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| 3GPP TR 38.849 V18.2.0 (2023-12) | |
| Technical Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Radio Access Networks;  Introduction of 6GHz NR unlicensed operation  (Release 18) | |
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| ***3GPP***  Postal address    3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
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# Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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In the present document, modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

# 1 Scope

The present document is a technical report for Work Item on New Radio (NR) Access Technology, covering introduction of lower 6GHz NR unlicensed operation for Europe (NR\_6GHz\_unlic\_EU) and in the 5925-7125 MHz range for other regions (NR\_6GHz\_unlic\_full).

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 37.890: Feasibility Study on 6 GHz for LTE and NR in Licensed and Unlicensed Operations

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ACLR Adjacent Channel Leakage Ratio

ACS Adjacent Channel Selectivity

BS Base Station

BW Bandwidth

EIRP Effective Isotropic Radiated Power

FR Frequency Range

GSCN Global Synchronization Channel Number

ICS In-Channel Selectivity

ITU‑R Radiocommunication Sector of the International Telecommunication Union

NR New Radio

NR-ARFCN NR Absolute Radio Frequency Channel Number

OTA Over The Air

RF Radio Frequency

RX Receiver

SCS Sub-Carrier Spacing

TDD Time division Duplex

# 4 Background

Administrations in Europe have had unlicensed operation in the range 5925 to 6425 MHz for consultation. The result of this consultation is that at the November 2020 meeting the ECC with ECC Decision (20)01 “on the harmonised use of the frequency bands 5945 to 6425 MHz for the implementation of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs)” approved unlicensed operation in the range 5945 to 6425 MHz. This initiated this TR which has later been expanded to also include NR unlicensed operation in the 6 GHz band for other regions.

NR-Unlicensed is standardized in Rel-16 with the definition of band n96 covering the spectrum range 5925-7125 MHz which is currently applicable in the USA only subject to FCC Report and Order FCC 20-51. For Rel-17 3GPP WG4 is tasked to also enable unlicensed operation in the range 5945 to 6425 MHz for European deployments and in the 5925-7125 MHz range for other regions.

Regulatory information is maintained in [2].

# 5 NR Frequency band definition

## 5.1 Band definition

### 5.1.1 Band definition for lower 6GHz NR unlicensed operation

A NR band for unlicensed operation in the range 5925-6425 MHz is defined as:

Table 5.1.1-1: NR *operating bands* in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | Uplink (UL) operating band BS receive / UE transmit  FUL,low – FUL,high | Downlink (DL) operating band BS transmit / UE receive  FDL,low – FDL,high | Duplex mode |
| n102 | 5925 MHz – 6425 MHz | 5925 MHz – 6425 MHz | TDD3 |
| NOTE 3: This band is restricted to operation with shared spectrum channel access as defined in TS 37.213. | | | |

Table 5.1.1-2: *Channel bandwidths* and SCS per *operating band* in FR1

| NR Band | SCS (kHz) | *Channel bandwidth* (MHz) | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  |  |  | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
| n102 | 30 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  | 100 |
|  | 60 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  | 100 |

### 5.1.2 Band definition for the full 6GHz NR unlicensed operation

A NR band covering the full 6 GHz unlicensed range is defined as:

Table 5.1.2-1: NR *operating bands* in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| NR operating band | Uplink (UL) operating band BS receive / UE transmit  FUL,low – FUL,high | Downlink (DL) operating band BS transmit / UE receive  FDL,low – FDL,high | Duplex mode |
| n96 | 5925 MHz – 7125 MHz | 5925 MHz – 7125 MHz | TDD3 |
| NOTE 3: This band is restricted to operation with shared spectrum channel access as defined in TS 37.213. | | | |

Table 5.1.2-2: *Channel bandwidths* and SCS per *operating band* in FR1

| NR Band | SCS (kHz) | *Channel bandwidth* (MHz) | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 60 | 70 | 80 | 90 | 100 |
|  | 15 |  |  |  | 20 |  |  |  | 40 |  |  |  |  |  |  |  |
| n96 | 30 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  | 100 |
|  | 60 |  |  |  | 20 |  |  |  | 40 |  |  | 60 |  | 80 |  | 100 |

## 5.2 NR-ARFCN and GSCN

### 5.2.1 NR-ARFCN and GSCN for full 6GHz NR unlicensed operation

Operation in the full 6GHz band is to be aligned with other technologies operation in the same shared spectrum restricted to the following NR-ARFCN and GSCN points.

Applicable GSCN:

- GSCN = {9548, 9562, 9576, 9590, 9603, 9617,9631, 9645, 9659, 9673, 9687, 9701, 9714, 9728, 9742, 9756, 9770, 9784, 9798, 9812, 9826, 9840, 9853, 9867, 9881, 9895, 9909, 9923, 9937, 9951, 9964, 9978, 9992, 10006, 10020, 10034, 10048, 10062, 10076, 10090, 10103, 10117, 10131, 10145, 10159, 10173, 10187, 10201, 10214, 10228, 10242, 10256, 10270, 10284, 10298, 10312, 10325, 10339, 10353}

Applicable NR-ARFCN:

- For 20 MHz channel bandwidth, NREF = {795668, 797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332, 815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668, 829000, 830332, 831668, 833000, 834332, 835668, 837000, 838332, 839668, 841000, 842332, 843668, 845000, 846332, 847668, 849000, 850332, 851668, 853000, 854332, 855668, 857000, 858332, 859668, 861000, 862332, 863668, 865000, 866332, 867668, 869000, 870332, 871668, 873000, 874332}

- For 40 MHz channel bandwidth, NREF = {797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000, 829668, 832332, 835000, 837668, 840332, 843000, 845668, 848332, 851000, 853668, 856332, 859000, 861668, 864332, 867000, 869668, 872332}

- For 60 MHz channel bandwidth, NREF = {798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332, 830332, 831668, 835668, 837000, 841000, 842332, 846332, 847668, 851668, 853000, 857000, 858332, 862332, 863668, 867668, 869000, 873000}

- For 80 MHz channel bandwidth, NREF = {799000, 804332, 809668, 815000, 820332, 825668, 831000, 836332, 841668, 847000, 852332, 857668, 863000, 868332}

- For 100 MHz channel bandwidth, NREF = {799668, 803668, 810332, 814332, 821000, 825000, 831668, 835668, 842332, 846332, 853000, 857000, 863668, 867668, 869000, 870332, 871668}

### 5.2.2 NR-ARFCN and GSCN for lower 6GHz NR unlicensed operation

Operation in the lower 6GHz band is to be aligned with other technologies operation in the same shared spectrum restricted to the following NR-ARFCN and GSCN points.

