**3GPP TSG- Meeting #**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **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:*** | R4 |
|  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Addition of n7, n41 and n78 based on endorsed R4-2403843, R4-2403844 and R4-2400619 respectively. |
|  |  |
| ***Summary of change:*** | Relevasnt sections updated based on endorsed R4-2403843, R4-2403844 and R4-2400619. |
|  |  |
| ***Consequences if not approved:*** | PC1 operation not possible for n7, n41 and n78. |
|  |  |
| ***Clauses affected:*** | **6.2.1, 6.2.3, 6.5.3.3.25** |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS 38.521-1 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NRband | Class 1 (dBm) | Tolerance (dB) | Class 1.5 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) |
| n1 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n2 |  |  |  |  |  |  | 23 | ±23 |
| n3 |  |  |  |  | 26 | +2/-33 | 23 | ±23 |
| n5 |  |  |  |  |  |  | 23 | ±2 |
| n7 | 316 | +2/-3 |  |  |  |  | 23 | ±23 |
| n8 |  |  |  |  | 26 | +2/-33 | 23 | ±23 |
| n12 |  |  |  |  |  |  | 23 | ±23 |
| n13 |  |  |  |  |  |  | 23 | ±2 |
| n14 | 316 | +2/-3 |  |  |  |  | 23 | ±2 |
| n18 |  |  |  |  |  |  | 23 | ±2 |
| n20 |  |  |  |  |  |  | 23 | ±23 |
| n24 |  |  |  |  |  |  | 23 | +2/-33 |
| n25 |  |  |  |  | 26 | +2/-33 | 23 | ±23 |
| n26 |  |  |  |  |  |  | 23 | ±23 |
| n28 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n30 |  |  |  |  |  |  | 23 | ±2 |
| n31 | 316 | +2/-3 |  |  |  |  | 23 | ±2 |
| n34 |  |  | 295 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| n38 |  |  |  |  |  |  | 23 | ±2 |
| n39 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n40 |  |  | 295 | +2/-3 | 26 | +2/-3 | 23 | ±2 |
| n41 | 316 | +2/-3 | 295 | +2/-33 | 26 | +2/-33 | 23 | ±23 |
| n47 |  |  |  |  |  |  | 23 | ±2 |
| n48 |  |  |  |  |  |  | 23 | +2/-3 |
| n50 |  |  |  |  |  |  | 23 | ±2 |
| n51 |  |  |  |  |  |  | 23 | ±2 |
| n53 |  |  |  |  |  |  | 23 | ±2 |
| n54 |  |  |  |  |  |  | 23 | ±2 |
| n65 |  |  |  |  |  |  | 23 | ±2 |
| n66 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n70 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n71 | 316 | +2/-3 |  |  | 26 | +2/-3 | 23 | +2/-2.5 |
| n72 | 316 | +2/-3 |  |  |  |  | 23 | ±2 |
| n74 |  |  |  |  |  |  | 23 | ±2 |
| n77 | 316 | +2/-3 | 295 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n78 | 316 | +2/-3 | 295 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n79 |  |  | 295 | +2/-3 | 26 | +2/-3 | 23 | +2/-3 |
| n80 |  |  |  |  | 26 | +2/-33 | 23 | ±23 |
| n81 |  |  |  |  |  |  | 23 | ±2 |
| n82 |  |  |  |  |  |  | 23 | ±2 |
| n83 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n84 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n85 | 316 | +2/-3 |  |  |  |  | 23 | ±23 |
| n86 |  |  |  |  |  |  | 23 | ±2 |
| n89 |  |  |  |  |  |  | 23 | ±2 |
| n91 |  |  |  |  |  |  | 23 | ±23, 4 |
| n92 |  |  |  |  |  |  | 23 | ±23, 4 |
| n93 |  |  |  |  |  |  | 23 | ±23, 4 |
| n94 |  |  |  |  |  |  | 23 | ±23, 4 |
| n95 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n97 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n98 |  |  |  |  | 26 | +2/-3 | 23 | ±2 |
| n99 |  |  |  |  |  |  | 23 | +2/-33 |
| n100 | 316 | +2/-3 |  |  |  |  | 23 | ±2 |
| n101 | 316 | +2/-3 |  |  |  |  | 23 | ±2 |
| n104 |  |  |  |  | 26 | +2/-3 | 23 | +2/-3 |
| n105 |  |  |  |  |  |  | 23 | +2/-2.5 |
| n106 |  |  |  |  |  |  | 23 | ±2 |
| n109 |  |  |  |  |  |  | 23 | ±23, 4 |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the toleranceNOTE 2: Powerclass 3 is default power class unless otherwise statedNOTE 3: Refers to the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB.NOTE 4: The maximum output power requirement is relaxed by reducing the lower tolerance limit by 0.3 dBNOTE 5: Achieved via dual TxNOTE 6: Generally, PC1 UE is not targeted for smartphone form factor. The UE power class 1 requirements for Band n14 are applicable for public safety scenario only. |

