, the management authority must make the necessary determinations.
- (4) The calculation or measurement of radio frequency interference levels must be based on the following criteria –
 - (a) the application of the relevant standard for the calculation method to predict the radio frequency interference level as defined in, but not

limited to, the calculation standards and methods set out in Annexure B to these Schedule B Regulations;

- (b) signal levels that shall not be exceeded for more than 5% of the time, over a twenty-four (24) hour period;
 - (c) a reference height of 10 meters above ground level at the assessment points for the protection conditions prescribed in Schedule A of these Regulations;
 - (d) an isotropic antenna condition with 0dB gain at the assessment points for the protection conditions prescribed in Schedule A of these Regulations;
 - (e) the use of a digital terrain model that will produce acceptable results and which may take clutter data and ground conductivity into account; and
 - (f) the transmission characteristics provided in the compliance assessment.
- (5) The determination of the radio frequency interference levels must include the following –
- (a) a point-to-point calculation of the radio frequency interference level on the propagation path between the radio station or location of the radio equipment and the specified assessment points for the protection conditions prescribed in Schedule A of these Regulations; and
 - (b) the calculation of the signal path losses over the propagation paths referred to in (a), in dB.

7. Criteria, procedures and conditions that apply to a designated service

- (1) Radio communication transmissions that provide the services listed below may be considered by the management authority for classification as designated services –
- (a) broadcasting signal distribution via geostationary satellites for distribution to terrestrial broadcasting transmitters and for direct-to-home reception and VHF/FM sound broadcasting transmissions;

- (b) electronic communications network services of provincial and national scope licensed by ICASA in terms of section 5(3) of the Electronic Communications Act, 2005;
 - (c) electronic communications for the operation and maintenance of electricity transmission and distribution power systems;
 - (d) electronic communications for the operation and maintenance of rail transport;
 - (e) electronic communications for security services and their objects as defined in Chapter 11 of the Constitution of the Republic of South Africa 1996, local government and their objects as defined in Chapter 7 of the Constitution, health services and emergency services; and
 - (f) geostationary satellite communications.
- (2) An application for a permit in terms of regulation 4(7) of these Schedule B Regulations for a radio communication service that may qualify to be classified as a designated service in terms of sub-regulation 7(1), must –
- (a) request such classification in the permit application;
 - (b) state the transmissions and the radio frequency interference level that cannot be reduced to comply with the applicable protection level without significantly affecting that service;
 - (c) provide an explanation and the reasons why the interference level cannot be reduced; and
 - (d) request that a radio frequency interference level in excess of the prescribed value be permitted.
- (3) In the determination by the management authority of whether a radio communication service in sub-regulation 7(1) should be classified as a designated service, or not, consideration must be given to –
- (a) the existence of a functionally suitable and economically feasible alternative which complies with or better meets the conditions prescribed in regulation 4 of Schedule A of these Regulations; and
 - (b) the possible use of an alternative frequency band and/or an alternative technology that has a lesser radio frequency interference impact on the protection of radio astronomy.

- (4) The classification for each different type of radio communication service, operating in a different frequency band or using a different technology, in particular for licensees providing multiple types of services, must be determined separately and so indicated in the permit to be issued.
- (5) The management authority must, before the evaluation process for the compliance assessment and the application for a permit prescribed in regulation 5 of this Schedule B Regulations commences, determine whether the radio communication service involved will be classified as a designated service.
- (6) A radio communication service classified as a designated service must comply with the conditions prescribed in regulation 4 of these Schedule A Regulations, provided that a radio frequency interference level in excess of the prescribed value may be permitted.
- (7) A classification as a designated service may be cancelled by the management authority when a different electronic communication system that is functionally suitable and economically feasible becomes available, which complies with or to a greater extent meets the restrictions, conditions and standards prescribed in Schedule A of these Regulations for the protection of radio astronomy. However, any cancellation contemplated, must first provide a reasonable opportunity to the permit holder to study the consequences of the cancellation, to consider alternative options and to submit an alternative solution in this regard.
- (8) No relief may be granted by the management authority where radio frequency interference is likely to exceed the saturation level at any applicable assessment point or area prescribed in Schedule A of these Regulations.

