**R4-25118013GPP TSG- Meeting #**

**, , – (revision of R4-2509534)**

|  |
| --- |
| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |   | **rev** |  | **Current version:** |  |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| --- |
|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | Add UE RF requirements for new NTN L-bands |
|  |  |
| ***Summary of change:*** | Band specific UE RF requirements are added in the following sub-clauses:- 5.2.2: new band definitions- 5.3.5: applicable channel bandwidths- 5.3.6: applicable asymmetric channel bandwidths- 5.4.2.3: channel raster points for a new band- 5.4.3.3: sync raster points for a new band- 5.4.4: Tx-Rx separation distance (fixed and variable) for a new band- 6.2.1: maximum output power- 6.2.3.1: new NS flags needed for this band- 6.2.3.7 and 6.2.3.8: A-MPR values for new NS flags- 6.5.2.3.3: additional emission requirements- 6.5.3.2: UE-to-UE co-existence requirements- 6.5.3.3.8 and 6.5.3.3.9: additional spurious emission requirements for new NS flags- 7.3.2: REFSENS values for a new band- 7.6.2: in-band blocking requirements for a new band- 7.6.3: out-of-band blocking requirements for a new band- 7.6.4: narrow-band blocking requirements for a new band |
|  |  |
| ***Consequences if not approved:*** | UE RF requirements will be missing |
|  |  |
| ***Clauses affected:*** | 5.2.2, 5.3.5, 5.3.6, 5.4.2.3, 5.4.3.3, 5.4.4, 6.2.1, 6.2.3.1, 6.2.3.7(new), 6.2.3.8(new), 6.2.3.9(new), 6.5.2.3.3(new), 6.5.3.2, 6.5.3.3.8(new), 6.5.3.3.9(new), 6.5.3.3.10(new), 7.3.2, 7.6.2, 7.6.3, 7.6.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev 1: Two NS flags are added, NS\_13N and NS\_14N, to support updated ETSI requirements for the L-bands. |

### 5.2.2 Operating bands with conducted requirements

NTN satellite is designed to operate in the operating bands defined in Table 5.2.2-1.

Table 5.2.2-1: NTN satellite bands in FR1-NTN

|  |  |  |  |
| --- | --- | --- | --- |
| NTN satellite operating band | Uplink (UL) operating bandSatellite Access Node receive / UE transmitFUL,low – FUL,high | Downlink (DL) operating bandSatellite Access Node transmit / UE receiveFDL,low – FDL,high  | Duplex mode |
| n256 | 1980 MHz – 2010 MHz | 2170 MHz – 2200 MHz | FDD |
| n255 | 1626.5 MHz – 1660.5 MHz | 1525 MHz – 1559 MHz | FDD |
| n254 | 1610 – 1626.5 MHz | 2483.5 – 2500 MHz | FDD |
| n253 | 1668 MHz – 1675 MHz | 1518 MHz – 1525 MHz | FDD |
| n252 | 2000 – 2020 MHz | 2180 – 2200 MHz | FDD |
| n251 | 1626.5 MHz – 1660.5 MHz | 1518 MHz – 1559 MHz | FDD |
| n250 | 1668 MHz – 1675 MHz | 1518 MHz – 1559 MHz | FDD |
| NOTE: NTN satellite bands are numbered in descending order from n256. |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

### 5.3.5 UE channel bandwidth per operating band

The requirements in this specification apply to the combination of channel bandwidths, SCS and operating bands shown in Table 5.3.5-1 for FR1-NTN and table 5.3.5-2 for FR2-NTN. The transmission bandwidth configuration in Table 5.3.2-1 and Table 5.3.2-2 shall be supported for each of the specified channel bandwidths. The channel bandwidths are specified for both the Tx and Rx path.

Table 5.3.5-1: Channel bandwidths for each NTN satellite band in FR1-NTN

| NTN satellite band | SCSkHz | UE Channel bandwidth (MHz) |
| --- | --- | --- |
| 5 | 10 | 15 | 20 | **30****(NOTE)** |
|  | 15 | 5 | 10 | 15 | 20 |  |
| n256 | 30 |  | 10 | 15 | 20 |  |
|  | 60 |  | 10 | 15 | 20 |  |
|  | 15 | 5 | 10 | 15 | 20 |  |
| n255 | 30 |  | 10 | 15 | 20 |  |
|  | 60 |  | 10 | 15 | 20 |  |
|  | 15 | 5 | 10 | 15 |  |  |
| n254 | 30 |  | 10 | 15 |  |  |
|  | 60 |  | 10 | 15 |  |  |
| n253 | 15 | 5 |  |  |  |  |
| 30 |  |  |  |  |  |
| 60 |  |  |  |  |  |
| n252 | 15 | 5 | 10 | 15 | 20 |  |
|  | 30 |  | 10 | 15 | 20 |  |
|  | 60 |  | 10 | 15 | 20 |  |
| n251 | 15 | 5 | 10 | 15 | 20 |  |
| 30 |  | 10 | 15 | 20 |  |
| 60 |  | 10 | 15 | 20 |  |
| n250 | 15 | 5 | 102 | 152 | 202 |  |
| 30 |  | 102 | 152 | 202 |  |
| 60 |  | 102 | 152 | 202 |  |
| NOTE: Deployment of 30 MHz channel bandwidth for NTN SAN needs to be preceded by introduction of all applicable Tx RF, Rx RF, and demodulation requirements.NOTE 2: This UE channel bandwidth is applicable only to downlink |

Table 5.3.5-2: Channel bandwidths for each NTN satellite band in FR2-NTN

|  |  |  |
| --- | --- | --- |
| **NTN satellite band** | **SCS (kHz)** | ***UE channel bandwidth* (MHz)** |
| **50** | **100** | **200** | **400** |
| n512 | 60 | 50 | 100 | 2001 |  |
|  | 120 | 50 | 100 | 2001 | 4001 |
| n511 | 60 | 50 | 100 | 2001 |  |
|  | 120 | 50 | 100 | 2001 | 4001 |
| n510 | 60 | 50 | 100 | 2001 |  |
|  | 120 | 50 | 100 | 2001 | 4001 |
| NOTE 1: This UE channel bandwidth is optional in this release of the specification. |

### 5.3.6 Asymmetric channel bandwidths

The UE channel bandwidth can be asymmetric in downlink and uplink. In asymmetric channel bandwidth operation, the narrower carrier shall be confined within the frequency range of the wider channel bandwidth.

In FDD, the confinement is defined as a maximum deviation to the Tx-Rx carrier center frequency separation (defined in table 5.4.4-1) as following:

ΔFTX-RX = | (BWDL – BWUL)/2 |

The operating bands and supported asymmetric channel bandwidth combinations are defined in table 5.3.6-1.