If a UE supports a different power class than the default UE power class for the band and the supported power class enables the higher maximum output power than that of the default power class:

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is absent and the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 50% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC2-FR1* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* is not absent and half the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the IE P-Max as defined in TS 38.331 [7] is provided and set to the maximum output power of the default power class or lower;

- shall apply all requirements for the default power class to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else if the UE does not support a power class with higher maximum output power than PC2; or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is absent and the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* is absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 25% (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC2-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than 0.5\**maxUplinkDutyCycle-PC2-FR1* (The exact evaluation period is no less than one radio frame); or

- if the field of UE capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* is not absent and the percentage of uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-PC1dot5-MPE-FR1* as defined in TS 38.306 (The exact evaluation period is no less than one radio frame); or

- if the IE P-Max as defined in TS 38.331 [7] is provided and set to the maximum output power of the power class 2 or lower;

- shall apply all requirements for power class 2 to the supported power class and set the configured transmitted power as specified in clause 6.2.4;

- else shall apply all requirements for the supported power class and set the configured transmitted power as specified in clause 6.2.4.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 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 frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [7]*.*

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 clause 6.2.2. Unless stated otherwise, Edge RB allocations get the same AMPR as Outer RB allocations. 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. In case of a power class 3 UE, when IE *powerBoostPi2BPSK* is set to 1, power class 2 A-MPR values apply. The mapping of NR frequency band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2.3.1-1A.

For almost contiguous allocations in CP-OFDM waveforms in power class 3, the allowed A-MPR defined in clause 6.2.3 is increased by CEIL{ 10 log10(1 + NRB\_gap / NRB\_alloc), 0.5 } dB, where CEIL{x, 0.5} means x rounding upwards to closest 0.5dB, NRB\_gap is the total number of unallocated RBs between allocated RBs and NRB\_alloc is the total number of allocated RBs, and the parameter LCRB is replaced by NRB\_alloc + NRB\_gap in specifying the RB allocation regions.

Unless otherwise specified, pi/2 BPSK in following A-MPR tables refers to both variants of pi/2 BPSK referenced in 6.2.2 tables 6.2.2-1.

