**3GPP TSG-RAN WG4 Meeting #98-e *R4-2103886***

**Electronic Meeting, 25 January – 5 February, 2020**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *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:***  | CR to 37.145-1 on OBUE table headings and applicability |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The OBUE applicability tables headings are ambiguous, and sometimes not complete or fully aligned with the intended applicability:* Reference to BC is not consistent and, in some cases, incorrect
* Language is unclear, especially the use of “except for” and or/nor.
* The order of references to BC, frequency ranges, supported RATs etc. is inconsistent between headings, causing confusion and ambiguity
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|  |  |
| ***Summary of change:*** | The CR corrects the headings to align with the intended applicability, see also the guidance on Lists in TR 21.801. The revised headings are all written with the same structure: “<BS class> BS operating band unwanted emission mask (UEM) in <BC> bands <f. range> applicable for: <BS type 1>; <BS type 2>…; or <BS type x>…”Where <BS class> = “Wide Area”, “Medium range” or “Local Area” <BC> = BC1, BC2, BC3 or combination thereof <f range> = Limitation to frequency range for bands, e.g. “below 1 GHz” <BS type> = A set of conditions on supported RAT(s), specific bands, etc., always starting with “BS…”, separated by “,” and an “and” for the final condition. Condition on max power is always first.If there are multiple types, they are separated by “;”Examples:“**Wide Area** BS operating band unwanted emission mask (UEM) in **BC1 and BC3 bands** applicable for: BS **not supporting NR**; BS **operating NR in Band 1, 7 and/or 38 in Europe**; or BS **with standalone NB-IoT at the BS RF bandwidth edge (irrespective of NR support)**”“**Medium Range** BS operating band unwanted emission mask (UEM) in **BC1 and BC3 bands** applicable for: BS **with maximum output power 31 < PRated,c ≤ 38 dBm**, **supporting NR** and **not supporting UTRA**” Change marks are made over the complete heading text for each table, in order to make the full change visible and to ease the CR implementation by MCC. |
|  |  |
| ***Consequences if not approved:*** | OBUE table headings would remain ambiguous and, in some cases, incomplete or incorrect. |
|  |  |
| ***Clauses affected:*** | 6.6.5.5.2, 6.6.5.5.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | 37.105 |
| ***affected:*** | **X** |  |  Test specifications | 37.145-2 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev1: The applicability for BC3 has been corrected to align with the original text in some headings. “Or” is added to the penultimate applicable “BS type” as recommended in TR 21.801. |

#### 6.6.5.5 Test requirements

##### 6.6.5.5.1 General

Conformance may be shown to either the measure and sum test requirement or the per *TAB connector* test requirement.

1) The spurious emission test requirements for an AAS BS when using the measure and sum alternative are that for each *TAB connector TX cell group* and each applicable *basic limit* as specified in this clause, the power summation of emissions at the *TAB connectors* of the *TAB connector TX cell* *group* shall not exceed a limit specified as the *basic limit* + 10log10(NTXU,countedpercell).

2) The spurious emission test requirements for an AAS BS when using the per *TAB connector* alternative are that for each *TAB connector TX cell group* and each applicable *basic limit* as specified in this clause, the emissions at each of the *TAB connectors* of the *TAB connector TX cell* *group* shall not exceed a limit specified as the *basic limit* + 10log10(NTXU,countedpercell) - 10log(n) where n is the number of *TAB connectors* in the *TAB connector TX cell group*.

The appropriate table for the basic limit is based on the same power level (PRated,c,sys)as used for the AAS BS rated power limits for BS classes in table 6.2.2.1-1 the same method of scaling the power level using NTXU,counted is used.

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

##### 6.6.5.5.2 Basic Limits for MSR Band Categories 1 and 3

For an AAS BS of Wide Area BS class operating in Band Category 1 or Band Category 3, the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Wide Area BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Wide Area BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

For an AAS BS of Medium Range BS class operating in Band Category 1 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Medium Range BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Medium Range BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

For an AAS BS of Local Area BS class operating in Band Category 1 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a Local Area BS operating in non-contiguous spectrum, it applies inside any sub-block gap. In addition, for an AAS BS of Local Area BS class operating in multiple bands, it applies inside any *Inter RF Bandwidth gap*.