8. Criteria to be met by a person carrying out compliance assessment

- (1) A person who carries out a compliance assessment and compiles the report, must:
 - (a) possess an academic qualification in electronic or radio frequency engineering at least at the level that would qualify that person to be

registered as a professional engineering technologist in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000);

- (b) have access to or be able to obtain access to a computerised frequency spectrum planning system that is usable to carry out the computer modelling for the radio frequency signal level calculations based on the relevant methods and standards listed in Annexure B to these Schedule B Regulations, and uses a digital terrain model that will produce acceptable results; and
 - (c) be able to provide at least two references for work carried out successfully in the preceding five (5) years which involved the determination of radio wave propagation and signal levels.
- (2) Alternative to sub-regulation 8(1), the management authority shall perform an assessment of the skills and experience of a person wishing to carry out the compliance assessment and the compilation of the report to determine whether the person possesses the required ability and capacity.
 - (3) The format of the assessment report to be compiled by the person who performs the compliance assessment and the information required therein shall be in accordance with a schedule to be obtained from the management authority.
 - (4) The management authority must advise the applicant for a permit in writing whether the person who carried out the compliance assessment and submitted the required information, met the requirements stated in sub-regulation 8(1), or not, or if a skills and experience assessment was undertaken, what the outcome was. A person who met the requirements or who had a positive outcome in an assessment, will be presumed to be competent to carry out further compliance assessments if the person is shown, to the satisfaction of the management authority, to have remained actively engaged in the work that led to that person's having been regarded as competent: in which case the said person shall only have to provide his name and an appropriate identification number for further permit applications, the compliance assessment of which was carried out by him.

9. Permit conditions and permit register

- (1) Each permit granted by the management authority in terms of regulation 5 of these Schedule B Regulations, shall include the permissible transmission characteristics and the conditions for the required protection that the permit holder shall comply with.
- (2) The transmission characteristics and the conditions specified in each permit issued in terms of regulation 5 of these Schedule B Regulations, must be entered, by the management authority, into a permit register for the Karoo central astronomy advantage areas, such register being held at the management authority.
- (3) The detailed information to be entered in the permit register must include the transmission characteristics used for the compliance assessment and the assessment results for each radio communication signal and assessment point involved.
- (4) Access to the register is limited to the manager of the management authority under whose control the register is placed by the Minister or, with written permission of the manager, a person in the service of that management authority provided that access to the Register may be gained by the permit holder with the written authorisation of the manager or the person authorised by him or, in the absence thereof, consequent upon a court order granted to the permit holder or another person, on good cause shown; provided further that a certified copy may be provided to such a permit holder by way of registered post by the manager or the person authorised by him.

Annexure A to Schedule B: Table of Compliance Requirements for Permit Applications

The table below is provided to assist applicants for permits to determine whether the applicants have complied with all the administrative requirements for permit applications prescribed in these Schedule B Regulations. These Schedule B Regulations provides in regulation 4(3)(c) that compliance with all applicable regulations made in terms of the Act need to be determined and regulation 5(2) states the manner in which incomplete applications are to be dealt with.

<u>Reference</u>	<u>Summary of requirement</u>
Regulation 4(1)	A compliance assessment shall be performed before the submission of a permit application if the permit applicant chooses to perform the compliance assessment.
Regulation 4(2)	The compliance assessment shall be performed by a competent person.
Regulation 4(3)	The compliance assessment must include the activities prescribed in sub-regulations 4(3) (a), (b) and (c).
Regulation 4(4)	The compliance assessment report shall comply with the format and information requirements in the schedule to be obtained from the management authority.
Regulation 4(7)	A permit application shall comply with a form to be obtained from the management authority.
Regulation 6	Criteria for determination of radio frequency interference levels.
Regulation 7(2)	Respond to the sub-items if consideration as a designated service is sought.

Annexure B to Schedule B: Propagation calculation standards and methods

This annexure relates to sub-regulation 6(4)(a) of these Schedule B Regulations. The intention of the information provided in this annexure is to assist competent persons or any other person involved in the determination of radio frequency interference levels. The information is not meant to be prescriptive or limiting of the standards and techniques that may be used and that may provide results with a higher level of accuracy. The options stated may be considered as the minimum standards applicable to carry out radio frequency interference level predictions.