Applicable GSCN:

- GSCN = {9548, 9562, 9576, 9590, 9603, 9617,9631, 9645, 9659, 9673, 9687, 9701, 9714, 9728, 9742, 9756, 9770, 9784, 9798, 9812, 9826, 9840, 9853, 9867}

Applicable NR-ARFCN:

- For 20 MHz channel bandwidth, NREF = {795668, 797000, 798332, 799668, 801000, 802332, 803668, 805000, 806332, 807668, 809000, 810332, 811668, 813000, 814332, 815668, 817000, 818332, 819668, 821000, 822332, 823668, 825000, 826332, 827668}

- For 40 MHz channel bandwidth, NREF = {797668, 800332, 803000, 805668, 808332, 811000, 813668, 816332, 819000, 821668, 824332, 827000}

- For 60 MHz channel bandwidth, NREF = {798332, 799668, 803668, 805000, 809000, 810332, 814332, 815668, 819668, 821000, 825000, 826332}

- For 80 MHz channel bandwidth, NREF = {799000, 804332, 809668, 815000, 820332, 825668}

- For 100 MHz channel bandwidth, NREF = {799668, 803668, 810332, 814332, 821000, 825000}

# 6 RF requirements

## 6.1 UE specific

### 6.1.1 Transmitter characteristics

This section details specific transmitter characteristics for a UE operating in the 6 GHz NR band.

Table 6.1.1-1: Summary of NS values.

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Mode | | |
| SP | LPI | VLP |
| Region 1 | | | |
| EU/CEPT | N/A | NS\_58 | NS\_64 |
| UK | N/A | NS\_01 | NS\_65 |
| Morocco | N/A | NS\_01 | NS\_65 |
| UAE | N/A | NS\_01 | N/A |
| Saudi Arabia | N/A | NS\_01 | N/A |
| Kenya | N/A | NS\_01 | NS\_68 |
| Qatar | N/A | NS\_01 | NS\_65 |
| Jordan | N/A | NS\_01 | NS\_65 |
| Russian Federation | N/A | NS\_01 | NS\_68 |
| South Africa | N/A | NS\_58 | NS\_64 |
| **Region 2** | | | |
| US | NS\_54 | NS\_53 | [NS\_66] |
| Canada | NS\_54 | NS\_59 | NS\_66 |
| Brazil | N/A | NS\_53 | NS\_67 |
| Peru | N/A | NS\_53 | N/A |
| Chile | N/A | NS\_53 | N/A |
| Costa Rica | N/A | NS\_01 | NS\_65 |
| Colombia | N/A | NS\_53 | N/A |
| Dominican Republic | N/A | NS\_60 | NS\_66 |
| Argentina | N/A | NS\_53 | N/A |
| **Region 3** | | | |
| South Korea | N/A | NS\_60 | [NS\_61] |
| Hong Kong | N/A | NS\_58 | NS\_64 |
| Australia | N/A | NS\_01 | NS\_68 |
| New Zealand | N/A | NS\_01 | NS\_68 |
| Malaysia | N/A | NS\_01 | NS\_65 |
| Japan | N/A | NS\_63 | NS\_69 |
| Singapore | N/A | NS\_01 | NS\_68 |

#### 6.1.1.1 A-MPR for a NS(s) for lower 6GHz NR unlicensed operation in Europe.

##### 6.1.1.1.1 EU/CEPT

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band as detailed in TS 38.101-1*.*

To meet the additional requirements applicable in EU as given in EN 303 687, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.1.1.1.1-1 for low power indoor (LPI) with PC5 and in Table 6.1.1.1.1-1b for PC3.

Table 6.1.1.1-1: A-MPR for PC5 LPI

|  |  |  |  |
| --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation | |
|  |  | Full2 (dB) | Partial3 (dB) |
| DFT-s-ODFM | Pi/2 BPSK4 | ≤ 1.5 | ≤ 2.5 |
|  | QPSK | ≤ 2.0 | ≤ 3.5 |
|  | 16 QAM | ≤ 2.5 | ≤ 4.0 |
|  | 64 QAM | ≤ 3.5 | ≤ 4.5 |
|  | 256 QAM | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 4.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 4.5 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel. The MPR applies to interlaced allocations with uplink resource allocation type 2 as specified in TS 38.214 [10].  NOTE 2: Full RB allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and sub-bands are transmitted according to configuration A in Table 6.2F.2-2.  NOTE 3: Partial RB allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when the transmitted sub-bands for wideband operation are transmitted according to configuration B in Table 6.2F.2-2.  NOTE 4: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 5: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, and 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR as specified in Table 6.2F.2-1 applies. | | | |

Table 6.1.1.1.1-1a: Signal setup

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Modulation | Waveform | Allocation |
| 1 | Pi/2 BPSK | DFT-s-OFDM | Full |
| 2 | Pi/2 BPSK | DFT-s-OFDM | Interlaced |
| 3 | Pi/2 BPSK | DFT-s-OFDM | Wideband |
| 4 | Pi/2 BPSK | DFT-s-OFDM | Wideband Interlaced |
| 5 | QPSK | DFT-s-OFDM | Full |
| 6 | QPSK | CP-OFDM | Full |
| 7 | QPSK | DFT-s-OFDM | Interlaced |
| 8 | QPSK | CP-OFDM | Interlaced |
| 9 | QPSK | DFT-s-OFDM | Wideband |
| 10 | QPSK | CP-OFDM | Wideband |
| 11 | QPSK | DFT-s-OFDM | Wideband Interlaced |
| 12 | QPSK | CP-OFDM | Wideband Interlaced |
| 13 | 16QAM | DFT-s-OFDM | Full |
| 14 | 16QAM | CP-OFDM | Full |
| 15 | 16QAM | DFT-s-OFDM | Interlaced |
| 16 | 16QAM | CP-OFDM | Interlaced |
| 17 | 16QAM | DFT-s-OFDM | Wideband |
| 18 | 16QAM | CP-OFDM | Wideband |
| 19 | 16QAM | DFT-s-OFDM | Wideband Interlaced |
| 20 | 16QAM | CP-OFDM | Wideband Interlaced |
| 21 | 64QAM | DFT-s-OFDM | Full |
| 22 | 64QAM | CP-OFDM | Full |
| 23 | 64QAM | DFT-s-OFDM | Interlaced |
| 24 | 64QAM | CP-OFDM | Interlaced |
| 25 | 64QAM | DFT-s-OFDM | Wideband |
| 26 | 64QAM | CP-OFDM | Wideband |
| 27 | 64QAM | DFT-s-OFDM | Wideband Interlaced |
| 28 | 64QAM | CP-OFDM | Wideband Interlaced |
| 29 | 256QAM | DFT-s-OFDM | Full |
| 30 | 256QAM | CP-OFDM | Full |
| 31 | 256QAM | DFT-s-OFDM | Interlaced |
| 32 | 256QAM | CP-OFDM | Interlaced |
| 33 | 256QAM | DFT-s-OFDM | Wideband |
| 34 | 256QAM | CP-OFDM | Wideband |
| 35 | 256QAM | DFT-s-OFDM | Wideband Interlaced |
| 36 | 256QAM | CP-OFDM | Wideband Interlaced |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.1.1-1a: A-MPR simulation results for PC3 LPI in EU/CEPT.