Table 5.3.6-1: FDD asymmetric UL and DL channel bandwidth combinations

|  |  |  |  |
| --- | --- | --- | --- |
| NR Band | Channel bandwidths for UL (MHz) | Channel bandwidths for DL (MHz) | Asymmetric channel bandwidth combination set |
| n254 | 5 | 10,15 | 0 |
| 10 | 15 | 0 |
| n252 | 5 | 10,15, 20 | 0 |
|  | 10 | 15, 20 | 0 |
|  | 15 | 20 | 0 |
| n250 | 5 | 10, 15, 20 | 0 |
| n251 | 5 | 10, 15, 20 | 0 |
| 10 | 15, 20 | 0 |
| 15 | 20 | 0 |
| NOTE 1: The assignment of the paired UL and DL channels are subject to a TX-RX separation as specified in clause 5.4.4.NOTE 2: As indicated in TS38.306 [11], it is mandatory for UEs to support asymmetric channel BCS0 if there is an asymmetric BCS0 defined for the band. |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

#### 5.4.2.3 Channel raster entries for each operating band

The RF channel positions on the channel raster in each NTN satellite operating band are given through the applicable NR-ARFCN in Table 5.4.2.3‑1 and Table 5.4.2.3-2 for FR1-NTN, and in Table 5.4.2.3-3 for FR2-NTN, using the channel raster to resource element mapping in clause 5.4.2.2.

For NTN satellite operating bands with 100 kHz channel raster, ΔFRaster = 20 × ΔFGlobal. In this case every 20th NR-ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in Table 5.4.2.3‑1 is given as <20> for FR1-NTN.

Table 5.4.2.3-1: Applicable NR-ARFCN per operating band in FR1-NTN

|  |  |  |  |
| --- | --- | --- | --- |
| NTN satellite operating band | ΔFRaster(kHz) | UplinkRange of NREF(First – <Step size> – Last) | DownlinkRange of NREF(First – <Step size> – Last) |
| n256 | 100 | 396000 – <20> – 402000 | 434000 – <20> – 440000 |
| n255 | 100 | 325300 – <20> – 332100 | 305000 – <20> – 311800 |
| n254 | 100 | 322000 – <20> – 325300 | 496700 – <20> – 500000 |
| n253 | 100 | 333600 – <20> – 335000 | 303600 – <20> – 305000 |
| n252 | 100 | 400000 – <20> – 404000 | 436000 – <20> – 440000 |
| n251 | 100 | 325300 – <20> – 332100 | 303600 – <20> – 311800 |
| n250 | 100 | 333600 – <20> – 335000 | 303600 – <20> – 311800 |
| NOTE : The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. |

For NTN operating bands with 100 kHz channel raster, Enhanced channel raster is defined with ΔFRaster = 2 × ΔFGlobal. In this case every 2th NR-ARFCN within the operating band are applicable for the channel raster within the operating band and the step size for the channel raster in Table 5.4.2.3‑2 is given as <2>.

Table 5.4.2.3-2: Applicable NR-ARFCN per operating band in FR1-NTN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NTN satellite operating band | ΔFRaster(kHz) | UplinkRange of NREF(First – <Step size> – Last) | DownlinkRange of NREF(First – <Step size> – Last) | Mandatory support |
| n256 | 10 | 396000 – <2> – 402000 | 434000 – <2> – 440000 | Yes |
| n255 | 10 | 325300 – <2> – 332100 | 305000 – <2> – 311800 | Yes |
| n254 | 10 | 322000 – <2> – 325300 | 496700 – <2> – 500000 | Yes |
| n253 | 10 | 333600 – <2> – 335000 | 303600 – <2> – 305000 | Yes |
| n252 | 10 | 400000 – <2> – 404000 | 436000 – <2> – 440000 | Yes |
| n251 | 10 | 325300 – <2> – 332100 | 303600 – <2> – 311800 | Yes |
| n250 | 10 | 333600 – <2> – 335000 | 303600 – <2> – 311800 | Yes |
| NOTE: The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. These channel numbers shall also be such that the minimum guard band for each channel bandwidth and SCS specified in Table 5.3.3-1 are met for carriers located at the upper or lower edge of an operating band. |

For FR2-NTN satellite operating bands, ΔFRaster = *I1* × ΔFGlobal for UL channel and ΔFRaster = *I2* × ΔFGlobal for DL channel, where (*I1*, *I2*) ϵ *{(1,4) or (2, 8)}.* But (*I1*, *I2*) = *(2, 8)* only applies under the condition that 120kHz SCS is configured in the channel and SSB SCS is equal to or larger than 120kHz. In this case, every *I1*th NR-ARFCN for UL channel and *I2*th NR-ARFCN for DL channel are applicable for the UL and DL channel raster correspondingly within the operating band and the <(*UL\_step size*, *DL\_step size*)> for the UL and DL channel raster in Table 5.4.2.3‑3 is given as <(*I1*, *I2*)> for FR2-NTN.

Table 5.4.2.3-3: Applicable NR-ARFCN per operating band in FR2-NTN

|  |  |  |  |
| --- | --- | --- | --- |
| SAN operating band | ΔFRaster(kHz)  | Uplinkrange of NREF(First – <Step size> – Last) | Downlinkrange of NREF(First – <Step size> – Last) |
| n512 | 60 | 2070833 – <1> – 2112499 | 1553336 – <4> – 1746664 |
|  | 120 | 2070833 – <2> – 2112499 | 1553336 – <8> – 1746664 |
| n511 | 60 | 2084999 – <1> –2112499 | 1553336 – <4> – 1746664 |
|  | 120 | 2084999 – <2> –2112499 | 1553336 – <8> – 1746664 |
| n510 | 60 | 2070833 – <1> – 2084999 | 1553336 – <4> – 1746664 |
|  | 120 | 2070833 – <2> – 2084999 | 1553336 – <8> – 1746664 |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

#### 5.4.3.3 Synchronization raster entries for each operating band

The synchronization raster for each band is give in Table 5.4.3.3-1 and Table 5.4.3.3-2. The distance between applicable GSCN entries is given by the <Step size> indicated in Table 5.4.3.3-1 for FR1-NTN and Table 5.4.3.3-2 for FR2-NTN.