1. ITU Recommendation ITU-R P.1144 - Guide to the application of the propagation methods of Radiocommunication Study Group 3. This recommendation lists the ITU-R radio wave propagation prediction methods that may be used for the different applications. The options applicable to radio frequency interference predictions that relate to Schedule A of these Regulations, are listed below.
 - 1.1. Recommendation ITU-R P.452 – Service employing stations on the surface of the Earth; interference
 - 1.2. Recommendation ITU-R P.526 – Propagation by diffraction
 - 1.3. Recommendation ITU-R P.528 – Aeronautical mobile
 - 1.4. Recommendation ITU-R P.530 – Line-of-sight fixed links
 - 1.5. Recommendation ITU-R P.617 – Trans-horizon fixed links
 - 1.6. Recommendation ITU-R P.2001 – Terrestrial services
2. The Longley-Rice model accepted by the Federal Communications Commission in the United States of America may also be used as it is employed in a number of computerised prediction programmes on the market.
3. Other methods for determining the propagation path loss may also be used with agreement of the management authority.

SCHEDULE C OF THESE REGULATIONS**Regulations on financial compensation procedures for the Karoo central astronomy advantage areas****1. Definitions**

For purposes of these Schedule C Regulations, unless the context indicates otherwise –

"the Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"affected person" means a person who –

- (a) lawfully conducted an activity in a central astronomy advantage area prior to the restriction of that activity by virtue of Schedules A and D of these Regulations; and
- (b) is required by the Minister in terms of Schedules A and D of these Regulations to cease that activity or to comply with conditions prescribed in terms of Schedules A and D of these Regulations;

"Electronic Communications Act" means the Electronic Communications Act, 2005 (Act No. 36 of 2005);

"financial loss" means –

- (a) the substantiated monetary loss incurred by an affected person as a result of having to comply with a restriction or implement a requirement or a condition imposed in terms of section 23 of the Act as provided for in Schedules A and D of these Regulations; and
- (b) the connecting cost and additional user cost to a radio communications service user for an electronic communications service that is different to the electronic communications service used by that user prior to the publication of a regulation in terms of section 23 of the Act;

"GPS" means a global positioning system;

"ICASA" means the Independent Communication Authority of South Africa, an independent regulatory body established in terms of the Independent

Communication Authority of South Africa Act, 2000 (Act No. 13 of 2000), responsible for regulating broadcasting, postal services and electronic communications in the Republic;

"licence exempt operator" means a person who provides a service pursuant to an exemption granted by ICASA in terms of section 6 of the Electronic Communications Act, 2005, or uses radio frequency spectrum which is exempt from requiring a radio frequency spectrum licence by virtue of section 31(6) of the Electronic Communications Act, 2005, and regulations made in terms thereof;

"licensee" means a person to whom ICASA has issued a licence to provide a service in terms of Chapter 3 or to use radio frequency spectrum in terms of section 31 of the Electronic Communications Act, 2005;

"management authority" means the organ of state to which the Minister has assigned the management of the relevant central astronomy advantage area in terms of section 15 of the Act and includes any party with whom the management authority has entered into a co-management agreement for the co-management of the relevant central astronomy advantage area in terms of section 18 of the Act;

"Schedule A Regulations" means the regulations to prohibit and restrict the use of certain radio frequency spectrum in terms of section 22 of the Act and certain declared activities in terms of section 23 of the Act, within the Karoo central astronomy advantage areas, which is Schedule A of these Regulations; and

"Schedule D Regulations" means the regulations to restrict certain electrical activities in terms of section 23 of the Act, within the Karoo central astronomy advantage area 1, which is Schedule D of these Regulations.

2. Scope of the regulations in this Schedule C

- (1) These regulations apply to any central astronomy advantage area declared for radio astronomy purposes and related scientific endeavours.
- (2) If there are irreconcilable differences between the English and the Afrikaans texts of these regulations, the English text will take precedence.

3. Procedures and criteria to apply for financial compensation

- (1) An affected person who has suffered a substantiated financial loss solely as a direct result of that person's compliance with a requirement or a condition imposed in terms of Schedules A and D of these Regulations, or a person whose use of the service of a licensee or a licence exempt operator is adversely affected as a direct result of that operator's compliance with a requirement or a condition imposed in terms of Schedule A of these Regulations, may apply to the Minister for compensation in terms of this regulation.
- (2) The application for compensation contemplated in sub-regulation (1) must be submitted on the form which may be obtained from the management authority or the website of the management authority and submitted to the management authority within two (2) years of the implementation of the relevant requirement or condition.
- (3) If an applicant applies for compensation in relation to different activities or services, the applicant must submit a separate application for each activity or service.