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| NS\_01 |  | Table 5.2-1(NOTE 8) | 3, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | Table 5.3.2-1 | N/A |
| NS\_03 | 6.5.2.3.3 | n2, n25, n66,n70, n86 |  |  | Clause 6.2.3.7 |
| NS\_03U | 6.5.2.3.3, 6.5.2.4.2 | n2, n25, n66, n86 (NOTE 1) |  |  | Clause 6.2.3.7 |
| NS\_04 | 6.5.2.3.2, 6.5.3.3.1 | n41, n90 | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 |  | Clause 6.2.3.2 |
| NS\_05 | 6.5.3.3.4 | n1, n65, n84 (NOTE 1) | 5, 10, 15, 20(NOTE 2) |  | Clause 6.2.3.4 (NOTE 7) |
| NS\_05U | 6.5.3.3.4, 6.5.2.4.2 | n1, n65, n84 | 5, 10, 15, 20 |  | Clause 6.2.3.4 (NOTE 7) |
| NS\_06 | 6.5.2.3.4 | n1213, n85 | 3, 5, 10, 15 |  | Clause6.2.3.3212 |
|  |  | n14 | 5,10 |  |  |
| NS\_07 | 6.5.2.3.46.5.3.3.26 | n13 | 5,10 | Table 6.2.3.29-1 | Table6.2.3.29-2 |
| NS\_10 |  | n20, n82 | 15, 20 | Table 6.2.3.3-1 | Table6.2.3.3-1 |
| NS\_12 | 6.5.3.3.17 | n26 | 3,5,10 | Table 6.2.3.21-1 | Table 6.2.3.21-2 |
| NS\_13 | 6.5.3.3.18 | n26 | 3, 5 | Table 6.2.3.22-1 | Table 6.2.3.22-2 |
| NS\_14 | 6.5.3.3.19 | n26 | 10,15,20 | Table 6.2.3.23-1 | Table 6.2.3.23-2 |
| NS\_15 | 6.5.3.3.20 | n26 | 3,5,10,15,20 | Table 6.2.3.24-1 | Table 6.2.3.24-2 |
| NS\_17 | 6.5.3.3.2 | n28, n8313 | 3,5,10 | Table 5.3.2-1 | N/A |
| NS\_18 | 6.5.3.3.3 | n28, n8313 | 3, 5 |  | Table 6.2.3.13-1, A1 |
|  |  |  | 10, 15, 20 |  | Table 6.2.3.13-1, A2 |
|  |  |  | 25, 30 |  | Table 6.2.3.13-1, A3, A4, A5 |
| NS\_21 | 6.5.2.3.96.5.3.3.12 | n30 | 5, 10 |  | Clause 6.2.3.14 |
| NS\_24 | 6.5.3.3.13 | n65 (NOTE 4) | 5, 10, 15, 20 | Table 6.2.3.15-1 | Clause 6.2.3.15 |
| NS\_27 | 6.5.2.3.86.5.3.3.14 | n48 | 5, 10, 15, 20, 30, 40 | Table 6.2.3.16-1 | Table 6.2.3.16-2 |
| NS\_35 | 6.5.2.3.1 | n71(NOTE 11) | 5, 10, 15, 20, 25, 30 | Table 5.3.2-1 | Clause6.2.3.3111 |
| NS\_37 | 6.5.3.3.6 | n74(NOTE 3) | 10, 15 | Table 6.2.3.8-1 | Table6.2.3.8-1 |
| NS\_38 | 6.5.3.3.7 | n74 | 5, 10, 15, 20 | Table 6.2.3.9-1 | Table6.2.3.9-1 |
| NS\_39 | 6.5.3.3.8 | n74 | 10, 15, 20 | Table 6.2.3.10-1 | Table 6.2.3.10-1 |
| NS\_40 | 6.5.3.3.9 | n51 | 5 |  | Table6.2.3.5-1 |
| NS\_41 | 6.5.3.3.10 | n50 | 5, 10, 15, 20, 30, 40, 50, 60 |  | Table 6.2.3.11-1 |
| NS\_42 | 6.5.3.3.11 | n50 | 5, 10, 15, 20, 30, 40, 50, 60 |  | Table 6.2.3.12-1 |
| NS\_43 | 6.5.3.3.5 | n8, n81 | 5, 10, 15 |  | Clause 6.2.3.6 |
| NS\_43U | 6.5.3.3.5, 6.5.2.4.2 | n8, n81 (NOTE 1) | 5, 10, 15 |  | Clause 6.2.3.6 |
| NS\_44 | 6.5.3.3.24 | n38 | 25, 30, 40 | Table 6.2.3.20-1 | Table 6.2.3.20-1 |
| NS\_45 | 6.5.3.3.21 | n53 | 5, 10 |  | Clause 6.2.3.25 |
| NS\_46 | 6.5.3.3.25 | n7 | 25, 30, 35, 40, 50 | Table 6.2.3.17-1Table 6.2.3.17-311 | Table 6.2.3.17-2Table 6.2.3.17-411 |
| NS\_47 | 6.5.3.3.15 | n41 (Note 5) | 30 | Table 6.2.3.18-1 | Table 6.2.3.18-2 |
| NS\_48 | 6.5.3.3.22 | n1 and n84 | 10, 15, 20, 25, 30, 40, 45, 50 | Table 6.2.3.26-1,Table 6.2.3.26-3 | Table 6.2.3.26-2,Table 6.2.3.26-4 (NOTE 7) |
| NS\_49 | 6.5.3.3.23 | n1 and n84 | 10, 15, 20, 25, 30, 40, 45, 50 | Table 6.2.3.27-1,Table 6.2.3.27-3 | Table 6.2.3.27-2,Table 6.2.3.27-4 (NOTE 7) |
| NS\_50 | 6.5.3.3.16 | n39, n98 | 10, 15, 20, 25, 30, 35, 40 |  | Clause 6.2.3.19 |
| NS\_51 | 6.5.3.3.22 | n65 | 50 | Table 6.2.3.28-1 | Table 6.2.3.28-2 |
| NS\_55 | NOTE 6 | n77 | 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 |  | N/A |
| NS\_56 | 6.5.3.3.27 | n24, n99 | 5, 10 |  | Clause 6.2.3.30 |
| NS\_57 | NOTE 10 | n77 | 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 |  | N/A |
| NS\_62 | 6.5.3.3.28 | n54 | 5 |  | N/A |
| NS\_100 | 6.5.2.4.2 | n1, n2, n3, n5, n8, n18, n25, n26, n65, n66, n80, n81, n84, n86, n89(NOTE 1) |  |  | Table6.2.3.1-2 |
| NOTE 1: This NS can be signalled for NR bands that have UTRA services deployed.NOTE 2: No A-MPR is applied for 5 MHz BWChannel where the upper channel edge is ≥ 1930 MHz,10 MHz BWChannel where the upper channel edge is ≥ 1950 MHz and 15 MHz BWChannel where the upper channel edge is ≥ 1955 MHz and 20 MHz BWChannel where the upper channel edge is ≥ 1970 MHz.NOTE 3: Applicable when the NR carrier is within 1447.9 – 1462.9 MHz.NOTE 4: Applicable when the upper edge of the channel bandwidth frequency is greater than 1980 MHz.NOTE 5: Applicable when the NR carrier is within 2545 – 2575 MHz. PC1 operation is not allowed.NOTE 6: This NS value is applicable for cells in the range 3450 – 3550 MHz for operations in the USA. This NS value does not indicate any additional spurious emission and maximum output power reduction requirements.NOTE 7: The 1Tx architecture is assumed. For power class 2 UE indicating *txDiversity-r16* [TS 38.306], the additional relaxation of [2] dB is applicable.NOTE 8: The NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.NOTE 9: VoidNOTE 10: This NS value is applicable for cells below 3980 MHz that are partly or fully within the range 3650-3980 MHz for operations in Canada. This NS value does not indicate any additional spurious emission and maximum output power reduction requirements.NOTE 11: Applicable only for power class 1 operation.NOTE 12: Applicable only for power class 1 operation on band n85.NOTE 13: 3 MHz channel bandwidth is not applicable. |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 6.2.3.2 A-MPR for NS\_04