Table 5.4.3.3-1: Applicable SS raster entries per operating band (FR1-NTN)

|  |  |  |  |
| --- | --- | --- | --- |
| NTN satellite operating band | SS Block SCS | SS Block pattern1 | Range of GSCN(First – <Step size> – Last) |
| n256 | 15 kHz | Case A | 5429 – <1> – 5494 |
| n255 | 15 kHz | Case A | 3818 – <1> – 3892 |
|  | 30 kHz | Case B | 3824 – <1> – 3886 |
| n254 | 15 kHz | Case A | 6215 – <1> – 6244 |
|  | 30 kHz | Case C | 6218 – <1> – 6241 |
| n253 | 15 kHz | Case A | 3800 – <1> – 3807 |
| n252 | 15 kHz | Case A | 5456 – <1> – 5494 |
| n251 | 15 kHz | Case A | 3800 – <1> – 3892 |
| 30 kHz | Case B | 3806 – <1> – 3886 |
| n250 | 15 kHz | Case A | 3800 – <1> – 3892 |
| 30 kHz | Case B | 3806 – <1> – 3886 |
| NOTE : SS Block pattern is defined in clause 4.1 in 3GPP TS 38.213 [7]. |

Table 5.4.3.3-2: Applicable SS raster entries per operating band (FR2-NTN)

|  |  |  |  |
| --- | --- | --- | --- |
| SAN operating band | SS Block SCS | SS Block pattern(NOTE) | Range of GSCN(First – <Step size> – Last) |
| n512 | 120 kHz | Case D | 17448 – <12> – 19428 |
|  | 240 kHz | Case E | 17472 – <24> – 19416 |
| n511 | 120 kHz | Case D | 17448 – <12> – 19428 |
|  | 240 kHz | Case E | 17472 – <24> – 19416 |
| n510 | 120 kHz | Case D | 17448 – <12> – 19428 |
|  | 240 kHz | Case E | 17472 – <24> – 19416 |
| NOTE: SS Block pattern is defined in section 4.1 in TS 38.213 [7]. |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

### 5.4.4 TX–RX frequency separation

The default TX channel (carrier centre frequency) to RX channel (carrier centre frequency) separation for operating bands is specified in Table 5.4.4-1 for FR1-NTN.

Table 5.4.4-1: UE TX-RX frequency separation (FR1-NTN)

| **NTN Satellite Operating Band** | **TX – RX carrier centre frequencyseparation** |
| --- | --- |
| n256 | 190 MHz1165 to 215 MHz2 |
| n255 | -101.5 MHz1-72.5 to -130.5 MHz2 |
| n254 | 862 – 885 MHz |
| n253 | -150 MHz1-148 to -152 MHz2 |
| n252 | 180 MHz1165 to 195 MHz2 |
| n251 | -108.5 MHz1-72.5 to -137.5 MHz2 |
| n250 | -150 MHz1-114 to -152 MHz2 |
| NOTE 1: Default Tx-Rx separation NOTE 2: The verification of flexible Tx-Rx frequency separation within this range is limited to reference sensitivity. Further details are specified in clause 7.3.2 |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

### 6.2.1 UE maximum output power

The following UE Power Classes define the maximum output power for any transmission bandwidth within the channel bandwidth of NR carrier unless otherwise stated. The period of measurement shall be at least one sub frame (1ms).

Table 6.2.1-1: UE Power Class

|  |  |  |
| --- | --- | --- |
| NR satellite band | Class 3 (dBm) | Tolerance (dB) |
| n256 | 23 | ±2 |
| n255 | 23 | ±2 |
| n254 | 23 | ±2 |
| n253 | 23 | ±2 |
| n252 | 23 | ±2 |
| n251 | 23 | ±2 |
| n250 | 23 | ±2 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the toleranceNOTE 2: Powerclass 3 is default power class unless otherwise stated |

The UE shall meet the following additional requirements for maximum mean transmission power density specified in Table 6.2.1-2 when NS is signaled and when the configured channel overlaps with any portion of the specified frequency range.

Table 6.2.1-2: Additional requirements for transmit power density

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR Band | NS value | Channel bandwidth (MHz) | Frequency range (MHz) | Maximum power density |
| n254 | NS\_04N | 5 | 1610 - 1618.25 | 27dBm/4kHz (mean) |
| NS\_05N | 5 | 1618.25 - 1626.5 |
| 10, 15 | 1610 – 1626.5 |
| NS\_11N | 5 | 1610 - 1618.25 | 15dBm/4kHz (peak limit) |
| NS\_12N | 5 | 1618.25 - 1626.5 |
| 10, 15 | 1610 – 1626.5 |

### 6.2.2 UE maximum output power reduction

UE is allowed to reduce the maximum output power due to higher order modulations and transmit bandwidth configurations. For UE power class 3, the allowed maximum power reduction (MPR) is defined as Table 6.2.2-1 in 3GPP TS 38.101-1[5] clause 6.2.2.

### 6.2.3 UE additional maximum output power reduction

#### 6.2.3.1 General

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 and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR satellite band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [8]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2.2. Outer and inner allocation notation used in clause 6.2.3 is defined in 3GPP TS 38.101-1 [5] clause 6.2.2. In absence of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2.3.1-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable operating band(s) for each NS value. The mapping of NR satellite band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2.3.1-1A.

Table 6.2.3.1-1: Additional maximum power reduction (A-MPR)

| Network signalling label | Requirements (clause) | NR satellite Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| --- | --- | --- | --- | --- | --- |
| NS\_01 |  | Table 5.2.2-1(NOTE 3) | 5, 10, 15, 20 | Table 5.3.2-1 | N/A |
| NS\_24 | 6.5.3.3.13 in 3GPP TS 38.101-1 [5] | n256 | 5, 10, 15, 20 | Table 6.2.3.15-1 in 3GPP TS 38.101-1 [5] | Clause 6.2.3.15 in 3GPP TS 38.101-1 [5]2 |
| NS\_02N | 6.5.3.3.2 | n255 | 5, 10, 15, 20 |  | N/A |
| NS\_100 | 6.5.2.4.2 in 3GPP TS 38.101-1 [5] | n2561 |  |  | Table6.2.3.1-2 in 3GPP TS 38.101-1 [5] |
| NS\_03N | 6.5.3.3.3 | n254 | 5, 10, 15 |  | Clause 6.2.3.2 |
| NS\_04N | 6.5.2.3.16.5.3.3.4 | n254 | 5 |  | Clause 6.2.3.3 |
| NS\_05N | 6.5.2.3.26.5.3.3.4 | n254 | 5, 10, 15 |  | Clause 6.2.3.4 |
| NS\_06N | 6.5.3.3.5 | n252 | 5, 10, 15, 20 |  | N/A |
| NS\_07N | 6.5.3.3.6 | n2524 | 5, 10, 15, 20 |  | Clause 6.2.3.5 |
| NS\_08N | 6.5.3.3.7 | n2524 | 5, 10, 15, 20 |  | Clause 6.2.3.6 |
| NS\_09N | 6.5.2.3.36.5.3.3.8 | n250, n253 | 5 |  | Clause 6.2.3.7 |
| NS\_10N | 6.5.2.3.36.5.3.3.9 | n251 | 5, 10, 15, 20 |  | Clause 6.2.3.8 |
| NS\_11N | 6.5.2.3.16.5.3.3.4 | n254 | 5 |  | Clause 6.2.3.3 |
| NS\_12N | 6.5.2.3.26.5.3.3.4 | n254 | 5, 10, 15 |  | Clause 6.2.3.4 |
| NS\_13N | 6.5.3.3.10 | [n250, n253] | 5 |  |  |
| NS\_14N | 6.5.3.3.10 | [n251] | 5, 10, 15, 20 |  | Clause 6.2.3.9 |
| NOTE 1: This NS can be signalled for NR satellite bands that have UTRA services deployed.NOTE 2: A-MPR for the upper 5 MHz of the band is not specified, and therefore shall be used as a guard band.NOTE 3: The NS\_01 label with the field *additionalPmax* [8] absent is default for all NR satellite bands.NOTE 4: The NS\_07N and NS\_08N is signalled based on coordination between operators and subject to regional/national regulation |