Table 6.1.1.1.1-1b: A-MPR for PC3 LPI (1TX)

|  |  |  |  |
| --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation | |
|  |  | Full2 (dB) | Partial3 (dB) |
| DFT-s-ODFM | Pi/2 BPSK4 | ≤ 1.5 | ≤ 4.5 |
|  | QPSK | ≤ 2.0 | ≤ 4.5 |
|  | 16 QAM | ≤ 2.5 | ≤ 4.5 |
|  | 64 QAM | ≤ 3.0 | ≤ 4.5 |
|  | 256 QAM | ≤ 4.5 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 5.0 |
|  | 16 QAM | ≤ 4.0 | ≤ 5.0 |
|  | 64 QAM | ≤ 4.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 6.5 | ≤ 7.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel. The MPR applies to interlaced allocations with uplink resource allocation type 2 as specified in TS 38.214 [10].  NOTE 2: Full RB allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and sub-bands are transmitted according to configuration A in Table 6.2F.2-2.  NOTE 3: Partial RB allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when the transmitted sub-bands for wideband operation are transmitted according to configuration B in Table 6.2F.2-2.  NOTE 4: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 5: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR as specified in Table 6.2F.2-1 applies. | | | |

For very low power (VLP) operation the out-of-band emissions and in-band power spectral density requirements are much more restrictive than for LPI. For PC5 VLP, a comprehensive set of A-MPR simulation results is provided below for 20, 40, 60, and 80 MHz channels. In Figure 6.1.1.1-1 all channels in the band are represented while in Figure 6.1.1.1-2 lower edge channels are not illustrated since those are most impacted by the additional spurious emission requirement of -45 dBm/MHz. The lower edge channels found to be impacted were the ones centered at 5955 MHz for 20 MHz channels, 5965 MHz for 40 MHz channels, 5975 MHz and 5995 MHz for 60 MHz channels, and 5985 MHz for 80 MHz channels.

Table 6.1.1.1-2. Simulation scenarios for all CBW/SCS

|  |  |  |  |
| --- | --- | --- | --- |
| Scenario | Modulation | DFT/CP | Allocation |
| 1 | QPSK | CP | Interlace\_0 |
| 2 | QPSK | DFT-S | Interlace\_0 |
| 3 | QPSK | CP | Full |
| 4 | QPSK | DFT-S | Full |
| 5 | 16QAM | CP | Interlace\_0 |
| 6 | 16QAM | DFT-S | Interlace\_0 |
| 7 | 16QAM | CP | Full |
| 8 | 16QAM | DFT-S | Full |
| 9 | 64QAM | CP | Interlace\_0 |
| 10 | 64QAM | DFT-S | Interlace\_0 |
| 11 | 64QAM | CP | Full |
| 12 | 64QAM | DFT-S | Full |
| 13 | 256QAM | CP | Interlace\_0 |
| 14 | 256QAM | DFT-S | Interlace\_0 |
| 15 | 256QAM | CP | Full |
| 16 | 256QAM | DFT-S | Full |