Outside the *Base Station RF Bandwidth edges*, emissions *basic limits* are specified in tables 6.6.2.5.1-1 to 6.6.2.5.1-4 below, where:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is the offset to the frequency ΔfOBUE outside the downlink operating band.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band TAB connector*, inside any *Inter RF Bandwidth gap*s with Wgap < 2\* ΔfOBUE, a combined *basic* limit shall be applied which is the cumulative sum of the test requirements specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The *basic limit* for *Base Station RF Bandwidth edge* is specified in tables 6.6.5.5.2-1 to 6.6.5.5.2-8, where in this case:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *Inter RF Bandwidth gap* divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band TAB connector*, the operating band unwanted emission limits apply also in a supported operating band without any carriers transmitted, in the case where there are carriers transmitted in another operating band. In this case where there is no carrier transmitted in an operating band, no cumulative *basic limits* are applied in the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted and

- In case the *Inter RF Bandwidth gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted is less than 2\*ΔfOBUE MHz, f\_offsetmax shall be the offset to the frequency ΔfOBUE outside the outermost edges of the two supported downlink operating bands and the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause, shall apply across both supported downlink bands.

- In other cases, the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause for the largest frequency offset (Δfmax), shall apply from ΔfOBUE below the lowest frequency, up to ΔfOBUE above the highest frequency of the supported downlink operating band without any carrier transmitted.

Inside any sub-block gap for a *TAB connector* operating in non-contiguous spectrum, a combined *basic limit* shall be applied which is the cumulative sum of the test requirements specified for the adjacent sub blocks on each side of the sub block gap. The *basic limit* for each sub block is specified in tables 6.6.5.5.2-1 to 6.6.5.5.2-8, where in this case:

- Δf is the separation between the sub block edge frequency and the nominal -3 dB point of the measuring filter closest to the sub block edge frequency.

- f\_offset is the separation between the sub block edge frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the sub block gap bandwidth divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

Applicability of Wide Area operating band unwanted emission requirements in tables 6.6.5.5.2-1/2, 6.6.5.5.2-2a and 6.5.5.2-2b is specified in table 6.6.5.5.2-0.

Table 6.6.5.2.2-0: Applicability of operating band unwanted emission requirements for BC1 and BC3 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported (NOTE 1) | Applicable requirement table |
| None | Y/N | 6.6.5.5.2-1/2 |
| In certain regions (NOTE 2), band 1 | N | 6.6.5.5.2-1/2 |
| Any below 1 GHz | N | 6.6.5.5.2-2a |
| Any above 1 GHz except for certain regions (NOTE 2), band 1 | N | 6.5.5.2-2b |
| NOTE 1: NR operation with UTRA is not supported in this version of specification.NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [35] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [4] and TS 38.104 [36] are applied. |

Table 6.6.5.5.2-1: Wide Area BS operating band unwanted emission mask (UEM) in BC1 and BC3 bands ≤ 3 GHz applicable for: BS not supporting NR; or BS supporting NR in Band n1