Table 6.2.3.1-1A: Mapping of network signalling label

|  |  |
| --- | --- |
| NR satellite band | Value of *additionalSpectrumEmission* |
|  | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| n256 | NS\_01 | NS\_24 | NS\_100 |  |  |  |  |  |
| n255 | NS\_01 | NS\_02N |  |  |  |  |  |  |
| n254 | NS\_01 | NS\_03N | NS\_04N | NS\_05N | NS\_11N | NS\_12N |  |  |
| n253 | NS\_01 | NS\_02N | NS\_09N | NS\_14N |  |  |  |  |
| n252 | NS\_01 | NS\_06N | NS\_07N | NS\_08N |  |  |  |  |
| n251 | NS\_01 | NS\_02N | NS\_10N | NS\_13N |  |  |  |  |
| n250 | NS\_01 | NS\_02N | NS\_09N | NS\_14N |  |  |  |  |
| NOTE: *additionalSpectrumEmission* corresponds to an information element of the same name defined in clause 6.3.2 of 3GPP TS 38.331 [8]. |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

#### 6.2.3.7 A-MPR for NS\_09N

Table 6.2.3.7-1: A-MPR regions for NS\_09N

|  |  |  |
| --- | --- | --- |
| Channel Bandwidth(MHz) | Carrier Centre Frequency, Fc (MHz) | Region |
| RBstart\*12\*SCS | LCRB\*12\*SCS | A-MPR |
| 5MHz | 1670.5 <= Fc <= 1672.5 | >= 3.6 |  | A1 |

Table 6.2.3.7-2: A-MPR values for NS\_09N

|  |  |  |
| --- | --- | --- |
|  | Modulation | A1 |
| DFT-s-OFDM | Pi/2 BPSK | 1 |
| QPSK | 1.5 |
| 16QAM | 1.5 |
| 64QAM | 2 |
| CP-OFDM | QPSK | 3.0 |
| 16QAM | 3 |
| 64QAM | 3 |

#### 6.2.3.8 A-MPR for NS\_10N

Table 6.2.3.8-1: A-MPR regions for NS\_10N

|  |  |  |
| --- | --- | --- |
| Channel Bandwidth(MHz) | Carrier Centre Frequency, Fc (MHz) | Region |
| RBstart\*12\*SCS | LCRB\*12\*SCS | A-MPR |
| 5MHz | 1629 <= Fc < 1632.5  | <= 0.9 |  | A1 |
| 1654< Fc <= 1658 | >= 3.24 |  | A1 |
|  | >= 3.24 | A1 |
| 10MHz | 1631.5 <= Fc < 1636  | <= 2.7 | < 7.2 | A1 |
|  | >= 7.2 | A2 |
| 1650 < Fc <= 1655.5 | >= 6.84 |  | A3 |
| < 6.84 | >= 3.6 | A2 |
| 15MHz | 1634 <= Fc < 1641 | <= 4.32 |  | A2 |
| <= 6.12 | >= 7.2 | A2 |
| 1641 <= Fc <= 1646 | <= 1.8, >= 12.02 | <= 1.08 | A3 |
| 1646 < Fc <= 1653 | >= 10.08 |  | A4 |
| < 10.8 | >= 3.6 | A3 |
| 20MHz | 1636.5 <= Fc < 1644 | <= 3.6 | <= 3.6 | A5 |
| >3.6, <=5.4 | <= 0.72 | A1 |
| <= 3.6 | > 3.6 | A4 |
| >= 18.0 |  | A1 |
|  |  |  |  |
| 1644 < Fc <= 1650.5 | < 13.32 | >= 3.6 | A3 |
| >= 13.32 |  | A4 |
| <= 1.08 |  | A1 |

Table 6.2.3.8-2: A-MPR values for NS\_10N

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | A1 | A2 | A3 | A4 | A5 |
| DFT-s-OFDM | Pi/2 BPSK | 1.5 | 2 | 2 | 3 | 3.5 |
| QPSK | 2 | 2.5 | 2.5 | 3.5 | 4.5 |
| 16QAM | 2 | 2.5 | 3 | 4 | 5 |
| 64QAM | 2.5 | 3 | 3 | 4 | 5 |
| CP-OFDM | QPSK | 3.5 | 4 | 4.0 | 5.5 | 6 |
| 16QAM | 3.5 | 4 | 4 | 5.5 | 6 |
| 64QAM | 3.5 | 4 | 4 | 5.5 | 6 |

#### 6.2.3.9 A-MPR for NS\_14N

Table 6.2.3.9-1: A-MPR regions for NS\_14N

|  |  |  |
| --- | --- | --- |
| Channel Bandwidth(MHz) | Carrier Centre Frequency, Fc (MHz) | Region |
| RBstart\*12\*SCS | LCRB\*12\*SCS | A-MPR |
| 5MHz | 1629 <= Fc <= 1632.5 | <= 0.9 |   | A1 |
| 10MHz | 1631.5 <= Fc <= 1636 | <= 2.7 | < 5.4 | A1 |
|   | >= 5.4 | A1 |
| 15MHz | 1634 <= Fc < 1641 | <= 4.32 |   | A2 |
| 20MHz | 1636.5 <= Fc < 1644  | <= 3.6 | <= 3.6 | A5 |
| > 3.6, <= 5.4 | <= 0.72 | A1 |
| <= 3.6 | > 3.6 | A4 |
| >= 18 |  | A1 |

Table 6.2.3.9-2: A-MPR values for NS\_14N

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | A1 | A2 | A3 | A4 | A5 |
| DFT-s-OFDM | Pi/2 BPSK | 1.5 | 2 | 2 | 3 | 3.5 |
| QPSK | 2 | 2.5 | 2.5 | 3.5 | 4.5 |
| 16QAM | 2 | 2.5 | 3 | 4 | 5 |
| 64QAM | 2.5 | 3 | 3 | 4 | 5 |
| CP-OFDM | QPSK | 3.5 | 4 | 4.0 | 5.5 | 6 |
| 16QAM | 3.5 | 4 | 4 | 5.5 | 6 |
| 64QAM | 3.5 | 4 | 4 | 5.5 | 6 |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

#### 6.5.2.3 Additional spectrum emission mask

##### 6.5.2.3.1 Requirements for network signalling value "NS\_04N"

When "NS\_04N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.2.3.1-1 for any channel bandwidth configured within 1610-1618.25MHz.