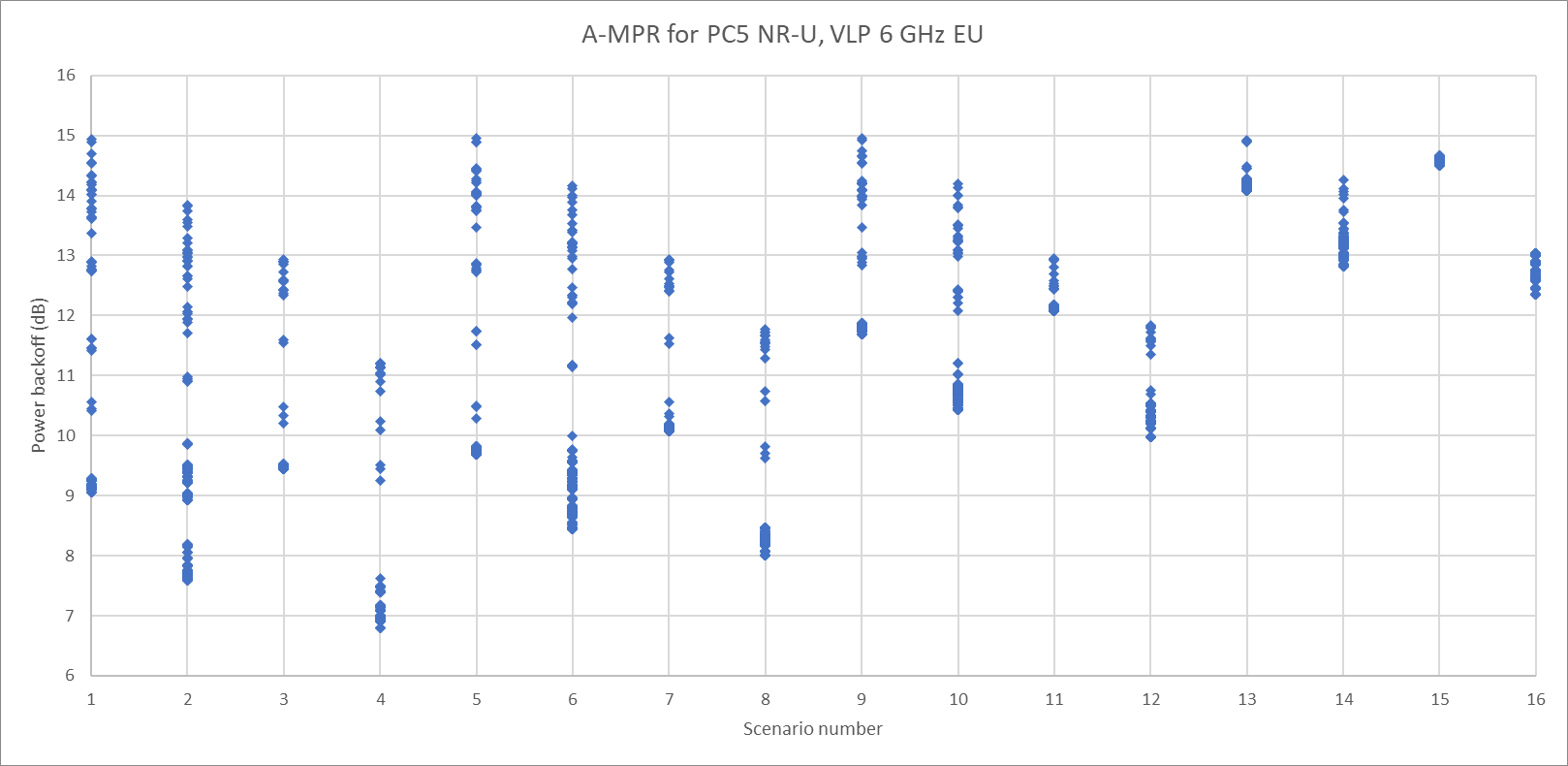


Figure 6.1.1.1.1-1. Power backoff for 20, 40, 60, and 80 MHz channels

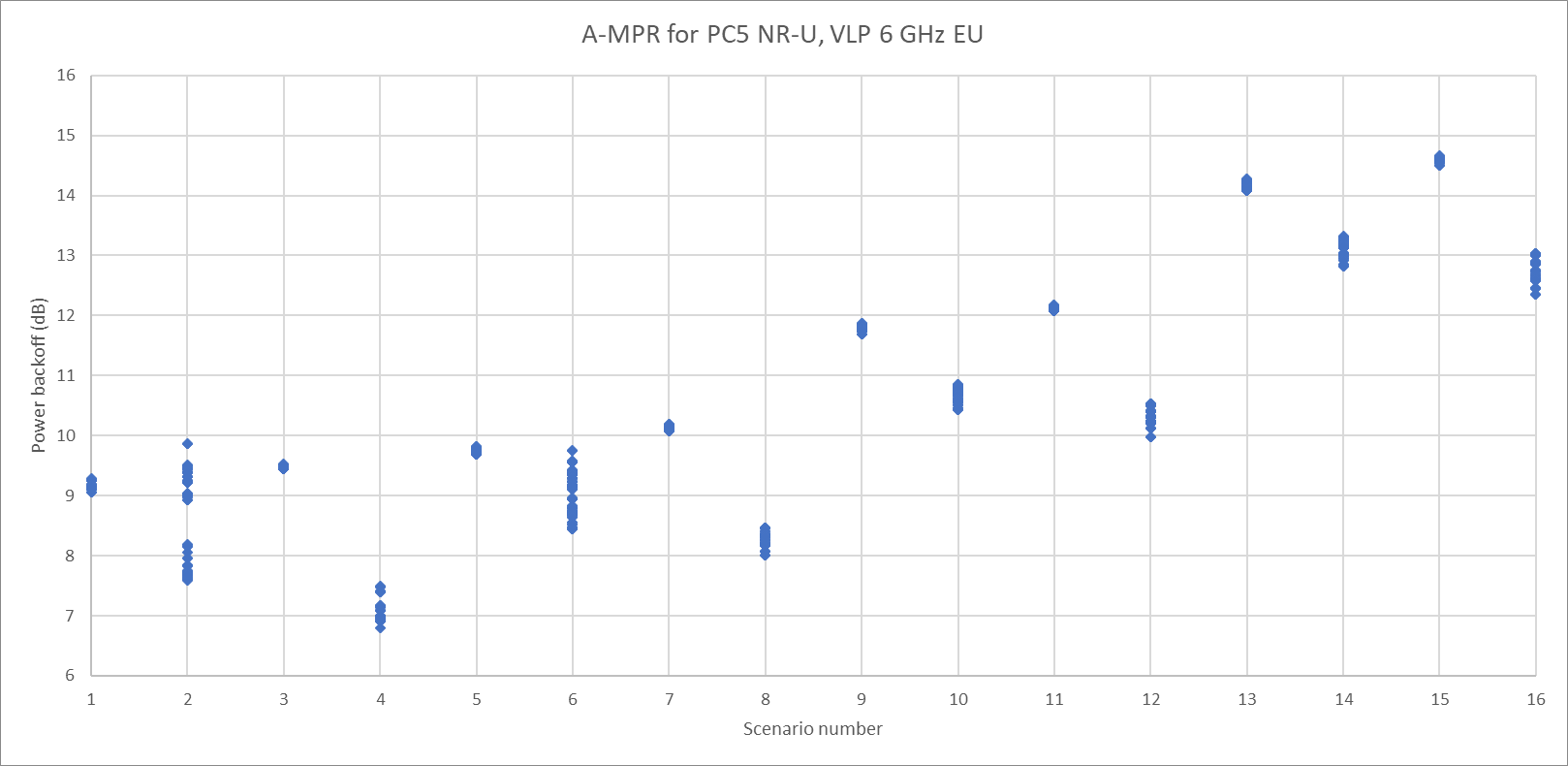


Figure 6.1.1.1.1-2. Power backoff with lower edge channels excluded

Based on these simulation results, the A-MPR table for VLP is provided below in Table 6.1.1.1.1-3.

Table 6.1.1.1.1-3. PC5 A-MPR table for VLP

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | | RB Allocation (Note 3) | |
|  |  | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 12 | ≤ 14 | ≤ 8 | ≤ 10 |
|  | 16 QAM | ≤ 12 | ≤ 15 | ≤ 9 | ≤ 10 |
|  | 64 QAM | ≤ 12 | ≤ 15 | ≤ 11 | ≤ 11 |
|  | 256 QAM | ≤ 13 | ≤ 15 | ≤ 13 | ≤ 14 |
| CP-OFDM | QPSK | ≤ 13 | ≤ 15 | ≤ 10 | ≤ 10 |
|  | 16 QAM | ≤ 13 | ≤ 15 | ≤ 11 | ≤ 10 |
|  | 64 QAM | ≤ 13 | ≤ 15 | ≤ 13 | ≤ 12 |
|  | 256 QAM | ≤ 15 | ≤ 15 | ≤ 15 | ≤ 15 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channels centered at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channels centered at the nearest NR-ARFCN corresponding to 5975 and 5995 MHz and 80 MHz channels centered at the nearest NR-ARFCN corresponding to 5985 MHz.  NOTE 3: Applicable for all valid channels other than those enumerated under NOTE 2. | | | | | |

##### 6.1.1.2.2 Australia and New Zealand

Table 6.1.1.2.2-1: Signal setup (LPI).

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Modulation | Waveform | Allocation |
| 1 | QPSK | DFT-s-OFDM | Full |
| 2 | QPSK | CP-OFDM | Full |
| 3 | QPSK | DFT-s-OFDM | Interlaced |
| 4 | QPSK | CP-OFDM | Interlaced |
| 5 | QPSK | DFT-s-OFDM | Wideband |
| 6 | QPSK | CP-OFDM | Wideband |
| 7 | QPSK | DFT-s-OFDM | Wideband Interlaced |
| 8 | QPSK | CP-OFDM | Wideband Interlaced |
| 9 | 16QAM | DFT-s-OFDM | Full |
| 10 | 16QAM | CP-OFDM | Full |
| 11 | 16QAM | DFT-s-OFDM | Interlaced |
| 12 | 16QAM | CP-OFDM | Interlaced |
| 13 | 16QAM | DFT-s-OFDM | Wideband |
| 14 | 16QAM | CP-OFDM | Wideband |
| 15 | 16QAM | DFT-s-OFDM | Wideband Interlaced |
| 16 | 16QAM | CP-OFDM | Wideband Interlaced |
| 17 | 64QAM | DFT-s-OFDM | Full |
| 18 | 64QAM | CP-OFDM | Full |
| 19 | 64QAM | DFT-s-OFDM | Interlaced |
| 20 | 64QAM | CP-OFDM | Interlaced |
| 21 | 64QAM | DFT-s-OFDM | Wideband |
| 22 | 64QAM | CP-OFDM | Wideband |
| 23 | 64QAM | DFT-s-OFDM | Wideband Interlaced |
| 24 | 64QAM | CP-OFDM | Wideband Interlaced |
| 25 | 256QAM | DFT-s-OFDM | Full |
| 26 | 256QAM | CP-OFDM | Full |
| 27 | 256QAM | DFT-s-OFDM | Interlaced |
| 28 | 256QAM | CP-OFDM | Interlaced |
| 29 | 256QAM | DFT-s-OFDM | Wideband |
| 30 | 256QAM | CP-OFDM | Wideband |
| 31 | 256QAM | DFT-s-OFDM | Wideband Interlaced |
| 32 | 256QAM | CP-OFDM | Wideband Interlaced |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.2-1: A-MPR simulation results for PC5 LPI in Australia.