4. Processing of the application by the management authority

- (1) Upon receipt of the application, the management authority may request further information from the applicant, in writing, and, if deemed necessary, the applicant must by way of a sworn statement provide such further information to the management authority, for consideration of the application and the applicant must respond to the request for further information within thirty (30) days from the date that the request was sent.
- (2) The management authority must consult ICASA, on each application received, to determine whether the activity involved in the application for

financial compensation was lawfully conducted within the relevant central astronomy advantage area immediately before the Schedule A Regulations were published.

- (3) The management authority must, within sixty (60) days from the date that the last information required was received, refer the application, all relevant documentation and any further particulars submitted by the applicant, with a recommendation to the Minister for a decision, provided that the Minister may extend the period of sixty (60) days on good cause shown, as set out by the management authority, by notice to the applicant.
- (4) The management authority must within thirty (30) days of receipt of the Minister's decision, inform the applicant in writing of the Minister's decision and provide the applicant with written reasons for the decision, which includes an offer of compensation as determined in accordance with regulation 5 of these Schedule C Regulations.

5. Determination of compensation by the Minister

If the Minister approves that the applicant should receive compensation, the Minister must determine the amount of compensation, having regard to all the relevant circumstances, including –

- (a) the nature and extent of the activity lawfully conducted or the service used by the applicant immediately before the implementation of the relevant requirement or condition;
- (b) the extent to which the applicant ceased the relevant activity, the nature and extent to which the applicant modified its conduct of the relevant activity, or the extent and nature to which the applicant's use of the service was adversely affected, solely as a direct result of compliance with the requirement(s) or conditions imposed in terms of Schedules A and D of these Regulations;
- (c) the property or equipment which was owned or used by the applicant to conduct the relevant activity or use the service and the extent to which the use thereof had been adversely affected solely as a direct result of compliance with the requirement(s) or conditions imposed in terms of Schedules A and D of these Regulations; and

- (d) the substantiated actual financial loss suffered by the applicant solely as a direct result of compliance with the requirement or conditions imposed in terms of Schedules A and D of these Regulations.

6. Acceptance of the offer by the applicant

- (1) Within thirty (30) days of receipt of the offer in sub-regulation 4(4), the applicant must inform the management authority in writing of its acceptance or rejection of the offer.
- (2) If the applicant accepts the offer made in terms of sub-regulation 4(4), the management authority must pay the applicant the amount in a manner and within the period agreed upon by the applicant and the management authority, which period may not be more than sixty (60) days after receipt of notice of acceptance of the offer from the applicant.

SCHEDULE D OF THESE REGULATIONS**Regulations restricting interference due to electrical activities within the Karoo central astronomy advantage area 1****1. Definitions**

For purposes of these regulations unless the context indicates otherwise –

"the Act" means the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);

"CENELEC" means the European Committee for Electrotechnical Standardisation;

"CISPR" means the International Special Committee on Radio Interference setting standards for controlling electromagnetic interference in electrical and electronic devices;

"electrical equipment" means any electrical machinery, electrical systems, appliances or devices, including any wireless data communications used for the operation of these facilities, used for construction, distribution and transmission power systems, exploration, farming, household, manufacturing, maintenance, or mining purposes;

"electrical infrastructure" means any infrastructure or facility, including any wireless data communications used for the operation of the electrical infrastructure, to be used in any way for electricity generation, electricity distribution, electricity transmission, or for a distribution or transmission power system, and electrical facilities and equipment used for these applications;

"electricity generation" means the production of electricity by any means including inverters converting direct current into alternating current;

"Electricity Regulation Act" means the Electricity Regulation Act, 2006 (Act No. 4 of 2006);

"electromagnetic emissions" means unintentional radio frequency emissions by electrical infrastructure, and electrical equipment, which characteristically occupies broad parts of the radio frequency spectrum and causes radio frequency interference;

"existing electrical equipment and infrastructure" means electrical equipment and infrastructure that is in operation or in use or where construction on site has started, prior to the date on which these regulations are promulgated by publication in the *Government Gazette*;

"isotropic antenna" means a theoretical point source or destination of electromagnetic waves which radiates the same intensity of radiation or has the same sensitivity of reception in all directions;

