**3GPP TSG-WG4 Meeting # 99-e *R4-211xxxx***

**, 19th - 27th May 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **346** | **rev** | **1** | **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 |  | Radio Access Network | **X** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | TS 38.141-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Perf | | | | |  | ***Date:*** | | | 2021-05-25 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The current emission limit of -39.4 dBm/27 MHz is not in line with the ECC Dec 17(06) specifying -72 dBW/27MHz. In TS 38.104 and TS 38.141-1 the limit is correctly set to -42 dBm/27 MHz. This requirements are also applicable in OBUE domain. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Added a statement in the OBUE additional limits  Change the limit to -42 dBm/27MHz.  Change table titles. Remove “declared”  Added bands n74 and n75 to the emissionslimits above 1518 MHz  Limits over 1518 Mhz as EIRP in line with spectrum decision  Added 0dB test tolerance for the respective requirements in annex C.1 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Wrong value for unwanted emissions limit and lack of compliance with a European spectrum decision. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.7.4.5.1.6, 6.7.5.1, 6.7.5.4.5, C.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Removed “in any direction” above table 6.7.5.4.5-4 and add “n” to band numbers in the new sub-clause 6.7.4.5.1.6.3  Removed “declared” in the table title, as these values are not declared.  Added 0 dB test tolerance in annec C.1 for this requirement | | | | | | | | |

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6.7.4.5.1.6 Additional requirements

6.7.4.5.1.6.1 Limits in FCC Title 47

In addition to the requirements in tables 6.7.4.5.1.1-1 to 6.7.4.5.1.5-3, the BS may have to comply with the applicable emission limits established by FCC Title 47 [14], when deployed in regions where those limits are applied, and under the conditions declared by the manufacturer.

6.7.4.5.1.6.2 Protection of DTT

In certain regions the following requirement may apply for protection of DTT. For *BS type 1-O* operating in Band n20, the level of emissions in the band 470-790 MHz, measured in an 8 MHz filter bandwidth on centre frequencies Ffilter according to table 6.7.4.5.1.6.2-1, shall not exceed the maximum emission TRP level shown in the table. This requirement applies in the frequency range 470-790 MHz even though part of the range falls in the spurious domain.

Table 6.7.4.5.1.6.2-1: Declared emissions levels for protection of DTT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case | Measurement filter centre frequency | Condition on BS maximum aggregate EIRP / 10 MHz, PEIRP\_10MHz  (NOTE) | Maximum level  PEIRP,N,MAX | Measurement bandwidth |
| A: for DTT frequencies where | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz ≥ 59 dBm | 0 dBm | 8 MHz |
| broadcasting is protected | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | 36 ≤ PEIRP\_10MHz < 59 dBm | PEIRP\_10MHz – 59 dBm | 8 MHz |
|  | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz < 36 dBm | -23 dBm | 8 MHz |
| B: for DTT frequencies where | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz ≥ 59 dBm | 10 dBm | 8 MHz |
| broadcasting is subject to an | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | 36 ≤ PEIRP\_10MHz < 59 dBm | PEIRP\_10MHz – 49 dBm | 8 MHz |
| intermediate level of protection | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz < 36 dBm | -13 dBm | 8 MHz |
| C: for DTT frequencies where broadcasting is not protected | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | N.A. | 22 dBm | 8 MHz |
| NOTE: PEIRP\_10MHz (dBm) is defined by PEIRP\_10MHz = P10MHz + Gant + 9dB, where Gant is 17 dBi. | | | | |

6.7.4.5.1.6.3 Additional limits for BS operating in Bands n50, n51, n74, n75, n76

For BS operating in bands n50, n51, n74, n75 and n76 additional emission limits that might be applicable in the OBUE frequency domain are specified in clause 6.7.5.4.5.

##### 6.7.4.5.2 *BS type 2-O*

6.7.4.5.2.1 General

The requirements of either clause 6.7.4.5.2.2 (Category A limits) or clause 6.7.4.5.2.3 (Category B limits) shall apply. The application of either Category A or Category B limits shall be the same as for General OTA transmitter spurious emissions requirements (*BS type 2-O*) in clause 6.7.5.2.5.2. In addition, the limits in clause 6.7.4.5.2.4 may also apply. The emission measurement result shall not exceed the maximum levels specified in the tables below, where:

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### 6.7.5 OTA transmitter spurious emissions

#### 6.7.5.1 General

Unless otherwise stated, all requirements are measured as mean power.