Table 6.1.1.2.2-2: A-MPR for PC5 LPI in Australia

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| CP-OFDM | QPSK | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 7.0 | ≤ 9.5 | ≤ 6.0 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | |

##### 6.1.1.2.3 Japan

Table 6.1.1.2.3-1: Signal setup (LPI and VLP).

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Modulation | Waveform | Allocation |
| 1 | Pi/2 BPSK | DFT-s-OFDM | Full |
| 2 | Pi/2 BPSK | DFT-s-OFDM | Interlaced |
| 3 | Pi/2 BPSK | DFT-s-OFDM | Wideband |
| 4 | Pi/2 BPSK | DFT-s-OFDM | Wideband Interlaced |
| 5 | QPSK | DFT-s-OFDM | Full |
| 6 | QPSK | CP-OFDM | Full |
| 7 | QPSK | DFT-s-OFDM | Interlaced |
| 8 | QPSK | CP-OFDM | Interlaced |
| 9 | QPSK | DFT-s-OFDM | Wideband |
| 10 | QPSK | CP-OFDM | Wideband |
| 11 | QPSK | DFT-s-OFDM | Wideband Interlaced |
| 12 | QPSK | CP-OFDM | Wideband Interlaced |
| 13 | 16QAM | DFT-s-OFDM | Full |
| 14 | 16QAM | CP-OFDM | Full |
| 15 | 16QAM | DFT-s-OFDM | Interlaced |
| 16 | 16QAM | CP-OFDM | Interlaced |
| 17 | 16QAM | DFT-s-OFDM | Wideband |
| 18 | 16QAM | CP-OFDM | Wideband |
| 19 | 16QAM | DFT-s-OFDM | Wideband Interlaced |
| 20 | 16QAM | CP-OFDM | Wideband Interlaced |
| 21 | 64QAM | DFT-s-OFDM | Full |
| 22 | 64QAM | CP-OFDM | Full |
| 23 | 64QAM | DFT-s-OFDM | Interlaced |
| 24 | 64QAM | CP-OFDM | Interlaced |
| 25 | 64QAM | DFT-s-OFDM | Wideband |
| 26 | 64QAM | CP-OFDM | Wideband |
| 27 | 64QAM | DFT-s-OFDM | Wideband Interlaced |
| 28 | 64QAM | CP-OFDM | Wideband Interlaced |
| 29 | 256QAM | DFT-s-OFDM | Full |
| 30 | 256QAM | CP-OFDM | Full |
| 31 | 256QAM | DFT-s-OFDM | Interlaced |
| 32 | 256QAM | CP-OFDM | Interlaced |
| 33 | 256QAM | DFT-s-OFDM | Wideband |
| 34 | 256QAM | CP-OFDM | Wideband |
| 35 | 256QAM | DFT-s-OFDM | Wideband Interlaced |
| 36 | 256QAM | CP-OFDM | Wideband Interlaced |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.3-1: A-MPR simulation results for PC5 LPI in Japan.

Table 6.1.1.2.3-3a: A-MPR for PC5 LPI in Japan (lower edge)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 2) | RB Allocation  (Note 3) | |
|  |  | Full/Partial | Full (dB) | Partial (dB) |
| DFT-s-OFDM | PI/2 BPSK4 | See Table PC5 MPR | ≤ 2.0 | ≤ 3.0 |
| QPSK | ≤ 2.5 | ≤ 3.5 |
| 16 QAM | ≤ 3.0 | ≤ 3.5 |
|  | 64 QAM |  | ≤ 3.5 | ≤ 4.5 |
|  | 256 QAM |  | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK |  | ≤ 4.5 | ≤ 5.0 |
|  | 16 QAM |  | ≤ 4.5 | ≤ 5.5 |
|  | 64 QAM |  | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM |  | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 3.  NOTE 3: Applicable for 40 MHz channels centered at the nearest NR-ARFCN corresponding to [5965 MHz], 60 MHz channels centered at the nearest NR-ARFCN corresponding to [5975 and 5995 MHz], and 80 MHz channels centered at the nearest NR-ARFCN corresponding to [5985 MHz].  NOTE 4: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 5: Channel bandwidth sizes of 60MHz and 100MHz are not applicable for this network signalling. | | | | |

Table 6.1.1.2.3-3b: A-MPR for PC5 LPI in Japan (upper edge)

|  |  |  |  |
| --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation  (Note 3) | |
|  |  | Full (dB) | Partial (dB) |
| DFT-s-OFDM | PI/2 BPSK4 | ≤ 2.0 | ≤ 3.0 |
| QPSK | ≤ 2.0 | ≤ 3.0 |
| 16 QAM | ≤ 2.5 | ≤ 3.5 |
|  | 64 QAM | ≤ 3.5 | ≤ 4.5 |
|  | 256 QAM | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 4.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 4.5 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated or when not all transmitted sub-bands for wideband operation are transmitted.  NOTE 2: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to [6415 MHz], 40 MHz channels centered at the nearest NR-ARFCN corresponding to [6405 MHz] and 80 MHz channels centered at the nearest NR-ARFCN corresponding to [6385 MHz].  NOTE 3: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 4: Channel bandwidth sizes of 60MHz and 100MHz are not applicable for this network signalling. | | | |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.3-2: A-MPR simulation results for PC5 VLP in Japan.

Table 6.1.1.2.3-3: A-MPR for PC5 VLP in Japan

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | |
| 20 MHz | | 40 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | PI/2 BPSK2 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.5 | ≤ 6.5 | ≤ 7.0 |
| QPSK | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.5 | ≤ 6.5 | ≤ 7.0 |
| 16 QAM | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.5 | ≤ 6.5 | ≤ 7.0 |
| 64 QAM | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.5 | ≤ 6.5 | ≤ 7.0 |
| 256 QAM | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.5 | ≤ 6.5 | ≤ 7.0 |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 8.0 | ≤ 6.5 | ≤ 8.5 |
| 16 QAM | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 8.0 | ≤ 6.5 | ≤ 8.5 |
| 64 QAM | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 8.0 | ≤ 6.5 | ≤ 8.5 |
| 256 QAM | ≤ 7.0 | ≤ 6.0 | ≤ 6.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.5 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies.  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 3: Channel bandwidth sizes of 60MHz and 100MHz are not applicable for this network signalling. | | | | | | | |