Table 6.5.2.3.1-1: Additional requirements for "NS\_04N"

|  |  |  |
| --- | --- | --- |
| ΔfOOB (kHz) | Spectrum emission limit (dBm) | Measurement bandwidth |
| ± 0-160 | -2 | 30kHz |
| ± 160-2300 | -2 to -26 |
| ± 2300-18500 | -26 |
| NOTE 1: Spectrum emissions are linearly interpolated in dBm versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna. |

##### 6.5.2.3.2 Requirements for network signalling value “NS\_05N"

When "NS\_05N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.2.3.2-1 for any channel bandwidth configured within 1618.25-1626.5MHz.

Table 6.5.2.3.2-1: Additional requirements for "NS\_05N"

|  |  |  |
| --- | --- | --- |
| ΔfOOB (kHz) | Spectrum emission limit (dBm) | Measurement bandwidth |
| ± 0-160 | -5 | 30kHz |
| ± 160-225 | -5 to -8.5 |
| ± 225-650 | -8.5 to -15 |
| ± 650-1365 | -15 |
| ± 1365-1800 | -23 to -26 |
| ± 1800-16500 | -26 |
| NOTE 1: Spectrum emissions are linearly interpolated in dBm versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna. |

##### 6.5.2.3.3 Requirements for network signalling value “NS\_09N" and “NS\_10N"

When "NS\_09N" or "NS\_10N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.2.3.3-1 for any channel bandwidth configured within the corresponding band.

Table 6.5.2.3.3-1: Additional requirements for "NS\_09N" and "NS\_10N"

|  |  |  |  |
| --- | --- | --- | --- |
| ΔfOOB (kHz) | Spectrum emission limit (dBm) | Measurement bandwidth | Note (measurement method) |
| ± 0-25 | 30 to 15 | 3 kHz | Average |
| ± 25-125 | 15 to -20 |
| ± 125-425 | -20 |
| ± 425-1500 | -20 to -35 |
| ± 1500-36000 | -25 | 30 kHz |
| NOTE 1: Spectrum emissions are linearly interpolated versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna. |  |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

#### 6.5.3.2 Spurious emissions for UE co-existence

This clause specifies the requirements for NR NTN satellite bands for UE coexistence with protected bands.

Table 6.5.3.2-1: Requirements for spurious emissions for UE co-existence

| NR NTN satellite Band | Spurious emission for UE co-existence |
| --- | --- |
| Protected band | Frequency range (MHz) | Maximum Level (dBm) | MBW (MHz) | NOTE |
| n250 | NR Band n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n25, n26, n28, n29, n30, n31, n34, n38, n39, n40, n41, n48, n50, n51, n53, n65, n66, n67, n70, n71, n72, n74, n75, n76, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n251 | NR Band n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n25, n26, n28, n29, n30, n31, n34, n38, n39, n40, n41, n48, n50, n51, n53, n65, n66, n67, n70, n71, n72, n74, n75, n76, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n252 | NR Band n1, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n26, n28, n29, n30, n31, n38, n39, n40, n41, n48, n50, n51, n53, n54, n65, n66, n67, n68, n71, n72, n74, n75, n76, n78, n79, n85, n87, n88, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109, n110 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 33, 35 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| NR Band n70 | FDL\_low | - | FDL\_high | NA | NA | 4 |
| n253 | NR Band n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n25, n26, n28, n29, n30, n31, n34, n38, n39, n40, n41, n48, n50, n51, n53, n65, n66, n67, n70, n71, n72, n74, n75, n76, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n254 | NR Band n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n25, n26, n28, n29, n30, n31, n34, n38, n39, n40, n41, n48, n50, n51, n53, n54, n65, n66, n67, n70, n71, n72, n74, n75, n76, n77, n78, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 73, 87, 88, 103 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n79, n104 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n255 | NR Band n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n25, n26, n28, n29, n30, n31, n34, n38, n39, n40, n41, n48, n50, n51, n53, n65, n66, n67, n70, n71, n72, n74, n75, n76, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| n256 | NR Band n1, n3, n5, n7, n8, n12, n13, n14, n18, n20, n24, n26, n28, n29, n30, n31, n38, n39, n40, n41, n48, n50, n51, n53, n54, n65, n66, n67, n71, n72, n74, n75, n76, n78, n79, n85, n90, n91, n92, n93, n94, n100, n101, n105, n106, n109 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 33, 35 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n77 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| NR Band n2, n25, n70 | FDL\_low | - | FDL\_high | NA | NA | 3 |
| NOTE 1: The protected NR or E-UTRA bands are specified in clause 5.2 from 3GPP TS 38.101-1 [5] or 3GPP TS 36.101 [10]. FDL\_low and FDL\_high refer to each frequency band specified in Table 5.2-1 in 3GPP TS 38.101-1 [5] or 3GPP TS 36.101 [10].NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.5.3.1-2 are permitted for each assigned NR carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. Due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2 MHz + N x LCRB x RBsize kHz), where N is 2, 3, 4, 5 for the 2nd, 3rd, 4th or 5th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.NOTE 3: The co-existence between n256 and band n2, n25 and n70 is subject to regional/national regulation.NOTE 4: The co-existence between n252 and band n70 is subject to regional/national regulation. |

NOTE: To simplify Table 6.5.3.2-1, NR band numbers are listed for bands which are specified only for NR operation or both E-UTRA and NR operation. E-UTRA band numbers are listed for bands which are specified only for E-UTRA operation.