"IEC" means the International Electrotechnical Commission that prepares and publishes international standards for electrical, electronic and related technologies;

"IEEE" means the Institute of Electrical and Electronics Engineers in the United States of America which makes, maintains and publishes standards;

"ITU" means the International Telecommunication Union;

"Karoo Central Astronomy Advantage Areas 1, 2 and 3" means the Karoo Central Astronomy Advantage Area 1, 2 and 3 declared on 12 March 2014 in *Government Gazette* No. 37434, under Notice No. 198;

"management authority" means the organ of state to which the Minister has assigned the management of the Karoo central astronomy advantage areas in terms of section 15 of the Act and includes any party with whom the management authority has entered into a co-management agreement for the co-management of the Karoo central astronomy advantage areas in terms of section 18 of the Act;

"protection corridors" means 10-km wide corridors of land, centred on a radio astronomical spiral arms configuration, within which SKA stations within the Karoo Central Astronomy Advantage Area 1 are to be positioned, that also

applies to the Karoo Central Astronomy Advantage areas 2 and 3, depending on the radio frequency used, and as depicted and described in Annexure A to these Schedule D Regulations;

"Protection Levels Regulations 2012" means the regulations on radio astronomy protection levels to be applied in astronomy advantage areas declared for the purposes of radio astronomy on 10 February 2012, in *Government Gazette* No. 35007, under Notice No. R.90;

"radio astronomy station" means one or more receiving systems at a location, including accessory equipment, for receiving radio waves of cosmic origin for the purposes of radio astronomy;

"radio frequency interference" means the detrimental effect of received radio signals or signals from electromagnetic emissions that exceed the radio astronomy observation protection levels prescribed in the Protection Levels Regulations, 2012;

"SABS" means the South African Bureau of Standards established by section 3 of the Standards Act, 2008 (Act No. 8 of 2008);

"SANS" means a South African National Standard developed by the SABS in terms of the Standards Act, 2008 (Act No. 8 of 2008), and includes international standards adopted by the SABS;

"saturation level" means the total received power level of (minus) -100 dBm, or higher, within the transmission bandwidth of the radio communication producing the radio frequency interference level at which the saturation phenomenon occurs at a specified assessment point or points, or within a specified area;

"separation distance" means the distance required between any electrical equipment or infrastructure and the nearest SKA Infrastructure Territory or the SKA Virtual Centre, taking into account any mitigation applied to reduce the radio frequency interference, which distance is required not to exceed the applicable protection levels prescribed in the Protection Levels Regulations, 2012;

“SKA” means the Square Kilometre Array radio telescope consisting of an array of radio astronomy stations to be located in the Republic of South Africa and in participating African countries in accordance with the decision of the SKA Organisation;

“SKA Infrastructure Territory” means the protection corridors within the Karoo Central Astronomy Advantage Area 1 as depicted and described in Annexure A to these Schedule D Regulations and the 20km radius circular area around the SKA Virtual Centre; and

“SKA Virtual Centre” means the geographical point located at geographical co-ordinates 30.71292 degrees South and 21.44380 degrees East that relates to the SKA array of radio astronomy stations within the Karoo Astronomy Advantage Areas.

2. Scope of the regulations in this Schedule D

- (1) These Schedule D Regulations apply to any electrical infrastructure and electrical equipment within the geographical area of the Karoo Central Astronomy Advantage Area 1 with respect to –
 - (a) electromagnetic emissions within the radio frequency spectrum from 100 MHz to 2170 MHz declared for radio astronomy purposes; and
 - (b) radio transmissions involved in wireless data communication used for the functioning of electrical infrastructure and electrical equipment within the radio frequency spectrum from 100 MHz to 25,5 GHz declared for radio astronomy purposes.
- (2) Radio communications used for support services on an infrastructure site, and externally to the site, shall be subject to the provisions of Schedule A of these Regulations.
- (3) If there are irreconcilable differences between the English and the Afrikaans texts of these regulations, the English text will take precedence.