#### 6.1.1.2 A-MPR for a NS(s) for the full 6GHz NR unlicensed operation

##### 6.1.1.2.1 Canada

Table 6.1.1.2.1-1: Signal setup (LPI).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ID | Waveform | BW | RB Setup | SCS |
| Full Allocation  Single CC | 1 | DFT-s-OFDM | 20 | 100RB3 | 15 |
| 2 | DFT-s-OFDM | 20 | 100RB0 | 15 |
| 3 | DFT-s-OFDM | 20 | 50RB0 | 30 |
| 4 | DFT-s-OFDM | 40 | 216RB0 | 15 |
| 5 | DFT-s-OFDM | 60 | 162RB0 | 30 |
| 6 | DFT-s-OFDM | 80 | 216RB0 | 30 |
| 7 | CP-OFDM | 20 | 106RB0 | 15 |
| 8 | CP-OFDM | 20 | 51RB0 | 30 |
| 9 | CP-OFDM | 40 | 216RB0 | 15 |
| 10 | CP-OFDM | 60 | 162RB0 | 30 |
| 11 | CP-OFDM | 80 | 217RB0 | 30 |
| Interlaced Allocation  Single CC | 12 | DFT-s-OFDM | 20 | 1RB0 every 10RBs (10x) | 15 |
| 13 | DFT-s-OFDM | 40 | 1RB0 every 10RBs (20x) | 15 |
| 14 | DFT-s-OFDM | 60 | 1RB0 every 10RBs (30x) | 30 |
| 15 | DFT-s-OFDM | 80 | 1RB0 every 5RBs (40x) | 30 |
| 16 | CP-OFDM | 20 | 1 RB0 every 10RBs (10x) | 15 |
| 17 | CP-OFDM | 40 | 1RB0 every 10RBs (22x) | 15 |
| 18 | CP-OFDM | 60 | 1RB0 every 10RBs (33x) | 30 |
| 19 | CP-OFDM | 80 | 1RB0 every 5RBs (44x) | 30 |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.1-1: A-MPR simulation results for PC5 LPI in Canada.

Table 6.1.1.2.1-2: A-MPR for PC5 LPI in Canada

|  |  |  |  |
| --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | |
| 20 MHz | |
| Full (dB) | Partial (dB) |
| DFT-s-ODFM | PI/2 BPSK | ≤ 3.0 | ≤ 5.5 |
|  | QPSK | ≤ 3.0 | ≤ 5.5 |
|  | 16 QAM | ≤ 3.0 | ≤ 5.5 |
|  | 64 QAM | ≤ 3.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 5.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 5.5 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 7.0 | ≤ 7.0 |

Table 6.1.1.2.1-3: Signal setup (VLP).

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Modulation | Waveform | Allocation |
| 1 | QPSK | DFT-s-OFDM | Full |
| 2 | QPSK | CP-OFDM | Full |
| 3 | QPSK | DFT-s-OFDM | Interlaced |
| 4 | QPSK | CP-OFDM | Interlaced |
| 5 | QPSK | DFT-s-OFDM | Wideband |
| 6 | QPSK | CP-OFDM | Wideband |
| 7 | QPSK | DFT-s-OFDM | Wideband Interlaced |
| 8 | QPSK | CP-OFDM | Wideband Interlaced |
| 9 | 16QAM | DFT-s-OFDM | Full |
| 10 | 16QAM | CP-OFDM | Full |
| 11 | 16QAM | DFT-s-OFDM | Interlaced |
| 12 | 16QAM | CP-OFDM | Interlaced |
| 13 | 16QAM | DFT-s-OFDM | Wideband |
| 14 | 16QAM | CP-OFDM | Wideband |
| 15 | 16QAM | DFT-s-OFDM | Wideband Interlaced |
| 16 | 16QAM | CP-OFDM | Wideband Interlaced |
| 17 | 64QAM | DFT-s-OFDM | Full |
| 18 | 64QAM | CP-OFDM | Full |
| 19 | 64QAM | DFT-s-OFDM | Interlaced |
| 20 | 64QAM | CP-OFDM | Interlaced |
| 21 | 64QAM | DFT-s-OFDM | Wideband |
| 22 | 64QAM | CP-OFDM | Wideband |
| 23 | 64QAM | DFT-s-OFDM | Wideband Interlaced |
| 24 | 64QAM | CP-OFDM | Wideband Interlaced |
| 25 | 256QAM | DFT-s-OFDM | Full |
| 26 | 256QAM | CP-OFDM | Full |
| 27 | 256QAM | DFT-s-OFDM | Interlaced |
| 28 | 256QAM | CP-OFDM | Interlaced |
| 29 | 256QAM | DFT-s-OFDM | Wideband |
| 30 | 256QAM | CP-OFDM | Wideband |
| 31 | 256QAM | DFT-s-OFDM | Wideband Interlaced |
| 32 | 256QAM | CP-OFDM | Wideband Interlaced |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.1-2: A-MPR simulation results for PC5 VLP in Canada.

Table 6.1.1.2.1-4: A-MPR for PC5 VLP in Canada

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 16 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 64 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 256 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| CP-OFDM | QPSK | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 16 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 64 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| 256 QAM | ≤ 16.0 | ≤ 18.5 | ≤ 12.5 | ≤ 15.5 | ≤ 11.0 | ≤ 14.0 | ≤ 9.5 | ≤ 12.5 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | |

##### 6.1.1.2.2 South Korea

Table 6.1.1.2.2-1: Signal setup (LPI and VLP).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ID | Waveform | BW | RB Setup | SCS |
| Full Allocation  Single CC | 1 | DFT-s-OFDM | 20 | 100RB3 | 15 |
| 2 | DFT-s-OFDM | 20 | 100RB0 | 15 |
| 3 | DFT-s-OFDM | 20 | 50RB0 | 30 |
| 4 | DFT-s-OFDM | 40 | 216RB0 | 15 |
| 5 | DFT-s-OFDM | 60 | 162RB0 | 30 |
| 6 | DFT-s-OFDM | 80 | 216RB0 | 30 |
| 7 | CP-OFDM | 20 | 106RB0 | 15 |
| 8 | CP-OFDM | 20 | 51RB0 | 30 |
| 9 | CP-OFDM | 40 | 216RB0 | 15 |
| 10 | CP-OFDM | 60 | 162RB0 | 30 |
| 11 | CP-OFDM | 80 | 217RB0 | 30 |
| Interlaced Allocation  Single CC | 12 | DFT-s-OFDM | 20 | 1RB0 every 10RBs (10x) | 15 |
| 13 | DFT-s-OFDM | 40 | 1RB0 every 10RBs (20x) | 15 |
| 14 | DFT-s-OFDM | 60 | 1RB0 every 10RBs (30x) | 30 |
| 15 | DFT-s-OFDM | 80 | 1RB0 every 5RBs (40x) | 30 |
| 16 | CP-OFDM | 20 | 1 RB0 every 10RBs (10x) | 15 |
| 17 | CP-OFDM | 40 | 1RB0 every 10RBs (22x) | 15 |
| 18 | CP-OFDM | 60 | 1RB0 every 10RBs (33x) | 30 |
| 19 | CP-OFDM | 80 | 1RB0 every 5RBs (44x) | 30 |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.2-1: A-MPR simulation results for PC5 LPI in South Korea.

Table 6.1.1.2.2-2: A-MPR for PC5 LPI in South Korea

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 4.0 | ≤ 5.5 | ≤ 3.5 | ≤ 4.5 | ≤ 3.0 | ≤ 4.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 5.0 | ≤ 3.5 | ≤ 5.0 |
| 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 5.0 | ≤ 3.5 | ≤ 5.0 |
| 256 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.0 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |

Table 6.1.1.2.2-3 contains A-MPR values for the 5945-6425MHz frequency range based on South Korea regulatory requirements.