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz  | -12.5 dBm | 30 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -24.5 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤min(Δfmax, 10 MHz)  | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.5 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 5) | 1 MHz  |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -15 dBm/MHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-2: Wide Area BS operating band unwanted emission mask (UEM) in BC1 and BC3 bands > 3 GHz applicable for: BS not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz  | -12.2 dBm | 30 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -24.2 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤min(Δfmax, 10 MHz)  | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.2 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 5) | 1 MHz  |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -15 dBm/MHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\* ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-2a: Wide Area BS operating band unwanted emission mask (UEM) in BC1 and BC3 bands ≤ 1 GHz applicable for: BS supporting NR and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  |  |
| 5 MHz ≤ Δf <min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <min(10.05 MHz, f\_offsetmax) | -12.5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax  | -16 dBm (Note 3) |  |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band*, the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be ‑16 dBm/100 kHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-2b: Wide Area BS operating band unwanted emission mask (UEM) in BC1 and BC3 bands > 1 GHz applicable for: BS supporting NR, not operating NR in band n1, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz  |
| 5 MHz ≤ Δf <min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <min(10.05 MHz, f\_offsetmax) | -12.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 3) | 1MHz  |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band*, the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be ‑15 dBm/1 MHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap, where the contribution from the far-end sub-block or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-3: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz  |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 63.5 dB | 30 kHz  |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.5 dB | 1 MHz  |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.5 dB, -13.5 dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min (f\_offsetmax, 10.5 MHz) | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 54.5 dB | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,cell - 10\*log10(NTXU,countedpercell) -56 dB (Note 5) | 1 MHz |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be (Prated,c,cell - 10\*log10(NTXU,countedpercell) - 56 dB)/MHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\* ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-3a: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell) -51.5 dB – 7/5(f\_offset - 0.05) dB | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,cell - 10\*log10(NTXU,countedpercell)- 58.5 dB | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,cell - 10\*log10(NTXU,countedpercell) - 60 dB, -25 dBm) (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band* the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be Min(Prated,c,cell - 10\*log10(NTXU,countedpercell) - 60 dB, -25 dBm) / 100 kHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-4: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands > 3 GHz applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz  |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 63.2 dB | 30 kHz  |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.2 dB | 1 MHz  |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.2 dB, -13.2dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax ,10.5 MHz) | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 54.2 dB | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,cell - 10\*log10(NTXU,countedpercell) -56 dB (Note 5) | 1 MHz |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be (Prated,c,cell - 10\*log10(NTXU,countedpercell) - 56 dB)/MHz.NOTE 2: For MSR multi-band *TAB connector* with *Inter RF Bandwidth gap* < 2\* ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-4a: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands > 3 GHz applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell) -51.2 dB – 7/5(f\_offset - 0.05) | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,cell - 10\*log10(NTXU,countedpercell)- 58.2 dB | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,cell - 60 dB, -25 dBm)Min(Prated,c,cell- 10\*log10(NTXU,countedpercell)- 60dB, -25dBm) (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band* the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be Min(Prated,c,cell- 10\*log10(NTXU,countedpercell)- 60dB, -25dBm) / 100 kHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-5: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 31 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz  |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -32.5 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -19.5 dBm | 1 MHz  |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz)  | -23.5 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 5) | 1 MHz |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -25 dBm/MHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-5a: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 31 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | $$-20.5 dBm-\frac{7}{5}\left(\frac{f\\_offset}{MHz}-0.05\right)dB$$ | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -27.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -29 dBm (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band* the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be -29dBm/100kHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-6: Medium Range BS operating band unwanted emission mask (UEM)
in BC1 bands > 3 GHz applicable for: BS with maximum output power Prated,c,cell - 10\*log10(NTXU,countedpercell) ≤ 31 dBm

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz  |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -32.2 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -19.2 dBm | 1 MHz  |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz)  | -23.2 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 5) | 1 MHz |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -25 dBm/MHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\*ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-6a: Medium Range BS operating band unwanted emission mask (UEM) in BC1 bands > 3 GHz applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 31 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | $$-20.2 dBm-\frac{7}{5}\left(\frac{f\\_offset}{MHz}-0.05\right)dB$$ | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -27.2 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -29 dBm (Note 3) | 100 kHz |
| NOTE 1: For a BS supporting non-contiguous spectrum operation within any *operating band* the emission limits within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the emission limits within sub-block gaps shall be -29dBm/100kHz.NOTE 2: For a *multi-band connector* with Inter RF Bandwidth gap < 2\*ΔfOBUE the emission limits within the Inter RF Bandwidth gaps is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the Inter RF Bandwidth gap.NOTE 3: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-7: Local Area BS operating band unwanted emission mask (UEM) in BC1 bands ≤ 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 1 and 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -35.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax  | -37 dBm (Note 5) | 100 kHz  |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -37 dBm/100 kHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\* ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: Void.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

Table 6.6.5.5.2-8: Local Area BS operating band unwanted emission mask (UEM) in BC1 bands > 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Note 1, 2) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -35.2 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax  | -37 dBm (Note 5) | 100 kHz  |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -37 dBm/100 kHz.NOTE 2: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2\* ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 3: Void.NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. |

##### 6.6.5.5.3 Basic Limits for MSR Band Category 2

For a *TAB connector* operating in Band Category 2 the requirement applies outside the *Base Station RF Bandwidth edges*. In addition, for a *TAB connector* operating in non-contiguous spectrum, it applies inside any sub-block gap.