3. Conditions for electrical infrastructure and equipment

- (1) No person may construct, install, operate or use any electrical infrastructure and electrical equipment within the Karoo Central Astronomy Advantage Area 1 unless it complies with these Schedule D Regulations and the management authority has issued a permit in relation thereto; or, it has been exempted from the possession of a permit as provided for in sub-regulations 3(3), 3(4) and 3(5).
- (2) All electrical infrastructure and any electrical equipment used in connection therewith or on its own –
 - (a) shall not cause radio frequency interference due to electromagnetic emissions within the SKA Infrastructure Territory;
 - (b) shall not cause radio frequency interference, due to any wireless communications used within an infrastructure installation, at the SKA

Virtual Centre or saturation level interference within the SKA Infrastructure Territory; and

- (c) shall be separated from the nearest SKA Infrastructure Territory and from the SKA Virtual Centre by the required separation distances that are determined in accordance with regulation 6 of these Schedule D Regulations in order to comply with sub-regulations 3(2)(a) and 3(2)(b).
- (3) Existing electrical equipment and infrastructure is exempted from the requirement to acquire and possess a permit unless it is found that radio frequency interference is caused.
- (4) New electrical equipment and infrastructure, with an electrical power rating of greater than 100 kVA and within a distance of 30 km from the nearest SKA Infrastructure Territory, or within a distance of 50 km for electricity generation by means of wind turbines, require a permit in terms of regulation 4 of these Schedule D Regulations. At greater distances, these facilities are exempted from the requirement to acquire and possess a permit unless it is found that radio frequency interference is caused.
- (5) New electrical equipment and infrastructure with an electrical power rating of equal to or less than 100 kVA, is exempted from the requirement to acquire and possess a permit unless it is found that radio frequency interference is caused.
- (6) In the event that radio frequency interference is caused within the nearest SKA Infrastructure Territory or at the SKA Virtual Centre by electrical equipment and infrastructure exempted in terms of sub-regulations 3(3), 3(4) and 3(5), the situation shall be attended to as follows –
 - (a) the interference caused shall be investigated by the management authority to determine the source and level of interference;
 - (b) the radio frequency interference must be removed in order to ensure compliance with sub-regulations 3(2)(a) and 3(2)(b); and
 - (c) to facilitate ongoing compliance, the management authority shall determine the required permit conditions that must be complied with and issue the permit under which the electrical equipment and

infrastructure may continue to operate without causing radio frequency interference.

4. Criteria and procedures for a permit application

- (1) An applicant for a permit, contemplated in sub-regulations 3(1) and 3(4), of these Schedule D Regulations, taking into account the exemptions provided for in sub-regulations 3(3), 3(4) and 3(5), must file a permit application at the management authority on a form obtained from the management authority.
- (2) The permit application contemplated in sub-regulation 4(1) must be accompanied by the information listed and described in a schedule to be obtained from the management authority.
- (3) The information to be provided, as contemplated in sub-regulation 4(2), must comply with the requirements of regulations 5 and 6 of these Schedule D Regulations.
- (4) The management authority must consider each application for a permit filed at the management authority and evaluate the information provided in terms of sub-regulation 4(2), as applicable, and if the management authority is satisfied that there is compliance, as applicable, with regulations 3 and 4(1) of these Schedule D Regulations, a permit must be issued to the applicant no later than sixty (60) days after the date that the application was received.
- (5) If the application does not comply, as applicable, with regulations 3 or 4(1) of these Schedule D Regulations, the management authority must inform the applicant in writing within a period of thirty (30) days of the date that the application was received and allow the applicant to re-submit the application with further information, measures or plans, as is relevant.
- (6) The management authority must take into account any mitigating measures or plans, submitted with the permit application or with a re-submission of the permit application.
- (7) If the management authority decides to grant the permit,
 - (i) the authority must issue the permit; and

- (ii) the permit must include all the conditions that the permit holder must comply with relating to the electrical infrastructure and equipment.
- (8) If a person who has been issued a permit ceases operations or ceases to use any electrical infrastructure or equipment to which the permit relates, that person must give written notice thereof to the authority which granted the permit within ninety (90) days of such cessation.
- (9) If a person who has been issued a permit, carries out design retrofits or alterations to the electrical infrastructure or equipment to which the permit relates, that will increase the level of electromagnetic emissions or radio transmissions that will result in non-compliance with sub-regulations 3(2)(a) and 3(2)(b) of these Schedule D Regulations, the permit issued will become invalid and the person must submit a new application in accordance with these Schedule D Regulations.