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

##### 6.5.3.3.7 Requirement for network signalling value "NS\_08N"

When "NS\_08N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.7-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5.3.3.7-1: Additional out-of-band requirements for "NS\_08N"

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency range**(MHz) | Channel bandwidth / Spectrum emission limit (dBm) | Measurement bandwidth  | NOTE |
| 5 MHz, 10 MHz, 15 MHz, 20MHz |
| 1559 ≤ f < 1610 | -50 | 700 Hz | Averaged over any 2 millisecond active transmission interval |
| 1559 ≤ f < 1610 | -40 | 1MHz |
| 1930 ≤ f ≤1995 | -30 | 1MHz |  |

##### 6.5.3.3.8 Requirement for network signalling value "NS\_09N"

When "NS\_09N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.8-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5.3.3.8-1: Additional out-of-band requirements for "NS\_09N"

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency range****(MHz)** | **Spectrum emission limit1 (dBm)** | **Measurement bandwidth**  | **NOTE****(measurement method)** |
| 30 to 1000 | -36 | 100 kHz | Peak hold |
| 1000 to 1559 | -31 | 1 MHz | Average |
| 1559 to 1605 | -40 | 1 MHz | Average |
| 1605 to 1612.5 | -40 to -28.5 | 1 MHz | Average |
| 1612.5 to 1616.5 | -25 to -20 | 1 MHz | Average |
| 1616.5 to 1621.5  | -20 to -16 | 1 MHz | Average |
| 1621.5 to 1624.5 | -30 to -27.5 | 30 kHz | Average |
| 1624.5 to 1625.125 | -27.5 to -27.2 | 30 kHz | Average |
| 1625.125 to 1625.8 | -27.2 to -20  | 30 kHz | Average |
| 1625.8 to 1626 | -20 to -17 | 30 kHz | Average |
| 1626 to 1626.2 | -17 to -10 | 30 kHz | Average |
| 1626.2 to 1626.5 | -10 | 30 kHz | Average |
|  |  |  |  |
| 1660.5 to 1666.5 | -25 | 30 kHz | Average |
| 1666.5 to 1667.575 | -20 to -35 | 3 kHz | Average |
| 1667.575 to 1667.875 | -20 | 3 kHz | Average |
| 1667.875 to 1667.975 | 15 to - 20 | 3 kHz | Average |
| 1667.975 to 1668 | 30 to 15 | 3 kHz | Average |
|  |  |
| 1675 to 1675.025 | 30 to 15 | 3 kHz | Average |
| 1675.025 to 1675.125  | 15 to - 20 | 3 kHz | Average |
| 1675.125 to 1675.425 | -20 | 3 kHz | Average |
| 1675.425 to 1676.5  | -20 to -35 | 3 kHz | Average |
| 1676.5 to 1677 | -25 | 30 kHz | Average |
| 1677 to 1680 | -30 | 30 kHz | Average |
| 1680 to 1685 | -30 | 100 kHz | Average |
| 1685 to 1695 | -30 | 300 kHz | Average |
| 1695 to 1705 | -30 | 1 MHz | Average |
| 1705 to 2250 | -30 | 3 MHz | Average |
| 2250 to 12750 | -30 | 3 MHz | Peak hold |
|  |  |  |  |
| NOTE 1: Spectrum emissions are linearly interpolated versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna.NOTE 3: The average measurement method shall apply except that an averaging period of 20ms shall be used in the sub-band 1573.42 MHz to 1580.42 MHz |

##### 6.5.3.3.9 Requirement for network signalling value "NS\_10N"

When "NS\_10N" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.9-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5.3.3.9-1: Additional out-of-band requirements for "NS\_10N"

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency range****(MHz)** | **Spectrum emission limit1 (dBm)** | **Measurement bandwidth**  | **NOTE****(measurement method)** |
| 30 to 1000 | -36 | 100 kHz | Peak hold |
| 1000 to 1559 | -31 | 1 MHz | Average |
| 1559 to 1605 | -40 | 1 MHz | Average |
| 1605 to 1612.5 | -40 to -28.5 | 1 MHz | Average |
| 1612.5 to 1616.5 | -25 to -20 | 1 MHz | Average |
| 1616.5 to 1621.5  | -20 to -16 | 1 MHz | Average |
| 1621.5 to 1624.5 | -30 to -27.5 | 30 kHz | Average |
| 1624.5 to 1625.125 | -27.5 to -27.2 | 30 kHz | Average |
| 1625.125 to 1625.8 | -27.2 to -20  | 30 kHz | Average |
| 1625.8 to 1626 | -20 to -17 | 30 kHz | Average |
| 1626 to 1626.2 | -17 to -10 | 30 kHz | Average |
| 1626.2 to 1626.5 | -10 | 30 kHz | Average |
|  |  |
| 1660.5 to 1660.525 | 30 to 15 | 3 kHz | Average |
| 1660.525 to 1660.625  | 15 to - 20 | 3 kHz | Average |
| 1660.625 to 1660.925 | -20 | 3 kHz | Average |
| 1660.925 to 1662  | -20 to -35 | 3 kHz | Average |
| 1662 to 1662.5 | -25 | 30 kHz | Average |
| 1662.5 to 1665.5 | -30 | 30 kHz | Average |
| 1665.5 to 1670.5 | -30 | 100 kHz | Average |
| 1670.5 to 1680.5 | -30 | 300 kHz | Average |
| 1680.5 to 1690.5 | -30 | 1 MHz | Average |
| 1690.5 to 2250 | -30 | 3 MHz | Average |
| 2250 to 12750 | -30 | 3 MHz | Peak hold |
|  |  |  |  |
| NOTE 1: Spectrum emissions are linearly interpolated versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna.NOTE 3: The average measurement method shall apply except that an averaging period of 20ms shall be used in the sub-band 1573.42 MHz to 1580.42 MHz |

##### 6.5.3.3.10 Requirement for network signalling value "NS\_14N"

When "NS\_14" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.10-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5.3.3.10-1: Additional out-of-band requirements for "NS\_14N"

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency range****(MHz)** | **Spectrum emission limit1 (dBm)** | **Measurement bandwidth**  | **NOTE****(measurement method)** |
| 30 to 1000 | -36 | 100 kHz | Peak hold |
| 1000 to 1559 | -31 | 1 MHz | Average |
| 1559 to 1605 | -40 | 1 MHz | Average |
| 1605 to 1612.5 | -40 to -28.5 | 1 MHz | Average |
| 1612.5 to 1616.5 | -25 to -20 | 1 MHz | Average |
| 1616.5 to 1621.5  | -20 to -16 | 1 MHz | Average |
| 1621.5 to 1624.5 | -30 to -27.5 | 30 kHz | Average |
| 1624.5 to 1625.125 | -27.5 to -27.2 | 30 kHz | Average |
| 1625.125 to 1625.8 | -27.2 to -20  | 30 kHz | Average |
| 1625.8 to 1626 | -20 to -17 | 30 kHz | Average |
| 1626 to 1626.2 | -17 to -10 | 30 kHz | Average |
| 1626.2 to 1626.5 | -10 | 30 kHz | Average |
| NOTE 1: Spectrum emissions are linearly interpolated versus frequency offset.NOTE 2: The EIRP requirement in regulation is converted to conducted requirement using a 0dBi antenna.NOTE 3: The average measurement method shall apply except that an averaging period of 20ms shall be used in the sub-band 1573.42 MHz to 1580.42 MHz |

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

### 7.3.2 Reference sensitivity power level

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annex A3.2.2 of 3GPP TS 38.101-1 [5], with parameters specified in Table 7.3.2-1.