Table 6.1.1.2.2-3: A-MPR for PC5 VLP in South Korea (5945-6425MHz).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | |

Table 6.1.1.2.2-4 contains A-MPR values for the 5925-5945MHz frequency range based on South Korea regulatory requirements.

Table 6.1.1.2.2-4: A-MPR for PC5 VLP in South Korea (5925-5945MHz).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 8.5 | ≤ 11.5 | ≤ 7.0 | ≤ 9.0 | ≤ 6.5 | ≤ 7.5 | ≤ 6.5 | ≤ 7.0 |
| 16 QAM | ≤ 8.5 | ≤ 11.5 | ≤ 7.0 | ≤ 9.0 | ≤ 6.5 | ≤ 7.5 | ≤ 6.5 | ≤ 7.0 |
| 64 QAM | ≤ 8.5 | ≤ 11.5 | ≤ 7.0 | ≤ 9.0 | ≤ 6.5 | ≤ 7.5 | ≤ 6.5 | ≤ 7.0 |
| 256 QAM | ≤ 8.5 | ≤ 11.5 | ≤ 7.0 | ≤ 9.0 | ≤ 6.5 | ≤ 7.5 | ≤ 6.5 | ≤ 7.0 |
| CP-OFDM | QPSK | ≤ 11 | ≤ 12.5 | ≤ 9.0 | ≤ 11.0 | ≤ 7.5 | ≤ 9.5 | ≤ 7.0 | ≤ 8.5 |
| 16 QAM | ≤ 11 | ≤ 12.5 | ≤ 9.0 | ≤ 11.0 | ≤ 7.5 | ≤ 9.5 | ≤ 7.0 | ≤ 8.5 |
| 64 QAM | ≤ 11 | ≤ 12.5 | ≤ 9.0 | ≤ 11.0 | ≤ 7.5 | ≤ 9.5 | ≤ 7.0 | ≤ 8.5 |
| 256 QAM | ≤ 11 | ≤ 12.5 | ≤ 9.0 | ≤ 11.0 | ≤ 7.5 | ≤ 9.5 | ≤ 7.0 | ≤ 8.5 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies.  NOTE 2: This table is applicable when the channel raster point is extended so that first 20MHz, i.e. 5925-5945MHz, can be used by NR-U. | | | | | | | | | |

Table 6.1.1.2.2-5 provides the A-MPR values for PC3 LPI with 1Tx based on South Korea regulatory requirements.

Table 6.1.1.2.2-5: A-MPR for PC3 LPI with 1Tx in South Korea

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | 100 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-OFDM | Pi/2 BPSK2 | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 2.5 | ≤ 5.0 |
| QPSK | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 2.5 | ≤ 5.0 |
| 16 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 2.5 | ≤ 5.0 |
| 64 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 2.5 | ≤ 5.0 |
| 256 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 4.5 | ≤ 6.0 | ≤ 4.5 | ≤ 5.0 |
| CP-OFDM | QPSK | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 4.0 | ≤ 6.0 | ≤ 3.5 | ≤ 5.0 |
| 16 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 4.0 | ≤ 6.0 | ≤ 3.5 | ≤ 5.0 |
| 64 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 4.0 | ≤ 6.0 | ≤ 4.0 | ≤ 5.0 |
| 256 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 6.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0. | | | | | | | | | | | |

Table 6.1.1.2.2-6 provides the A-MPR values for PC3 LPI with 2Tx based on South Korea regulatory requirements.

Table 6.1.1.2.2-6: A-MPR for PC3 LPI with 2Tx in South Korea

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | 100 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-OFDM | Pi/2 BPSK2 | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 3.0 | ≤ 5.5 |
| QPSK | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 3.0 | ≤ 5.5 |
| 16 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 3.0 | ≤ 5.5 |
| 64 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 3.0 | ≤ 6.0 | ≤ 3.0 | ≤ 5.5 |
| 256 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 4.5 | ≤ 7.0 | ≤ 4.5 | ≤ 6.0 | ≤ 4.5 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 5.0 | ≤ 7.0 | ≤ 4.5 | ≤ 6.0 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 5.0 | ≤ 7.0 | ≤ 4.5 | ≤ 6.0 | ≤ 4.5 | ≤ 5.5 |
| 64 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 5.0 | ≤ 7.0 | ≤ 4.5 | ≤ 6.0 | ≤ 4.5 | ≤ 5.5 |
| 256 QAM | ≤ 9.5 | ≤ 11.5 | ≤ 6.0 | ≤ 9.0 | ≤ 5.0 | ≤ 7.0 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 6.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0. | | | | | | | | | | | |

##### 6.1.1.2.3 Peru and Chile

Table 6.1.1.2.3-1: Signal setup (LPI).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ID | Waveform | BW | RB Setup | SCS |
| Full Allocation  Single CC | 1 | DFT-s-OFDM | 20 | 100RB3 | 15 |
| 2 | DFT-s-OFDM | 20 | 100RB0 | 15 |
| 3 | DFT-s-OFDM | 20 | 50RB0 | 30 |
| 4 | DFT-s-OFDM | 40 | 216RB0 | 15 |
| 5 | DFT-s-OFDM | 60 | 162RB0 | 30 |
| 6 | DFT-s-OFDM | 80 | 216RB0 | 30 |
| 7 | CP-OFDM | 20 | 106RB0 | 15 |
| 8 | CP-OFDM | 20 | 51RB0 | 30 |
| 9 | CP-OFDM | 40 | 216RB0 | 15 |
| 10 | CP-OFDM | 60 | 162RB0 | 30 |
| 11 | CP-OFDM | 80 | 217RB0 | 30 |
| Interlaced Allocation  Single CC | 12 | DFT-s-OFDM | 20 | 1RB0 every 10RBs (10x) | 15 |
| 13 | DFT-s-OFDM | 40 | 1RB0 every 10RBs (20x) | 15 |
| 14 | DFT-s-OFDM | 60 | 1RB0 every 10RBs (30x) | 30 |
| 15 | DFT-s-OFDM | 80 | 1RB0 every 5RBs (40x) | 30 |
| 16 | CP-OFDM | 20 | 1 RB0 every 10RBs (10x) | 15 |
| 17 | CP-OFDM | 40 | 1RB0 every 10RBs (22x) | 15 |
| 18 | CP-OFDM | 60 | 1RB0 every 10RBs (33x) | 30 |
| 19 | CP-OFDM | 80 | 1RB0 every 5RBs (44x) | 30 |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.3-1: A-MPR simulation results for PC5 LPI in Peru and Chile.

Table 6.1.1.2.3-2: A-MPR for PC5 LPI in Peru and Chile

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 3.0 | ≤ 5.5 |
| 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 3.0 | ≤ 5.5 |
| 64 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 3.0 | ≤ 5.5 |
| 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 5.0 | ≤ 6.5 | ≤ 5.0 | ≤ 5.5 |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 |
| 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 |
| 64 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 7.0 | ≤ 8.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |

The A-MPR results for PC5 LPI in Peru and Chile are mostly identical to the A-MPR results defined by NS\_53 (LPI in US). In some cases, A-MPR results are 0.5-1dB relaxed comparing to NS\_53. Thus, accounting for the marginal difference between these A-MPR values and NS\_53, the latter can be re-used to support Peru and Chile.