The OTA transmitter spurious emissions limits are specified as TRP per RIB, unless otherwise stated.

The OTA transmitter spurious emission limits for FR1 shall apply from 30 MHz to 12.75 GHz, excluding the frequency range from ΔfOBUE below the lowest frequency of each supported downlink *operating band*, up to ΔfOBUE above the highest frequency of each supported downlink *operating band*, where the ΔfOBUE is defined in clause 6.7.1. For some *operating bands*, the upper limit of the spurious range might be higher than 12.75 GHz in order to comply with the 5th harmonic limit of the downlink *operating band*, as specified in ITU-R recommendation SM.329 [5].

For *multi-band RIB* each supported *operating band* and the ΔfOBUE MHz around each band are excluded from the OTA transmitter spurious emissions requirements.

Additional limits in clause 6.7.5.4.5 may apply closer than ΔfOBUE from the edges of *downlink operating band*.

The requirements shall apply whatever the type of transmitter considered (single carrier or multi-carrier). It applies for all transmission modes foreseen by the manufacturer's specification.

*BS type 1-O* requirements consists of OTA transmitter spurious emission requirements based on TRP and co-location requirements not based on TRP.

The OTA transmitter spurious emission limits for FR2 shall apply from 30 MHz to 2nd harmonic of the upper frequency edge of the downlink *operating band*, excluding the frequency range from ΔfOBUE below the lowest frequency of each supported downlink *operating band*, up to ΔfOBUE above the highest frequency of each supported downlink *operating band*, where the ΔfOBUE is defined in clause 6.7.1.

#### 6.7.5.2 General OTA transmitter spurious emissions requirements

##### 6.7.5.2.1 Definition and applicability

The general OTA transmitter spurious emissions requirements are specified as TRP per RIB, per cell, unless otherwise specified.

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In certain regions, the following requirement may apply to BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band n51 and Band n76. Emissions shall not exceed the test level specified in table 6.7.5.4.5-3. This requirement is also applicable at the frequency range from ΔfOBUE below the lowest frequency of the BS downlink *operating band* up to ΔfOBUE above the highest frequency of the BS downlink *operating band*.

Table 6.7.5.4.5-3: Additional emission test limit for BS operating in Band n50 and n75 within 1432-1452 MHz, and in Band n51 and n76

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Test limit (dBm) | Measurement bandwidth |
| Ffilter = 1413.5 MHz | -42 | 27 MHz |

In certain regions, the following requirement may apply to BS operating in NR Band n50 and n75 within 1492-1517 MHz, and in Band n74 within 1492-1518 MHz. The maximum level of emissions, measured as EIRP, on centre frequencies Ffilter with filter bandwidth according to table 6.7.5.4.5-4, shall not exceed the EIRP limit.

Table 6.7.5.4.5-4: Operating band n50, n74 and n75 emission test limits above 1518 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | EIRP limit (dBm) | Measurement bandwidth |
| 1518.5 MHz ≤ Ffilter ≤ 1519.5 MHz | -0.8 | 1 MHz |
| 1520.5 MHz ≤ Ffilter ≤ 1558.5 MHz | -30 | 1 MHz |

In certain regions, the following requirement shall be applied to BS operating in Band n14 to ensure that appropriate interference protection is provided to 700 MHz public safety operations. This requirement is also applicable at the frequency range from 10 MHz below the lowest frequency of the BS downlink operating band up to 10 MHz above the highest frequency of the BS downlink operating band.

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Table C.1-1: Derivation of test requirements (FR1 OTA transmitter tests)

