**3GPP TSG-RAN WG4 Meeting #115 *R4-2505749***

**Malta, ML, 19th – 23rd May, 2025**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-5** | **CR** | **0170** | **rev** | **-** | **Current version:** | **19.0.0** |  |
|  | | | | | | | | |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <http://www.3gpp.org/Change-Requests>.* | | | | | | | | |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | BigCR on UE RF requirements for NTN less than 5MHz | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Xiaomi | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_IoT\_NTN\_req\_test\_enh | | | | |  | ***Date:*** | | | 2025-05-26 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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 can be 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:*** | | To introduce system parameters impact and UE RF requirements by introducing less than 5MHz into NTN to TS 38.101-5 based on the endorsed draftCRs in RAN4#115 meeting. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Relevant sections updated | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | 3MHz channel bandwidth is not supported for NR-NTN. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | Section 6.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<< Start of Change>>

# 6 Conducted transmitter characteristics

## 6.1 General

Unless otherwise stated, the transmitter characteristics for satellite access UEs are specified at the antenna connector of the UE with a single or multiple transmit antenna(s). For UE with integral antenna only, a reference antenna with a gain of 0 dBi is assumed. Handheld power class 3 UE is assumed in Release 17 for satellite access.

All requirements in this section are applicable to devices supporting GSO and/or NGSO satellites.

## 6.2 Transmitter power

### 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 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 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 | 3, 5 | 1610 - 1618.25 | 27dBm/4kHz (mean)  15dBm/4kHz (peak limit) |
| NS\_05N | 3, 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) | 3, 5, 10, 15, 20 | Table 5.3.2-1 | N/A |
| NS\_24N | 6.5.3.3.5 | n256 | 3, 5, 10, 15, 20 | Table 6.2.3.15-1 in 3GPP TS 38.101-1 [5] | Clause 6.2.3.5 |
| NS\_02N | 6.5.3.3.2 | n255 | 3, 5, 10, 15, 20 |  | N/A |
| NS\_100 | 6.5.2.4.2 in 3GPP TS 38.101-1 [5] | n2561 |  |  | Table  6.2.3.1-2 in 3GPP TS 38.101-1 [5] |
| NS\_03N | 6.5.3.3.3 | n254 | 3, 5, 10, 15 |  | Clause 6.2.3.2 |
| NS\_04N | 6.5.2.3.1  6.5.3.3.4 | n254 | 3, 5 |  | Clause 6.2.3.3 |
| NS\_05N | 6.5.2.3.2  6.5.3.3.4 | n254 | 3, 5, 10, 15 |  | Clause 6.2.3.4 |
| 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. | | | | | |

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\_24N | NS\_100 |  |  |  |  |  |
| n255 | NS\_01 | NS\_02N |  |  |  |  |  |  |
| n254 | NS\_01 | NS\_03N | NS\_04N | NS\_05N |  |  |  |  |
| NOTE: *additionalSpectrumEmission* corresponds to an information element of the same name defined in clause 6.3.2 of 3GPP TS 38.331 [8]. | | | | | | | | |

#### 6.2.3.2 A-MPR for NS\_03N

Table 6.2.3.2-1: A-MPR regions for NS\_03N

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Center Frequency | RB\_start\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| 3MHz | 1611.5 <= fc < 1613 | >= 0 | >= 2.16 | A7 |
| 5MHz | 1612.5 <= fc < 1613.9 | <= 0.36 | <= 0.36 | A1 |
|  | >= 2.88 | A2 |
| 1613.9 <= fc < 1615.7 |  | >= 3.24 | A3 |
| 10MHz | 1615 <= fc < 1620.1 | <= 1.8 | <= 5.04 | A4 |
| <= 1.8 | > 5.04 | A5 |
| > 7.2 | > 0 | A6 |
| > 1.8 | >= 2.88 | A2 |
| 1620.1 <= fc < 1621.5 |  | <= 6.48 | A6 |
| <= 0.36 | <= 0.36 | A1 |
|  | fc = 1621.5 |  | >= 7.2 | A1 |
| 15MHz | all | <= 3.6 | <= 5.04 | A4 |
| <= 3.6 | > 5.04 | A5 |
| > 10.44 |  | A6 |
| > 3.6 | >= 4.32 | A2 |