##### 6.1.1.2.4 Brazil

Table 6.1.1.2.4-1: Signal setup (VLP).

|  |  |  |  |
| --- | --- | --- | --- |
| ID | Modulation | Waveform | Allocation |
| 1 | QPSK | DFT-s-OFDM | Full |
| 2 | QPSK | CP-OFDM | Full |
| 3 | QPSK | DFT-s-OFDM | Interlaced |
| 4 | QPSK | CP-OFDM | Interlaced |
| 5 | QPSK | DFT-s-OFDM | Wideband |
| 6 | QPSK | CP-OFDM | Wideband |
| 7 | QPSK | DFT-s-OFDM | Wideband Interlaced |
| 8 | QPSK | CP-OFDM | Wideband Interlaced |
| 9 | 16QAM | DFT-s-OFDM | Full |
| 10 | 16QAM | CP-OFDM | Full |
| 11 | 16QAM | DFT-s-OFDM | Interlaced |
| 12 | 16QAM | CP-OFDM | Interlaced |
| 13 | 16QAM | DFT-s-OFDM | Wideband |
| 14 | 16QAM | CP-OFDM | Wideband |
| 15 | 16QAM | DFT-s-OFDM | Wideband Interlaced |
| 16 | 16QAM | CP-OFDM | Wideband Interlaced |
| 17 | 64QAM | DFT-s-OFDM | Full |
| 18 | 64QAM | CP-OFDM | Full |
| 19 | 64QAM | DFT-s-OFDM | Interlaced |
| 20 | 64QAM | CP-OFDM | Interlaced |
| 21 | 64QAM | DFT-s-OFDM | Wideband |
| 22 | 64QAM | CP-OFDM | Wideband |
| 23 | 64QAM | DFT-s-OFDM | Wideband Interlaced |
| 24 | 64QAM | CP-OFDM | Wideband Interlaced |
| 25 | 256QAM | DFT-s-OFDM | Full |
| 26 | 256QAM | CP-OFDM | Full |
| 27 | 256QAM | DFT-s-OFDM | Interlaced |
| 28 | 256QAM | CP-OFDM | Interlaced |
| 29 | 256QAM | DFT-s-OFDM | Wideband |
| 30 | 256QAM | CP-OFDM | Wideband |
| 31 | 256QAM | DFT-s-OFDM | Wideband Interlaced |
| 32 | 256QAM | CP-OFDM | Wideband Interlaced |

Chart, scatter chart

Description automatically generated

Figure 6.1.1.2.4-1: A-MPR simulation results for PC5 LPI in Brazil.

Table 6.1.1.2.4-2: A-MPR for PC5 LPI in Brazil

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| DFT-s-ODFM | QPSK | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 16 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 64 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 256 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| CP-OFDM | QPSK | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 16 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 64 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| 256 QAM | ≤ 13.0 | ≤ 15.5 | ≤ 9.5 | ≤ 12.5 | ≤ 8.0 | ≤ 11 | ≤ 6.5 | ≤ 9.5 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | |

6.1.2 Receiver characteristics

## 6.2 BS specific

6.2.1 Transmitter characteristics

For operation in full unlicensed band 5925-7125MHz, existing BS transmitter requirements for n96 can be reused.

6.2.2 Receiver characteristics

For operation in full unlicensed band 5925-7125MHz, existing BS receiver requirements for n96 can be reused.

# 7 RRM

## 7.1 Frequency bands grouping

Annex A (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2021-01 | RAN4-98e | R4-2101927 |  |  |  | TR Skeleton | 0.0.0 |
| 2021-02 | RAN4-98e | R4-2101928 |  |  |  | draft TR after RAN4-98e | 0.1.0 |
| 2021-04 | RAN4-98bis-e | R4-2107196 |  |  |  | draft TR after RAN4-98bis-e Inclusion of: R4-2105384 - TP to TR 38.849 on NR-ARFCN and GSCN points | 0.2.0 |
| 2021-05 | RAN4-99e | R4-2110691 |  |  |  | draft TR after RAN4-99-e Inclusion of:  R4-2107789 - TP to TR 38.849 on MPR values for LPI deployments  Removal of automatic bullets | 0.3.0 |
| 2021-08 | RAN4-100e | R4-2113692 |  |  |  | draft TR after RAN4-100-e Inclusion of:  R4-2114883 - TP to TR 38.849 on A-MPR for VLP | 0.4.0 |
| 2021-11 | RAN4-101e | R4-218617 |  |  |  | Update of TR to also include WI NR\_6GHz\_unlic\_full as per RAN agreement. | 0.4.1 |
| 2021-11 | RAN4-101e | R4-218616 |  |  |  | draft TR after RAN4-101-e Inclusion of:  R4-2117953 - Text proposal for TR 38.849 with A-MPR values | 0.5.0 |
| 2022-01 | RAN4-101bis-e | R4-2201080 |  |  |  | draft TR after RAN4-101bis-e Inclusion of:  R4-2201083 - TP to TR 38.849 updating clause 5.1 for the lower 6GHz band  R4-2201515 - TP for BS RF requirements  R4-2202264- TP to TR 38.849 updating clause 5.1 for the full 6GHz band  R4-2202258 - TP for TR 38.849  R4-2202263 - TP for TR 38.849 | 0.6.0 |
| 2022-03 | RAN4-102e | R4-2205559 |  |  |  | Draft TR after RAN4-102e  Inclusion of:  R4-2206369 - A-MPR analysis results for NR-U(VLP) considering regulatory parameters in Korea  R4-2205179 - Text proposal for TR 38.849 (background results for the existing A-MPR values)  R4-2203664 - TP for TR 38.849  R4-2206367 - Text proposal for TR 38.849 | 0.7.0 |
| 2022 | RAN95 | RP-220327 |  |  |  | TR for RAN approval | 2.0.0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2022-03 | RAN#95 |  |  |  |  | Approved by plenary – Rel-17 spec under change control | 17.0.0 |
| 2022-06 | RAN#96 | RP-221673 | 0001 |  | F | CR to TR 38.849 on adding NS value for South Korea VLP mode | 17.1.0 |
| 2023-06 | RAN#100 | RP-231343 | 0003 | 2 | F | Introduction of new countries with associated NS values and A-MPR back-off | 18.0.0 |
| 2023-09 | RAN#101 | RP-232499 | 0004 |  | F | Update of the NS values for new countries supporting license-exempt operation on the 6GHz band | 18.1.0 |
| 2023-09 | RAN#101 | RP-232486 | 0005 |  | F | Corrections in raster points for NR-ARFCN and GSCN | 18.1.0 |
| 2023-12 | RAN#102 | RP-233345 | 0007 |  | F | Adding 20MHz channel raster points for 5925-5945MHz in the full and lower 6GHz bands | 18.2.0 |