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Minimum requirement in TS 38.104 [2] | Test Tolerance (TTOTA) | Test requirement in the present document |
| 6.2 Radiated transmit power | See TS 38.104 [2], clause 9.2 | Normal conditions:  1.1 dB, f ≤ 3.0 GHz  1.3 dB, 3.0 GHz < f ≤ 4.2 GHz  1.3 dB, 4.2 GHz < f ≤ 6.0 GHz  Extreme conditions:  2.5 dB, f ≤ 3.0 GHz  2.6 dB, 3.0 GHz < f ≤ 4.2 GHz  2.6 dB, 4.2 GHz < f ≤ 6.0 GHz | Formula:  Upper limit + TT, Lower limit – TT |
| 6.3 OTA base station output power | See TS 38.104 [2], clause 9.3 | 1.4 dB, f ≤ 3.0 GHz  1.5 dB, 3.0 GHz < f ≤ 4.2 GHz  1.5 dB, 4.2 GHz < f ≤ 6.0 GHz | Formula:  Upper limit + TT, Lower limit – TT |
| 6.4 OTA output power dynamics | See TS 38.104 [2], clause 9.4 | 0.4 dB | Formula:  Total power dynamic range – TT |
| 6.5.1 OTA transmitter OFF power | See TS 38.104 [2], clause 9.5.2 | 3.4 dB , f ≤ 3.0GHz  3.6 dB, 3.0GHz < f ≤ 4.2GHz  3.6 dB, 4.2GHz < f ≤ 6.0GHz | Formula:  Minimum Requirement + TT |
| 6.6.2 OTA frequency Error | See TS 38.104 [2], clause 9.6.1 | 12 Hz | Formula:  Frequency Error limit + TT |
| 6.6.3 OTA Modulation quality (EVM) | See TS 38.104 [2], clause 9.6.2 | 1% | Formula:  EVM limit + TT |
| 6.6.4 OTA time alignment error | See TS 38.104 [2], clause 9.6.3 | 25 ns |  |
| 6.7.2 OTA occupied bandwidth | See TS 38.104 [2], clause 9.7.2 | 0 Hz | Formula:  Minimum Requirement + TT |
| 6.7.3 OTA Adjacent Channel Leakage Power Ratio (ACLR) | See TS 38.104 [2], clause 9.7.3 | Relative:  1.0 dB, f ≤ 3.0GHz  1.2 dB, 3.0GHz < f ≤ 4.2GHz  1.2 dB, 4.2GHz < f ≤ 6.0GHz  Absolute:  0 dB | Formula:  Relative limit - TT  Absolute limit +TT |
| 6.7.4 OTA operating band unwanted emissions | See TS 38.104 [2], clause 9.7.4 | Offsets < 10MHz  1.8 dB, f ≤ 3.0GHz  2 dB, 3.0GHz < f ≤ 4.2GHz  2 dB, 4.2GHz < f ≤ 6.0GHz  Offsets ≥ 10MHz:0 dB  Additional limits for bands n50, n51, n74, n75, n76: 0 dB | Formula:  Minimum Requirement + TT |
| 6.7.5.2 General transmitter spurious emissions requirements  Category A | See TS 38.104 [2], clause 9.7.5.2.2 | 0 dB | Formula:  Minimum Requirement + TT |
| 6.7.5.2 General transmitter spurious emissions requirements  Category B | See TS 38.104 [2], clause 9.7.5.2.2 | 0 dB | Formula:  Minimum Requirement + TT |
| 6.7.5.3 Protection of the BS receiver of own or different BS | See TS 38.104 [2], clause 9.7.5.2.3 | 3.1 dB, f ≤ 3.0GHz  3.3 dB, 3.0GHz < f ≤ 4.2GHz  3.4 dB, 4.2GHz < f ≤ 6.0GHz | Formula:  Minimum Requirement + TT |
| 6.7.5.4 Additional spurious emissions requirements | See TS 38.104 [2], clause 9.7.5.2.4 | 2.6 dB, f ≤ 3 GHz  3.0 dB, 3 GHz < f ≤ 4.2 GHz  3.5 dB, 4.2 GHz < f ≤ 6 GHz  For co-existence with PHS:  0 dB  Additional limits for bands n50, n51, n74, n75, n76: 0 dB | Formula:  Minimum Requirement + TT |
| 6.7.5.5 Co-location with other base stations | See TS 38.104 [2], clause 9.7.5.2.5 | 3.1 dB, f ≤ 3.0GHz  3.3 dB, 3.0GHz < f ≤ 4.2GHz  3.4 dB, 4.2GHz < f ≤ 6.0GHz | Formula:  Minimum Requirement + TT |
| 6.8 OTA transmitter intermodulation | See TS 38.104 [2], clause 9.8 | 0 dB |  |
| NOTE: TT values are applicable for normal condition unless otherwise stated. | | | |

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