For NS\_04, A-MPR is not added to MPR. Also, when NS\_04 is signalled, MPR shall be set to zero in the PCMAX equations to avoid double counting MPR.

For power Class 1.5, 2 and 3, allowed maximum power reduction is defined as A-MPR = max(MPR, A-MPR'),

Note that A-MPR' = 0 dB means only MPR is applied,

where A-MPR' is defined as

if RBstart ≤ fstart,max,IMD3 / (12⋅SCS) and LCRB ≤ AWmax,IMD3 / (12⋅SCS) and FC - BWChannel/2 < FUL\_low + offsetIMD3,
then

 the A-MPR' is defined according to Table 6.2.3.2-2 PC3\_A2 relative to 23 dBm for power class 3, PC2\_A4 relative to 26 dBm for power class 2, and PC1.5\_A6 relative to 29 dBm for power class 1.5,

else,

if RBstart ≤ LCRB/2 + start / (12⋅SCS) and LCRB ≤ AWmax,regrowth / (12⋅SCS) and FC - BWChannel/2 < FUL\_low + offsetregrowth,
then

 the A-MPR' is defined according to Table 6.2.3.2-2 PC3\_A1 relative to 23 dBm for power class 3, PC2\_A3 relative to 26 dBm for power class 2, , and PC1.5\_A5 relative to 29 dBm for power class 1.5,

else

 A-MPR' = 0 dB and apply MPR.

With the parameters defined in Table 6.2.3.2-1.