5. Determination of electromagnetic emission and radio transmission levels

- (1) For the purposes of these Schedule D Regulations, electromagnetic emissions must be determined in accordance with any applicable standard published by the CENELEC, CISPR, IEC, IEEE, ITU or SANS or a standard prescribed in terms of the Electricity Regulation Act, 2006. The management authority and the applicant must consider the applicable options for the standard to be applied and agree on the standard to be used.
- (2) If the electromagnetic emission standard has not been determined as contemplated in sub-regulation 5(1), or the emissions are different to those specified in the applicable standard, a detailed measurement report of the actual emission levels based on the applicable international or SANS measurement standard or a measurement report from an accredited measurement laboratory in the Republic or another country must be provided by the applicant to the management authority, together with supporting documentation.
- (3) If an applicable standard, as contemplated in sub-regulation 5(1) or (2) above, is not available or deemed to be inappropriate by the management authority, or if an agreement on the standard to be applied cannot be reached, and the undertaking of a measurement is not possible due to technical or other

reasons, the management authority must determine which existing standard is the most appropriate that must be used.

(4) A suitable standard may also be established in terms of section 37 of the Act.

(5) For radio transmissions involved in wireless communications in the electrical system at the site, the aggregate values of all the transmissions at the infrastructure site on the various frequencies must be determined in accordance with the applicable standard chosen from those listed in Annexure B to these Schedule D Regulations.

6. Determination of the required separation distances

(1) The required separation distances shall be the distances required to comply with both sub-regulations 3(2)(a) and 3(2)(b) of these Schedule D Regulations, over which distances the electromagnetic and radio signal levels, after signal loss through any mitigation at the site has been taken into account, shall be reduced to the applicable protection levels prescribed in the Protection Levels Regulations, 2012.

(2) The frequency dependent propagation path lengths required, shall be determined by physical measurements or by using the applicable methods and standards for propagation calculations listed in Annexure B to these Schedule D Regulations, and shall be the required separation distances for the radio frequency interference signals involved.

(3) The measurements or propagation calculations shall be based on the following criteria:

- (a) the maximum height above sea level of the electrical equipment or infrastructure;
- (b) the ground level height above sea level plus 10 metres at the nearest SKA Infrastructure Territory and the SKA Virtual Centre;
- (c) interference levels that will not be exceeded for more than 5% of the time over a twenty-four-hour period;
- (d) use of an isotropic antenna with 0dB gain at the nearest SKA Infrastructure Territory and at the SKA Virtual Centre; and

- (e) use of a digital terrain model that will produce acceptable results and which may take ground conductivity and clutter data for the Karoo Central Astronomy Advantage Area 1 into account.
- (4) The required separation distances to comply with sub-regulations 3(2)(a) and 3(2)(b) of these Schedule D Regulations are those reflecting the highest levels of radio frequency interference, respectively at the nearest SKA Infrastructure Territory related to electromagnetic emissions and at the SKA Virtual Centre related to radio signals.

7. Procedures to resolve radio frequency interference

In the event that radio frequency interference is caused by electrical infrastructure or electrical equipment exempted from the possession of a permit in terms of sub-regulations 3(3), 3(4) or 3(5) of these Schedule D Regulations or by electrical infrastructure or electrical equipment for which a permit has been issued, due to errors or accuracy limitations in the calculations to determine the separation distances, the following criteria and procedures shall apply-

- (1) The management authority must request a detailed measurement report on the actual electromagnetic interference levels based on the applicable SANS measurement standards, or a different applicable standard as determined by the management authority, with supporting documentation, to be provided to the management authority by the person in possession of the infrastructure or electrical equipment.
- (2) If the person who possesses the electrical infrastructure or electrical equipment is not able to provide the report, then the management authority must, at the cost of the permit holder for the infrastructure or electrical equipment, arrange for the measurements to be done in order to determine to what extent the applicable protection level prescribed in the Protection Levels Regulations, 2012, is exceeded.
- (3) The electromagnetic interference must be reduced to below the applicable protection level prescribed in the Protection Levels Regulations, 2012, by establishing the required separation distance determined according to regulation 6 of these Schedule D Regulations or by implementing

appropriate mitigation measures around the source of the radio frequency interference.

(4) When the radio frequency interference situation has been resolved and the required conditions determined, a permit must be issued by the management authority in which the conditions for the ongoing operation of the electrical infrastructure or electrical equipment are specified.