Table 7.3.2-1: Two antenna port reference sensitivity QPSK PREFSENS for FDD bands

| Operating band / SCS / Channel bandwidth |
| --- |
| Operating Band | SCS kHz | 5MHz(dBm) | 10MHz(dBm) | 15MHz(dBm) | 20MHz(dBm) | 25MHz(dBm) | 30 MHz (dBm) | 35 MHz (dBm) | 40MHz(dBm) | 45 MHz (dBm) | 50MHz(dBm) |
|  | 15 | -99.5 | -96.3 | -94.5 | -93.3 |  |  |  |  |  |  |
| n256 | 30 |  | -96.6 | -94.6 | -93.5 |  |  |  |  |  |  |
|  | 60 |  | -97.0 | -94.9 | -93.7 |  |  |  |  |  |  |
|  | 15 | -100.0 | -96.8 | -95.0 | -93.8 |  |  |  |  |  |  |
| n255 | 30 |  | -97.1 | -95.1 | -94.0 |  |  |  |  |  |  |
|  | 60 |  | -97.5 | -95.4 | -94.2 |  |  |  |  |  |  |
|  | 15 | -99.5 | -96.3 | -94.5 |  |  |  |  |  |  |  |
| n254 | 30 |  | -96.6 | -94.6 |  |  |  |  |  |  |  |
|  | 60 |  | -97.0 | -94.9 |  |  |  |  |  |  |  |
| n253 | 15 | -100.0 |  |  |  |  |  |  |  |  |  |
| 30 |  |  |  |  |  |  |  |  |  |  |
| 60 |  |  |  |  |  |  |  |  |  |  |
| n252 | 15 | -99.5 | -96.3 | -94.5 | -93.3 |  |  |  |  |  |  |
| 30 |  | -96.6 | -94.6 | -93.5 |  |  |  |  |  |  |
| 60 |  | -97.0 | -94.9 | -93.7 |  |  |  |  |  |  |
| n251 | 15 | -100.0 | -96.8 | -95.0 | -93.8 |  |  |  |  |  |  |
| 30 |  | -97.1 | -95.1 | -94.0 |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 |  |  |  |  |  |  |
| n250 | 15 | -100.0 | -96.8 | -95.0 | -93.8 |  |  |  |  |  |  |
| 30 |  | -97.1 | -95.1 | -94.0 |  |  |  |  |  |  |
| 60 |  | -97.5 | -95.4 | -94.2 |  |  |  |  |  |  |
| NOTE：The transmitter shall be set to PUMAX as defined in clause 6.2.4 of 3GPP TS 38.101-1 [5]. |

The reference receiver sensitivity (REFSENS) requirement specified in Table 7.3.2-1 shall be met with uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-2 and with default Tx-Rx carrier center frequency separation except for cases specified in Table 7.3.2-3.

Table 7.3.2-2: Uplink configuration for reference sensitivity

| Operating band / SCS (kHz) / Channel bandwidth (MHz) / Duplex mode |
| --- |
| Operating Band | SCS | 5 | 10 | 15 | 20 | Duplex Mode |
|  | 15 | 25 | 50 | 75 | 100 |  |
| n256 | 30 |  | 24 | 36 | 50 | FDD |
|  | 60 |  | 10 | 18 | 24 |  |
|  | 15 | 25 | 50 | 75 | 752503 |  |
| n255 | 30 |  | 24 | 36 | 362243 | FDD |
|  | 60 |  | 10 | 18 | 182103 |  |
|  | 15 | 25 | 50 | 75 |  |  |
| n254 | 30 |  | 24 | 36 |  | FDD |
|  | 60 |  | 10 | 18 |  |  |
| n253 | 15 | 25 |  |  |  | FDD |
| 30 |  |  |  |  |
| 60 |  |  |  |  |
|  | 15 | 25 | 50 | 75 | 100 |  |
| n252 | 30 |  | 24 | 36 | 50 | FDD |
|  | 60 |  | 10 | 18 | 24 |  |
| n251 | 15 | 25 | 50 | 75 | 752503 | FDD |
| 30 |  | 24 | 36 | 362243 |
| 60 |  | 10 | 18 | 182103 |
| n250 | 15 | 25 |  |  | 752503 | FDD |
| NOTE 1: UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth in Table 5.3.2-1.NOTE 2: Applicable for Tx-Rx frequency separation of -101.5 MHz and -115.5 MHz.NOTE 3: Applicable for Tx-Rx frequency separation of -87.5 MHz. |

Table 7.3.2-3: TX – RX carrier centre frequency separation for REFSENS verification

|  |  |  |
| --- | --- | --- |
| Operating Band | Channel bandwidth | TX – RX carrier centre frequency separation for REFSENS verification |
| n256 | 5 MHz | 165 MHz, 215 MHz |
| 20 MHz | 180 MHz, 200 MHz |
| n255 | 5 MHz | -72.5 MHz, -130.5 MHz |
| 20 MHz | -87.5 MHz, -115.5 MHz |
| n253 | 5 MHz | -148MHz, -152MHz |
| n252 | 5 MHz | 165 MHz, 195 MHz |
| 15 MHz | 175 MHz, 185 MHz |
| n251 | 5 MHz | -72.5 MHz, -137.5 MHz |
| 20 MHz | -87.5 MHz, -122.5MHz |
| n250 | 5 MHz | -114 MHz, -152 MHz |
| 20 MHz | -129 MHz, -137 MHz |

The minimum requirements specified in Table 7.3.2-1 shall be verified with the network signalling value NS\_01 configured in Table 6.2.3.1-1.

\*\*\*\*\*\*\*\*\*\* NEXT CHANGED SECTION \*\*\*\*\*\*\*\*\*\*

### 7.6.2 In-band blocking

For NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz in-band blocking (IBB) is defined for an unwanted interfering signal falling into the UE receive band or into the first 15 MHz below or above the UE receive band.