Table 6.2.3.2-2: A-MPR for NS\_03N

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | A1 | A2 | A3 | A4 | A5 | A6 | A7 |
| DFT-s-OFDM | Pi/2 BPSK | 2.5 | 3.0 | 1.0 | 4.0 | 6.5 | 1.5 | 2.0 |
| QPSK | 2.5 | 4.0 | 2.5 | 6.0 | 7.0 | 2.0 | 3.5 |
| 16QAM | 3.0 | 4.5 | 3.0 | 6.5 | 7.5 | 2.5 | 4.0 |
| 64QAM | 3.5 | 5 | 3.5 | 7 | 8 | 3 | 4.5 |
| CP-OFDM | QPSK | 3.5 | 6.0 | 4.0 | 8.0 | 10.0 | 4.0 | 4.5 |
| 16QAM | 3.5 | 6.0 | 4.0 | 8.0 | 10.0 | 4.0 | 4.5 |
| 64QAM | 3.5 | 6.0 | 4.0 | 8.0 | 10.0 | 4.0 | 4.5 |

#### 6.2.3.3 A-MPR for NS\_04N

Table 6.2.3.3-1: A-MPR regions for NS\_04N

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Center Frequency | RB\_start\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| 3MHz | 1611.5 <= fc < 1613 | >= 0 | >= 2.16 | A4 |
| 5MHz | 1612.5 <= fc < 1613.9 | <= 0.36 | <= 0.36 | A1 |
|  | >= 2.88 | A2 |
| 1613.9 <= fc < 1615.7 |  | >= 3.24 | A3 |

Table 6.2.3.3-2: A-MPR for NS\_04N

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Modulation | A1 | A2 | A3 | A4 |
| DFT-s-OFDM | Pi/2 BPSK | 2.5 | 3.0 | 1.0 | 2.0 |
| QPSK | 2.5 | 4.0 | 2.5 | 3.5 |
| 16QAM | 3.0 | 4.5 | 3.0 | 4.0 |
| 64QAM | 3.5 | 5 | 3.5 | 4.5 |
| CP-OFDM | QPSK | 3.5 | 6.0 | 4.0 | 4.5 |
| 16QAM | 3.5 | 6.0 | 4.0 | 4.5 |
| 64QAM | 3.5 | 6.0 | 4.0 | 4.5 |

#### 6.2.3.4 A-MPR for NS\_05N

Table 6.2.3.4-1: A-MPR regions for NS\_05N

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Center Frequency | RB\_start\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| 3MHz | 1623.4 < fc <= 1625 | >= 0 | >= 2.52 | A7 |
| <= 0.36 | <=0.36 | A7 |
| >= 2.34 | <=0.36 | A7 |
| 5MHz | 1622.4 < fc <= 1624 | >= 3.6 | > 0 | A3 |
|  | >= 2.88 | A1 |
| 10MHz | 1615 <= fc < 1620.1 | <= 1.8 | <= 5.04 | A4 |
| <= 1.8 | > 5.04 | A5 |
| > 7.2 | > 0 | A6 |
| > 1.8 | >= 2.88 | A2 |
| 1620.1 <= fc <= 1621.5 |  | <= 7.2 | A6 |
| <= 0.36 | <= 0.36 | A1 |
| > 7.2 | > 0 | A6 |
| 15MHz | all | <= 3.6 | <= 5.04 | A4 |
| <= 3.6 | > 5.04 | A5 |
| > 10.44 |  | A6 |
| > 3.6 | >= 4.32 | A2 |