(5) The person who incurred the cost to generate the radio frequency interference report may recover that cost, to the extent that it can be verified as applicable and reasonable, from the management authority in the event that the particular electrical infrastructure or equipment under consideration was wrongfully identified as the source of the radio frequency interference.

(6) If it is found that existing electrical equipment and infrastructure is causing radio frequency interference, then any cost for generating interference reports shall be borne by the management authority which shall carry out or arrange the required measurements.

8. Contraventions and penalties

(1) Contraventions for which a prosecution may be instituted in a Court of Law, are the following:

- (a) failure to be in possession of a permit where it is required, according to sub-regulations 3(1), 3(4) and 3(6)(c);
- (b) failure to comply with the conditions of a permit according to sub-regulations 3(1) and 4(7);
- (c) failure to abide by prescribed measures in these regulations to resolve interference as set out in sub-regulation 3(6)(c) and in regulation 7; and
- (d) failure by a permit holder to comply with the prescribed protection conditions as set out sub-regulation 3(2).

(2) The maximum fine for an intentional contravention of sub-regulation 8(1)(a), 8(b) or 8(1)(d) is R200 000 and for a negligent contravention is R100 000.

(3) The maximum fine for an intentional contravention of subsection 8(1)(c) is R20 000 and for a negligent contravention R5000.

- (4) The fines referred to in sub-regulations 8(2) and 8(3) may be suspended as a whole or in part subject to a condition that the person convicted is not found guilty of the same offence within a maximum of period of three years.

Annexure A to Schedule D Regulations – Map of protection corridors
Map of protection corridors containing the SKA radio astronomy stations
within the Karoo Central Astronomy Advantage Area 1

- (1) The map on the next page depicts the 20-km radius circle around the SKA Virtual Centre, within which radius circle approximately 173 SKA radio astronomy stations will be located. The map also depicts three protection corridors required for approximately 24 SKA radio astronomy stations located within the Karoo Central Astronomy Advantage Area 1.
- (2) Although the geographical area referred to is that related to the declared Karoo Central Astronomy Advantage Area 1, to define the SKA radio astronomy stations involved, the radio frequency interference to be restricted is that occurring in the whole of the radio frequency spectrum from 100 MHz to 25.5 GHz.
- (3) A smaller scale version of the map on the next page and/or a GIS-shape file is available on request from the management authority. The perimeters of the corridors are 5 km distant on either side of the spiral arms.
- (4) Applicants for a permit, who are determining radio frequency interference levels in terms of regulation 5, and required separation distances in terms of regulation 6 of these Schedule D Regulations, may request the management authority to provide the applicable geographical location on the periphery of the protection corridors or on the 20-km circle around the SKA Virtual Centre for the electromagnetic emissions under consideration.



Annexure B to Schedule D Regulations - Propagation standards**Propagation standards to determine propagation path loss**

This annexure relates to regulation 6(2) of these Schedule D Regulations. The intention of the information provided in this annexure is to assist persons involved in the determination of the propagation path loss required to determine the separation distance. The information is not meant to be prescriptive or limiting of the standards and techniques that may be used and that may provide results with a higher level of accuracy. The options stated may be considered as the minimum standards to be applied to calculate the propagation path loss.

1. ITU Recommendation ITU-R P.1144 - Guide to the application of the propagation methods of Radiocommunication Study Group 3. This recommendation lists the ITU-R radio wave propagation prediction methods that may be used for the different applications. The options applicable to electromagnetic interference predictions that relate to these Schedule D Regulations, are listed below.
 - 1.1. Recommendation ITU-R P.452 – Service employing stations on the surface of the Earth; interference
 - 1.2. Recommendation ITU-R P.526 – Propagation by diffraction
 - 1.3. Recommendation ITU-R P.528 – Aeronautical mobile
 - 1.4. Recommendation ITU-R P.530 – Line-of-sight fixed links
 - 1.5. Recommendation ITU-R P.617 – Trans-horizon fixed links
 - 1.6. Recommendation ITU-R P.2001 – Terrestrial services
2. The Longley-Rice model accepted by the Federal Communications Commission in the United States of America may also be used as it is employed in a number of computerised prediction programmes on the market.
3. Other methods for determining the propagation path loss may also be used with agreement of the management authority.