Table 6.2.3.2-1: Parameters for region edges and frequency offsets (Power Class 1.5, 2 and 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Symbol | Value | Related condition |
|  |  | CP-OFDM | DFT-s-OFDM |  |
| Max allocation start in IMD3 region | fstart,max,IMD3 | 0.33 BWChannel | RBstart ≤ fstart,max,IMD3 / (12SCS) |
| Max allocation BW in IMD3 region | AWmax,IMD3 | 4 MHz | LCRB ≤ AWmax,IMD3 / (12SCS) |
| Freq. offset required to avoid A-MPR in IMD3 region | offsetIMD3 | BWChannel – 6 MHz | FC - BWChannel/2 ≥ FUL\_low + offsetIMD3 |
| Right edge of regrowth region | start | 0.08 BWChannel | RBstart ≤ LCRB/2 + start / (12SCS) |
| Max allocation BW in regrowth region | AWmax,regrowth | 100 MHz | LCRB ≤ Min(LCRB,Max, AWmax,regrowth / (12SCS)) |
| Freq. offset required to avoid A-MPR in regrowth region | offsetregrowth | Max (10 MHz, 0.25\* BWChannel MHz) | Max (10 MHz, 0.45\* BWChannel MHz) | FC - BWChannel/2 ≥ FUL\_low + offsetregrowth |

Table 6.2.3.2-2: A-MPR' values Access (Power Class 1.5, 2 and 3)

|  |  |
| --- | --- |
| Modulation/Waveform | A-MPR' (dB) |
|  | PC3\_A1 | PC3\_A2 | PC2\_A3 | PC2\_A4 | PC1.5\_A51 | PC1.5\_A61 |
| DFT-s-OFDM | Pi/2-BPSK | ≤ 3.5 | ≤ 3.5 | ≤ 3.5 | ≤ 5.5 | ≤ 5 | ≤ 7 |
|  | QPSK | ≤ 4 | ≤ 4 | ≤ 4.5 | ≤ 6 | ≤ 6 | ≤ 7.5 |
|  | 16 QAM | ≤ 4 | ≤ 4 | ≤ 5 | ≤ 6 | ≤ 6.5 | ≤ 7.5 |
|  | 64 QAM | ≤ 4 | ≤ 4.5 | ≤ 5 | ≤ 6.5 | ≤ 6.5 | ≤ 8 |
|  | 256 QAM | ≤ 4.5 | ≤ 6 | ≤ 6.5 | ≤ 8 | ≤ 8 | ≤ 9.5 |
| CP-OFDM | QPSK | ≤ 5.5 | ≤ 5.5 | ≤ 6.5 | ≤ 7.5 | ≤ 8 | ≤ 9 |
|  | 16 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 6.5 | ≤ 7.5 | ≤ 8 | ≤ 9 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 6.5 | ≤ 7.5 | ≤ 8 | ≤ 9 |
|  | 256 QAM | ≤ 6.5 | ≤ 8 | ≤ 7.5 | ≤ 10 | ≤ 9 | ≤ 11.5 |
| NOTE 1: PC1.5 assumes dual Tx. |

For Power Class 1, NS\_04 A-MPR is defined as
A-MPR = max(MPR, A-MPRregrowth, A-MPRIMD3, A-MPRCIM3, A-MPRedge).

A-MPRregrowth is obtained from Table 6.2.3.2-3 in terms of *total guard bandwidth* (TGBW). The TGBW is defined as the frequency distance between the RB allocation and the additional spurious emission limit defined in Table 6.5.3.3.1-1, i.e.,

,

where

is the lower edge frequency of the RB allocation, is the channel centre frequency, is the channel bandwidth, and is the minimum guard bandwidth defined in Table 5.3.3-1.

**Table 6.2.3.2-3: A-MPRregrowth for NS\_04 (Power Class 1)**

|  |  |
| --- | --- |
| **TGBW range** | **A-MPRregrowth \*(dB)** |
| G0dB(BWalloc) ≤ TGBW | 0 |
| G1dB(BWalloc) ≤ TGBW < G0dB(BWalloc) | 1 |
| G2dB(BWalloc) ≤ TGBW < G1dB(BWalloc) | 2 |
| G3dB(BWalloc) ≤ TGBW < G2dB(BWalloc) | 3 |
| G4dB(BWalloc) ≤ TGBW < G3dB(BWalloc) | 4 |
| G5dB(BWalloc) ≤ TGBW < G4dB(BWalloc) | 5 |
| TGBW < G5dB(BWalloc) | 6 |

Each function defines the required minimum total guard bandwidth for A-MPR value and is defined as

,

where is the allocation bandwidth, and , , and are obtained from Table 6.2.3.2-4 for each combination of waveform, modulation, and back-off value .