Table 6.2.3.4-2: A-MPR for NS\_05N

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | A1 | A2 | A3 | A4 | A5 | A6 | A7 |
| DFT-s-OFDM | Pi/2 BPSK | 1.5 | 5.0 | 1.5 | 6.5 | 6.5 | 2.0 | 1.0 |
| QPSK | 1.5 | 5.0 | 1.5 | 6.5 | 7.0 | 2.5 | 1.5 |
| 16QAM | 2.0 | 5.5 | 2.0 | 7.0 | 7.5 | 3.0 | 2.0 |
| 64QAM | 2.5 | 6 | 2.5 | 7.5 | 8 | 3.5 | 2.5 |
| CP-OFDM | QPSK | 3.0 | 6.5 |  | 8.0 | 10.0 | 4.5 |  |
| 16QAM | 3.0 | 6.5 |  | 8.0 | 10.0 | 4.5 |  |
| 64QAM | 3.0 | 6.5 |  | 8.0 | 10.0 | 4.5 |  |

#### 6.2.3.5 A-MPR for NS\_24N

Table 6.2.3.5-1: A-MPR for NS\_24N

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Centre Frequency, Fc, MHz | Region A | | | Region B | | | Region C | | |
|  |  | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz | A-MPR |
| 3MHz | TBD |  |  |  |  |  |  |  |  |  |
| 5MHz | 1987.5 < Fc ≤ 1992.5 |  | >3.24 | A7 |  |  |  |  |  |  |
| 5MHz | 1992.5 < Fc ≤ 1997.5 |  | >3.24 | A4 |  |  |  |  |  |  |
| 5MHz | 1997.5 < Fc ≤ 2002.5 |  | >1.98 | A1 | >3.6 | >1.08 ≤1.98 | A2 | ≤3.6 | ≤1.98 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 10MHz | 1975 < Fc ≤ 1985 | >5.4 |  | A4 |  |  |  |  |  |  |
| 10MHz | 1985 < Fc ≤ 1995 |  | >4.32 | A1 | ≥7.2 | >1.08 ≤4.32 | A2 | <7.2 | ≤4.32 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 10MHz | 1995 < Fc ≤ 2000 | ≥5.76 |  | A5 | <3.06 |  | A5 | ≥3.06  <5.76 | >1.44 | A6 |
| 15MHz | 1972.5 < Fc ≤ 1987.5 |  | >6.84 | A1 | ≥10.8 | >1.08 ≤6.84 | A2 | <10.8 | ≤6.84 | A3 |
|  |  |  |  |  |  | ≤1.08 | A6 |  |  |  |
| 15MHz | 1987.5 < Fc ≤ 1997.5 | ≥8.64 |  | A5 | <3.78 |  | A5 | ≥3.78  <8.64 | >1.44 | A6 |
| 20MHz | 1970 < Fc ≤ 1990 | ≥12.96 |  | A5 | <4.68 |  | A5 | ≥4.68  <12.96 | >2.16 | A6 |
| 20MHz | 1990 < Fc ≤ 1995 | ≥11.52 |  | A5 | <5.58 |  | A5 | ≥5.58  <11.52 | >1.44 | A6 |
| NOTE 1: The A-MPR values are listed in Table 6.2.3.15-2.  NOTE 2: For any undefined region, MPR applies | | | | | | | | | | |

Table 6.2.3.15-2: A-MPR for modulation and waveform type

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 | A5 | A6 | A7 |
|  | Outer/Inner | Outer/Inner | Outer/Inner | Outer | Outer/Inner | Outer/Inner | Outer |
| DFT-s-OFDM PI/2 BPSK | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM QPSK | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM 16 QAM | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 18 | ≤ 10 | ≤ 3.5 |
| DFT-s-OFDM 64 QAM | ≤ 11 | ≤ 5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 10 | ≤ 3.5 |
| CP-OFDM QPSK | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| CP-OFDM 16 QAM | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| CP-OFDM 64 QAM | ≤ 13 | ≤ 6.5 | ≤ 4 | ≤ 8.5 | ≤ 19 | ≤ 12 | ≤ 5.5 |
| NOTE 1: The backoff applied is max(MPR, A-MPR) where MPR is defined in Table 6.2.2-1  NOTE 2: Outer and inner allocations are defined in clause 6.2.2 | | | | | | | |

### 6.2.4 Configured transmitted power

The requirements for configured transmitted power defined in subclause 6.2.4 of 3GPP TS 38.101-1 [5] clause 6.2.4 shall apply to NTN satellite UE.

<<End of Change>>