Outside the *Base Station RF Bandwidth edges*, *basic limits* are specified in tables 6.6.5.5.3-1 to 6.6.5.5.3-8, where:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is the offset to the frequency ΔfOBUE MHz outside the downlink operating band.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band TAB connector*, inside any *Inter RF Bandwidth gap*s with Wgap < 2×ΔfOBUE MHz, a combined *basic* limit shall be applied which is the cumulative sum of the test requirements specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The *basic limit* for *Base Station RF Bandwidth edge* is specified in tables 6.6.5.5.3-1 to 6.6.5.5.3-8, where in this case:

- Δf is the separation between the *Base Station RF Bandwidth edge* frequency and the nominal -3 dB point of the measuring filter closest to the carrier frequency.

- f\_offset is the separation between the *Base Station RF Bandwidth edge* frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the *Inter RF Bandwidth gap* divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

For a *multi-band TAB connector* and where there is no carrier transmitted in an operating band, no cumulative *basic limits* are applied in the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted and

- In case the *inter-band gap* between a supported downlink band with carrier(s) transmitted and a supported downlink band without any carrier transmitted less than is 2×ΔfOBUE MHz, f\_offsetmax shall be the offset to the frequency ΔfOBUE MHz outside the outermost edges of the two supported downlink operating bands and the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause, shall apply across both supported downlink bands.

- In other cases, the operating band unwanted emission limit of the band where there are carriers transmitted, as defined in the tables of the present clause for the largest frequency offset (Δfmax), shall apply from ΔfOBUE MHz below the lowest frequency, up to ΔfOBUE MHz above the highest frequency of the supported downlink operating band without any carrier transmitted.

Inside any sub-block gap for a *TAB connector* operating in non-contiguous spectrum, a combined *basic* limit shall be applied which is the cumulative sum of the test requirement specified for the adjacent sub blocks on each side of the sub block gap. The *basic limit* for each sub block is specified in tables 6.6.5.5.3-1 to 6.6.5.5.3-8, where in this case:

- Δf is the separation between the sub block edge frequency and the nominal -3 dB point of the measuring filter closest to the sub block edge.

- f\_offset is the separation between the sub block edge frequency and the centre of the measuring filter.

- f\_offsetmax is equal to the sub block gap bandwidth divided by two.

- Δfmax is equal to f\_offsetmax minus half of the bandwidth of the measuring filter.

Applicability of Wide Area operating band unwanted emission requirements in tables 6.6.5.5.3-1, 6.6.5.5.3-1a and 6.6.5.5.3-1b is specified in table 6.6.5.5.3-0.

Table 6.6.5.5.3-0: Applicability of operating band unwanted emission requirements for BC1 and BC3 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported (NOTE 1) | Applicable requirement table |
| None | Y/N | 6.6.5.5.3-1 |
| In certain regions (NOTE 2), band 1 | N | 6.6.5.5.3-1 |
| Any below 1 GHz | N | 6.6.5.5.3-1a |
| Any above 1 GHz except for certain regions (NOTE 2), band 1 | N | 6.6.5.5.3-1b |
| NOTE 1: NR operation with UTRA is not supported in this version of specification.NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [35] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [4] and TS 38.104 [36] are applied. |

Table 6.6.5.5.3-1: Wide Area BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS not supporting NR; or BS supporting NR in Band n3 or n8