**Table 6.2.3.2-4: Polynomial coefficients for determining the required
total guard bandwidth for each value of A-MPRregrowth (Power Class 1)**

|  |  |  |
| --- | --- | --- |
| **Waveform** | **Modulation** | **Back-off value *A* [dB] / Polynomial coefficients C2, C1, C0 [MHz]** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** |
| **DFT-s-OFDM** | **Pi/2-BPSK** | -3,40,10 | -91,98,0 | -248,143,-9 | -2148,604,-40 | 0,0,0 | N/A | N/A |
| **QPSK** | -27,71,1 | -49,73,0 | -76,76,-3 | -108,62,-3 | 0,0,0 | N/A | N/A |
| **16-QAM** | -34,81,-1(NOTE 1) | -57,92,-5 | -69,82,-5 | -119,79,-5 | 0,0,0 | N/A | N/A |
| **64-QAM** | -23,74,-1(NOTE 1) | -61,91,-4(NOTE 1) | -84,92,-5 | -116,80,-5 | 0,0,0 | N/A | N/A |
| **256-QAM** | 0, 0, 0(NOTE 2) | N/A | N/A | N/A | N/A | N/A | N/A |
| **CP-OFDM** | **QPSK** | -32,81,-2(NOTE 1) | -36,77,-3 | -40,70,-3 | -52,67,-3 | -67,60,-3 | -101,56,-4 | 0,0,0 |
| **16-QAM** | -31,80,-2(NOTE 1) | -32,72,-2(NOTE 1) | -36,66,-2 | -48,62,-2 | -66,58,-2 | -108,60,-4 | 0,0,0 |
| **64-QAM** | -28,78,-2(NOTE 1) | -33,73,-2(NOTE 1) | -36,66,-2(NOTE 1) | -48,62,-2 | -65,58,-2 | -124,67,-5 | 0,0,0 |
| **256-QAM** | 0, 0, 0(NOTE 2) | N/A | N/A | N/A | N/A | N/A | N/A |
| NOTE 1: Back-off value *A* is less than floor(MPR), thus this polynomial is irrelevant.NOTE 2: For 256-QAM, always A-MPRregrowth = 0. |

For both OFDM and DFT-S-OFDM, A-MPRIMD3 =
if ; otherwise, A-MPRIMD3 = 0 dB.

For OFDM, A-MPRCIM3 = dB if ;
otherwise, A-MPRCIM3 = 0.

For DFT-S-OFDM, A-MPRCIM3 = 3 dB if and ;
otherwise, A-MPRCIM3 = 0.

Here, is the upper edge frequency of the RB allocation.

For both OFDM and DFT-S-OFDM, if *, ,*  and , A-MPRedge is defined in Table 6.2.3.2-5. Otherwise, A-MPRedge = 0 dB.

**Table 6.2.3.2-5: A-MPRedge for NS\_04 (Power Class 1)**

|  |  |  |  |
| --- | --- | --- | --- |
| Waveform | [MHz] |  [MHz] | A-MPR [dB] |
| DFT-s-OFDM | < 40 | N/A | 0 |
| 40…90 |  | 3.5 |
| 100 | 11 |
| OFDM | < 90 | N/A | 0 |
| 90 | ≤ 6.5 | 3.5 |
| 100 | ≤ 8 | 11 |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 6.2.3.17 A-MPR for NS\_46

Table 6.2.3.17-1: A-MPR regions for NS\_46 (Power class 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Center Frequency, Fc, MHz | Regions | A-MPR |
|  |  | RBend\*12\*SCSMHz | LCRB\*12\*SCSMHz |  |
| 25 MHz | 2534.5 ≤ FC ≤ 2557.5 |  | Note 1 | A3 |
| 30 MHz | 2515 ≤ FC ≤ 2555 | ≥0, <1.44 | >0 | A4 |
|  |  | ≥1.44, <13.5 | >max (0, 12\*SCS\*RBend -1.8) | A5 |
|  |  | ≥13.5, <19.8 | >11.52 | A6 |
|  |  | ≥19.8, <25.92 | >6.3 | A7 |
|  |  | ≥25.92 | >0 | A8 |
| 35 MHz | 2517.5 ≤ FC ≤ 2552.5 | ≥0, <3.42 | >0 | A4 |
|  |  | ≥3.42, <15.84 | >max (0, 12\*SCS\*RBend - 3.06) | A5 |
|  |  | ≥15.84, <22.68 | >12.6 | A6 |
|  |  | ≥22.68, <28.8 | >9.0 | A7 |
|  |  | ≥28.8 | >0 | A8 |
| 40 MHz | 2520 ≤ FC ≤ 2550 | ≥0, <4.14 | >0 | A4 |
|  |  | ≥4.14, <18 | >max (0, 12\*SCS\*RBend - 4.5) | A5 |
|  |  | ≥18, <25.74 | >13.5 | A6 |
|  |  | ≥25.74, <32.4 | >12.6 | A7 |
|  |  | ≥32.4 | >0 | A8 |
| 50 MHz | 2525 ≤ FC ≤ 2545 | ≥0, <9 | >0 | A4 |
|  |  | ≥9, <21.6 | >max (0, 12\*SCS\*RBend - 7.2) | A5 |
|  |  | ≥21.6, <31.5 | >18 | A6 |
|  |  | ≥31.5, <39.6 | >16.2 | A7 |
|  |  | ≥39.6 | >0 | A8 |
| NOTE 1: > 9.72 MHz for DFT-s-OFDM, > 16.02 MHz for CP-OFDM.  |