The throughput of the wanted signal shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in 3GPP TS 38.101-1 [5] Annexes A.2.2 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD for the DL-signal as described in Annex A.5.1.1) with parameters specified in Table 7.6.2-1 and Table 7.6.2-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6.2-1: In-band blocking parameters for NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |
| --- | --- | --- |
| **RX parameter** | **Units** | **Channel bandwidth (MHz)** |
|  |  | **5, 10** | **15**  | **20** |
| Power in transmission bandwidth configuration3 | dBm | REFSENS + 6 dB | REFSENS + 7 dB | REFSENS + 9 dB  |
| BWinterferer | MHz | 5 |
| FIoffset, case 1 | MHz | 7.5 |
| FIoffset, case 2 | MHz | 12.5 |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in clause 7.3.2 with PCMAX\_L,f,c defined in clause 6.2.4.NOTE 2: The interferer consists of the RMC specified in 3GPP TS 38.101-1 [5] Annex A.3.2.2 with one sided dynamic OCNG Pattern OP.1 FDD for the DL-signal as described in Annex A.5.1.1 and 15 kHz SCS.NOTE 3: Power in transmission bandwidth configuration shall be rounded to the next higher 0.5dB value. |

Table 7.6.2-2: In-band blocking for NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Parameter | Unit | Case 1 | Case 2 |
|  | Pinterferer | dBm | -56 | -44 |
| n250,n251,n252,n253,n254,n255,n256 | Finterferer (offset) | MHz | -BWChannel/2 – FIoffset, case 1andBWChannel/2 + FIoffset, case 1 | ≤ -BWChannel/2 – FIoffset, case 2and≥ BWChannel/2 + FIoffset, case 2 |
|  | Finterferer | MHz | NOTE 2 | FDL\_low – 15toFDL\_high + 15 |
| NOTE 1: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with 15 kHz SCS.NOTE 2: For each carrier frequency, the requirement applies for two interferer carrier frequencies: a: -BWChannel/2 – FIoffset, case 1; b: BWChannel/2 + FIoffset, case 1 |

### 7.6.3 Out-of-band blocking

For NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz out-of-band band blocking is defined for an unwanted CW interfering signal falling outside a frequency range 15 MHz below or above the UE receive band.

The throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in 3GPP TS 38.101-1 [5] Annexes A.2.2 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD for the DL-signal as described in Annex A.5.1.1) with parameters specified in Table 7.6.3-1 and Table 7.6.3-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

**Table 7.6.3-1: Out-of-band blocking parameters for NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz**

|  |  |  |
| --- | --- | --- |
| **RX parameter** | **Units** | **Channel bandwidth (MHz)** |
|  |  | **5, 10** | **15** | **20** |
| Power in transmission bandwidth configuration2 | dBm | REFSENS + 6 dB | REFSENS + 7 dB |  REFSENS + 9 dB |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in clause 7.3.2 with PCMAX\_L,f,c defined in clause 6.2.4.NOTE 2: Power in transmission bandwidth configuration shall be rounded to the next higher 0.5dB value. |

Table 7.6.3-2: Out of-band blocking for NR satellite bands with FDL\_high < 2700 MHz and FUL\_high < 2700 MHz

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating Band | Parameter | Unit | Range 1 | Range 2 | Range 3 |
|  | Pinterferer | dBm | -44 | -30 | -15 |
| n250, n251 | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15or15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60or60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85orFDL\_high + 85 ≤ f≤ 12750 |
| n252 | Finterferer (CW) | MHz | -110 < f – FDL\_low < -15or15 < f – FDL\_high < 60 | -155 < f – FDL\_low ≤ -110or60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 155orFDL\_high + 85 ≤ f≤ 12750 |
| n253 | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15or15 < f – FDL\_high < 94 | -85 < f – FDL\_low ≤ -60or94 ≤ f – FDL\_high < 119 | 1 ≤ f ≤ FDL\_low – 85orFDL\_high + 119 ≤ f≤ 12750 |
| n2542 | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15or15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60or60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85orFDL\_high + 85 ≤ f≤ 12750 |
| n255 | Finterferer (CW) | MHz | -60 < f – FDL\_low < -15or15 < f – FDL\_high < 60 | -85 < f – FDL\_low ≤ -60or60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 85orFDL\_high + 85 ≤ f≤ 12750 |
| n2561 | Finterferer (CW) | MHz | -100 < f – FDL\_low < -15or15 < f – FDL\_high < 60 | -145 < f – FDL\_low ≤ -100or60 ≤ f – FDL\_high < 85 | 1 ≤ f ≤ FDL\_low – 145orFDL\_high + 85 ≤ f≤ 12750 |
| NOTE 1: Band n256 lower frequency ranges are modified to enable specific implementationsNOTE 2: Band n254 power level of the interferer (Pinterferer) for Range 3 shall be modified to -20 dBm for Finterferer > 2585 MHz and FInterferer < 2775 MHz.NOTE 3: voidNOTE 4: void |

For interferer frequencies across ranges 1, 2 and 3 in Table 7.6.3-1, a maximum of

 

exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a step size of MHz withthe number of resource blocks in the downlink transmission bandwidth configuration, BWChannelthe bandwidth of the frequency channel in MHz and *n* = 1, 2, 3 for SCS = 15, 30, 60 kHz, respectively. For these exceptions, the requirements in clause 7.7 apply.

### 7.6.4 Narrow band blocking

This requirement is measure of a receiver's ability to receive a NR signal at its assigned channel frequency in the presence of an unwanted narrow band CW interferer at a frequency, which is less than the nominal channel spacing. The relative throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in 3GPP TS 38.101-1 [5] Annexes A.2.2 and A.3.2 (with one sided dynamic OCNG Pattern OP.1 FDD for the DL-signal as described in Annex A.5.1.1) with parameters specified in Table 7.6.4-1.

Table 7.6.4-1: Narrow Band Blocking

|  |  |  |  |
| --- | --- | --- | --- |
| Operating Band | Parameter | Unit | Channel Bandwidth (MHz) |
|  |  |  | 5 | 10 | 15 | 20 |
| n250,n251,n252,n253,n254,n255,n256 | Pw | dBm | PREFSENS + channel-bandwidth specific value below |
|  |  |  | 16 | 13 | 14 | 16 |
|  | Puw (CW) | dBm | -55 |
|  | Fuw (offset SCS= 15 kHz) 3 | MHz |  |
|  | Fuw (offset SCS= 30 kHz)3 | MHz | NA |
| NOTE 1: The transmitter shall be set a 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in clause 7.3.2 with PCMAX\_L,f,c defined in clause 6.2.4NOTE 2: The PREFSENS power level is specified in clause 7.3.2. NOTE 3: Fuw shall be rounded to half of SCS. |