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2 and 3) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.2 MHz(Note 1) | 0.015 MHz ≤ f\_offset < 0.215 MHz  | -12.5 dBm | 30 kHz  |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz  |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -24.5 dBm | 30 kHz  |
| 1 MHz ≤ Δf ≤min(Δfmax, 10 MHz)  | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.5 dBm | 1 MHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 10) | 1 MHz  |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -15 dBm/MHz.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz operation the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-1a: Wide Area BS operating band unwanted emission mask (UEM) in BC2 bands ≤ 1 GHz applicable for: BS supporting NR, not operating NR in band n8, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -5.5 – 7/5(f\_offset/MHz – 0.05) dB | 100 kHz  |
| 5 MHz ≤ Δf <min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <min(10.05 MHz, f\_offsetmax) | -12.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax  | -16 dBm (Note 11) | 100 kHz  |
| NOTE 1: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band, the *basic limit* within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap, where the contribution from the far-end sub-block or *RF Bandwidth* shall be scaled according to the measurement bandwidth of the near-end sub-block or *RF Bandwidth*. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the *sub-block gap*, where the *basic limit* within sub-block gaps shall be -16dBm/100kHz.NOTE 2: For MSR *multi band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUEthe *basic limit* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or RF Bandwidth on each side of the *Inter RF Bandwidth gap*, where the contribution from the far-end sub-block or *RF Bandwidth* shall be scaled according to the measurement bandwidth of the near-end sub-block or *RF Bandwidth.*NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.2.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz. |

Table 6.6.5.5.3-1b: Wide Area BS operating band unwanted emission mask (UEM) in BC2 bands > 1 GHz applicable for: BS supporting NR, not operating NR in band n3, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -5.5 – 7/5(f\_offset/MHz – 0.05) dB | 100 kHz  |
| 5 MHz ≤ Δf <min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <min(10.05 MHz, f\_offsetmax) | -12.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax  | -15 dBm (Note 11) | 1MHz  |
| NOTE 1: For MSR *TAB connectors* supporting non-contiguous spectrum operation within any operating band, the *basic limit*  within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the *sub block gap*, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the *sub-block gap*, where the *basic limit* within sub-block gaps shall be -15dBm/1MHz.NOTE 2: For MSR *multi band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUEthe *basic limit* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *RF Bandwidth* on each side of the *Inter RF Bandwidth gap*, where the contribution from the far-end sub-block or *RF Bandwidth* shall be scaled according to the measurement bandwidth of the near-end sub-block or *RF Bandwidth.*NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz. |

Table 6.6.5.5.3-2: Wide Area BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS operating with E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Note 2, 3 and 4) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz  |  | 30 kHz  |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz  |  | 30 kHz  |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 4: Void.NOTE 8: Void.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-3: Medium Range BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2 and 3) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz(Note 1) | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 63.5 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.8 MHz | 1.5 MHz ≤ f\_offset < 3.3 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.5 dB | 1 MHz |
| 2.8 MHz ≤ Δf ≤ 5 MHz | 3.3 MHz ≤ f\_offset < 5.5 MHz | min(Prated,c,cell - 10\*log10(NTXU,countedpercell) - 50.5 dB, -13.5 dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | Prated,c,cell - 10\*log10(NTXU,countedpercell) - 54.5 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | Prated,c,cell - 10\*log10(NTXU,countedpercell) -56 dB (Note 10) | 1 MHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.3-5 apply for 0 MHz ≤ Δf < 0.15 MHz.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be (Prated,c,cell - 10\*log10(NTXU,countedpercell) - 56 dB)/MHz.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-3a: Medium Range BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | Prated,c,cell - 10\*log10(NTXU,countedpercell)-51.5 dB - (7/5)\*(f\_offset/MHz - 0,05) dB | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | Prated,c,cell - 10\*log10(NTXU,countedpercell)- 61.5 dB | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(Prated,c,cell - 10\*log10(NTXU,countedpercell) – 60 dB, -25 dBm) (Note 11) | 100 kHz |
| NOTE 1: For MSR *TAB connectors* supporting non-contiguous spectrum operation within any operating band the *basic limit* within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the *sub block gap*, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the *sub-block gap*, where the *basic limit* within sub-block gaps shall be Min(Prated,c,cell - 10\*log10(NTXU,countedpercell) – 60 dB, - 25 dBm) / 100 kHz.NOTE 2: For MSR *multi band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE the *basic limit* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *RF Bandwidth* on each side of *the Inter RF Bandwidth gap*, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-5 apply for 0 MHz ≤ Δf < 0.15 MHz. |