Table 6.2.3.17-2: A-MPR for NS\_46 (Power class 3)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A3 | A4 | A5 | A6 | A7 | A8 |
|  | Outer | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM | PI/2 BPSK | 4.5 | 5 | 2 | 3.5 | 6 | 10 |
|  | QPSK | 4.5 | 5 | 2 | 3.5 | 6 | 10 |
|  | 16 QAM | 4.5 | 5 | 2 | 3.5 | 6 | 10 |
|  | 64 QAM | 4.5 | 5 |  | 3.5 | 6 | 10 |
|  | 256 QAM |  |  |  |  | 6 | 10 |
| CP-OFDM | QPSK | 6 | 5 | 3.5 | 5.5 | 7 | 11 |
|  | 16 QAM | 6 | 5 | 3.5 | 5.5 | 7 | 11 |
|  | 64 QAM | 6 | 5 | 3.5 | 5.5 | 7 | 11 |
|  | 256 QAM | 6 |  |  |  | 7 | 11 |

Table 6.2.3.17-3: A-MPR regions for NS\_46 (Power class 1)

|  |  |  |  |
| --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Center Frequency, Fc, MHz | Regions | A-MPR |
| RBend\*12\*SCSMHz | LCRB\*12\*SCSMHz |
| 15 MHz | Fc > 2559.5 | ≥ 11.8 | ≥ -1.8\*12\*SCS\*RBend + 32.5 | A1 |
| ≥ 13.3 | ≤ 1.62 | A2 |
| 20 MHz | Fc > 2547.5 | ≥ 15.3 | ≥ -1.5\*12\*SCS\*RBend + 36.5 | A1 |
| ≥ 15 | ≤ 5.7 | A2 |
| 25 MHz | Fc > 2547.5 | ≥ 17 | ≥ -1.5\*12\*SCS\*RBend + 43.5 | A3 |
| ≥ 18.5 | ≤ 6.7 | A2 |
| 2535.5 < Fc ≤ 2547.5 | ≥ 21.6 | ≥ 21.6 | A5 |
| ≥ 20.5 | ≤ 5.6 | A2 |
| 30 MHz | 2523 < Fc ≤ 2545 | ≥ 22.5 | ≥ -0.7\*12\*SCS\*RBend + 41.0 | A5 |
| ≥ 23.4 | ≤ 7.2 | A2 |
| Fc > 2545 | ≥ 20.0 | ≥ -1.5\*12\*SCS\*RBend + 50.5 | A8 |
| ≥ 21.6 | ≤ 7.2 | A9 |
| ≤ 9.6 | ≥ 1.1\*12\*SCS\*RBend - 1.5 | A7 |
| 35 MHz | Fc ≤ 2532.5 | ≥ 28 | ≤ 7.2 | A2 |
| 2532.5 < Fc ≤ 2542.5 | ≥ 27.7 | ≥ -1.2\*12\*SCS\*RBend + 59.4 | A4 |
| ≥ 24.5 | ≤ 7.2 | A2 |
| Fc > 2542.5 | ≤ 18.4 | ≥ 1.15\*12\*SCS\*RBend – 3.4 | A7 |
| ≥ 21.6 | ≥ 9, ≥ -1.2\*12\*SCS\*RBend + 47 | A8 |
| ≥ 23 | < 9 | A9 |
| 40 MHz | Fc > 2540 | ≤ 24 | ≥ 1.15\*12\*SCS\*RBend - 6 | A7 |
|  > 24, < 35 | ≥ -0.75\*12\*SCS\*RBend + 40.5 | A9 |
| ≥ 34 | > 7.2 | A9 |
| ≥ 27 | > 2.2, ≤ 7.2 | A8 |
| ≥ 27 | ≤ 2.2 | A9 |
| 2530 < Fc ≤ 2540 | ≤ 10.8 | ≥ 1.2\*12\*SCS\*RBend – 2 | A7 |
| ≥ 29 | ≤ 7.2 | A9 |
| ≥ 28 | ≥ -1\*12\*SCS\*RBend + 56 | A10 |
| Fc ≤ 2530 | ≥ 30 | ≤ 7.2 | A2 |
| 50 MHz | Fc > 2535 | ≤ 19 | ≥ 1.17\*12\*SCS\*RBend – 10 | A7 |
| > 19, ≤ 29.5 | ≥ 1.17\*12\*SCS\*RBend – 10 | A11 |
| > 29.5 | > 12.8, ≥ -1.15\*12\*SCS\*RBend + 60 | A9 |
| > 41 | > 7.2, ≤ 12.8 | A12 |
| ≥ 33 | > 2.2, ≤ 7.2 | A8 |
| ≥ 33 | ≤ 2.2 | A9 |
| 2525 < Fc ≤ 2535 | ≤ 14 | ≥ 1.17\*12\*SCS\*RBend – 6 | A7 |
| > 14, ≤ 26 | ≥ 1.17\*12\*SCS\*RBend – 6 | A11 |
| ≥ 34 | > 22.5, ≥ -1.25\*12\*SCS\*RBend + 77.5 | A8 |
| ≥ 43 | > 7.2, ≤ 22.5 | A12 |
| ≥ 35 | > 2.2, ≤ 7.2 | A8 |
| ≥ 35 | ≤ 2.2 | A9 |
| Fc = 2525 | ≥ 47 | ≥ -1\*12\*SCS\*RBend + 94 | A13 |
| ≤ 9 | ≥ 1.14\*12\*SCS\*RBend – 2 | A7 |
| ≥ 37.4 | > 2.2, ≤ 7.6 | A8 |
| ≥ 37.4 | ≤ 2.2 | A9 |

Table 6.2.3.17-4: A-MPR regions for NS\_46 (Power class 1)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | A10 | A11 | A12 | A13 |
| Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM | PI/2 BPSK | 2 |  | 2 | 1 | 1 | 3 | 9.5 | 5 | 6 | 4 |  | 4 | 2.5 |
| QPSK | 3 | 4 | 3 | 2 | 2 | 6 | 11 | 6 | 6 | 5 |  | 4 | 4 |
| 16 QAM | 3 | 6.5 | 3 |  |  | 6 | 12 | 6 | 6.5 | 5 |  | 4 | 4 |
| 64 QAM | 3 | 7 | 3 |  |  | 6 | 12.5 | 6 | 7 | 5 |  | 4 | 4 |
| 256 QAM |  | 7 |  |  |  | 6 | 12.5 | 6 | 7 | 5 |  |  |  |
| CP-OFDM | QPSK | 4 | 12.5 | 6 | 4 |  | 6.5 | 15 | 9 | 12.5 | 5.5 | 10 | 5 | 4 |
| 16 QAM | 4 | 12.5 | 6 | 4 |  | 6.5 | 15 | 9 | 13 | 5.5 | 10 | 5 | 4 |
| 64 QAM | 4 | 13 | 6 |  |  | 6.5 | 15 | 9 | 13 | 5.5 | 10 | 5 | 4 |
| 256 QAM |  | 13 |  |  |  |  | 15 | 9 | 13 |  | 10 |  |  |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.5.3.3.25 Requirement for network signalling value "NS\_46"

When "NS\_46" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5.3.3.25-1. 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 6.5.3.3.25-1: Additional requirements for “NS\_46”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Protected band | Frequency range (MHz) | Maximum Level (dBm) | MBW (MHz) | NOTE |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 1, 2 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 1, 2 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 1 |
| NOTE 1: This requirement is applicable for power class 3 UE for all carriers confined in 2500-2570 MHz. Special restrictions apply for channel bandwidths up to 20MHz: For carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 - 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 - 2560 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB with the minimum supported SCS of 15KHz.NOTE 2: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band. |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*