Table 6.6.5.5.3-4: Medium Range BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell ≤ 31 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2 and 3) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.6 MHz(Note 1) | 0.015 MHz ≤ f\_offset < 0.615 MHz  |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz  | -32.5 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤ 5 MHz | 1.5 MHz ≤ f\_offset < 5.5 MHz | -19.5 dBm | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax,10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5 MHz) | -23.5 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 10) | 1 MHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-6 apply for 0 MHz ≤ Δf < 0.15 MHz.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -25 dBm/MHz.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-4a: Medium Range BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 31 dBm, supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic limit* (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | -20.5 dBm – 7/5(f\_offset/MHz-0.05) dB | 100 kHz  |
| 5 MHz ≤ Δf < min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -27.5 dBm | 100 kHz  |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -29 dBm (Note 11) | 100 kHz |
| NOTE 1: For MSR *TAB connectors* supporting non-contiguous spectrum operation within any operating band the *basic limit* within *sub-block gaps* is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the *sub block gap*, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the *sub-block gap*, where the *basic limit* within sub-block gaps shall be -29dBm/100kHz.NOTE 2: For MSR *multi band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUEthe *basic limit* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *RF Bandwidth* on each side of the *Inter RF Bandwidth gap*, where the contribution from the far-end sub-block shall be scaled according to the measurement bandwidth of the near-end sub-block.NOTE 3: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-5 apply for 0 MHz ≤ Δf < 0.15 MHz. |

Table 6.6.5.5.3-5: Medium Range BS operating band unwanted emission mask (UEM) applicable for: BS with maximum output power 31 < Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 38 dBm and operating E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

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| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2 and 3) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz  |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz  |  | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 8: Void.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-6: Medium Range BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS with maximum output power Prated,c,cell-10\*log10(NTXU,countedpercell) ≤ 31 dBm and operating E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*,

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2, 3 and 4) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz  |  | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz  |  | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 3: For *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 4: Void.NOTE 8: Void.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-7: Local Area BS operating band unwanted emission mask (UEM) in BC2 bands

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| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2 and 3) | Measurement bandwidth |
| 0 MHz ≤ Δf < 5 MHz(Note 1) | 0.05 MHz ≤ f\_offset < 5.05 MHz |  | 100 kHz |
| 5 MHz ≤ Δf < min (10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset < min(10.05 MHz, f\_offsetmax) | -35.5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax  | -37 dBm (Note 7) | 100 kHz |
| NOTE 1: For operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*, the limits in table 6.6.5.5.3-8 apply for 0 MHz ≤ Δf < 0.16 MHz.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *basic limit* within sub-block gaps shall be -37 dBm/100 kHz.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 8: Void.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |

Table 6.6.5.5.3-8: Local Area BS operating band unwanted emission mask (UEM) in BC2 bands applicable for: BS operating with E-UTRA 1.4 or 3 MHz carriers adjacent to the *Base Station RF Bandwidth edge*

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| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *basic limit* (Notes 2, 3 and 4) | Measurement bandwidth  |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz  |  | 30 kHz  |
| 0.05 MHz ≤ Δf < 0.16 MHz | 0.065 MHz ≤ f\_offset < 0.175 MHz  |  | 30 kHz  |
| NOTE 1: The limits in this table only apply for operation with an E-UTRA 1.4 or 3 MHz carrier adjacent to the *Base Station RF Bandwidth edge*.NOTE 2: For MSR *TAB connector* supporting non-contiguous spectrum operation within any operating band the *basic limit* within sub-block gaps is calculated as a cumulative sum of contributions from adjacent sub blocks on each side of the sub block gap.NOTE 3: For MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *basic limit* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.NOTE 4: Void.NOTE 8: Void.NOTE 10: The requirement is not applicable when Δfmax < 10 MHz |