**3GPP TSG-RAN4 Meeting #97-e *DRAFT R4-2017432***

**Online, , 2nd Nov 2020 - 13th Nov 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.105** | **CR** | **0212** | **rev** | **1** | **Current version:** | **15.10.0** |  |
|  | | | | | | | | |
| *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:*** |  | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AASenh\_BS\_LTE\_UTRA-Core, TEI15 | | | | |  | ***Date:*** | | | 2020-10-23 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-15 |
|  | *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:*** | | In relation to the following 3 CRs for UTRA+EUTRA+NR Capability Set to Rel-16 which were postponed last meeting, it was observed that the OBUE applicability table introduced by CR in R4-1811112 to the TS 37.104 v15.4.0, was not mirrored to the AAS specidication TS 37.105 Rel-15.  The below proposal CRs are fixinig this aspect for Rel-16, while this CRs is addressing missing OBUE applicability table for Rel-15.   |  |  | | --- | --- | | 1 | CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16 | | 2 | CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16 | | 3 | CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16 |   NOTE: Referring to related section in TS 37.104 Rel-16 specification, the OBUE applicabiltiy table captured the following band exceptions: band 1, 7, 38, 65. Below we provide some clarification on modifications applied in this CR:   * Bands 7 and 38 was introduced based on the ECC decision for non-AAS BS products – so it is not applicable to AAS. * Band 65 was introduced for Rel-16, so it is not applicable to the Rel-15 CR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 6.6.5.2.2, 6.6.5.2.3: OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated to align with MSR.  9.7.5.2.2, 9.7.5.2.3: OTA OBUE applicability table introduced for Band Category 1, 2, 3; table headers updated to align with MSR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | AAS BS specification would be misaligned with the MSR BS specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.6.5.2.2, 6.6.5.2.3, 9.7.5.2.2, 9.7.5.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | |  | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 37.145-1 CR#0232, TS 37.145-2 CR#0264 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Modifications in 9.7.5.2.2, 9.7.5.2.3 added. | | | | | | | | |

*------------------------------ Next modified section ------------------------------*

##### 6.6.5.2.2 *Basic limits* for Band Categories 1 and 3

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

Outside the *Base Station RF Bandwidth edges*, *basic limits* are specified in tables 6.6.5.2.2-1 to 6.6.5.2.2-4 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 gaps* with Wgap < 2×ΔfOBUE MHz, a combined *basic* limit shall be applied which is the cumulative sum of emissions shall not exceed the cumulative sum of the *basic limits* 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 table 6.6.5.2.2-1 to 6.6.5.2.2-4 below, 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 *Base Station RF Bandwidth* gap minus half of the bandwidth of the measuring filter.

- 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 *basic limits* apply also in a supported operating band without any carriers transmitted, in the case where there are carriers transmitted in other operating band(s). In this case where there is no carrier transmitted in an operating band, the operating band unwanted emission limit, as defined in the tables of the present subclause for the largest frequency offset (Δfmax), of a band where there is no carrier transmitted shall apply from 10 MHz below the lowest frequency, up to 10 MHz above the highest frequency of the supported downlink operating band without any carrier transmitted. And 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.

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 *basic limits* 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 6.6.5.2.2-1 to 6.6.5.2.2-4 below, 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 minus half of the bandwidth of the measuring filter.

- 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 6.6.5.2.2-1, 6.6.5.2.2-1a and 6.6.5.2.2-1b is specified in table 6.6.2.1-0.

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 | 6.6.5.2.2-1 |
| In certain regions (NOTE 2), band 1 | N | 6.6.5.2.2-1 |
| Any | N | 6.6.5.2.2-1 |
| Any below 1 GHz | N | 6.6.5.2.2-1a |
| Any above 1 GHz except for certain regions (NOTE 2), band 1 | N | 6.6.2.1-1b |
| 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 [14] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [8] and TS 38.104 [27] are applied. | | |

Table 6.6.5.2.2-1: Wide Area operating band unwanted emission mask (UEM) for BC1 and BC3 for BS not supporting NR (except for BS operating in Band 1)

|  |  |  |  |
| --- | --- | --- | --- |
| 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 4) |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015MHz ≤ f\_offset < 0.215MHz | -14 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215MHz ≤ f\_offset < 1.015MHz | (Note 6) | 30 kHz |
| (NOTE 3) | 1.015MHz ≤ f\_offset < 1.5 MHz | -26 dBm (Note 6) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -13 dBm (Note 6) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 5, 6) | 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*, 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/MHz (for MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz).  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 *Base Station 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 6: For MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz. | | | |

Table 6.6.5.2.2-1a: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR and not supporting UTRA in BC1 and BC3 bands below 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| 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 4) |
| 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) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -16 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*, 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 Base station *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*. | | | |

Table 6.6.5.2.2-1b: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR (except operation in band n1) and not supporting UTRA in BC1 and BC3 bands above 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| 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 4) |
| 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) | -14 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 5) | 1MHz |
| 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 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.* | | | |

*------------------------------ Unchanged part omitted ------------------------------*

*------------------------------ Next modified section ------------------------------*

##### 6.6.5.2.3 *Basic limit* for 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 6.6.5.2.3-1 to 6.6.5.2.3-8 below, 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 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 gaps* with Wgap < 2×ΔfOBUE MHz, a combined *basic* limit shall be applied which is the cumulative sum of the *basic limit*s 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 table 6.6.5.2.3-1 to 6.6.5.2.3-8 below, 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* minus half of the bandwidth of the measuring filter.

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

For a *multi-band TAB connector* where multiple bands are mapped on the same antenna connector and where there is no carrier transmitted in an operating band, the operating band unwanted emission limit, as defined in the tables of the present subclause for the largest frequency offset (Δfmax), of a band where there is no carrier transmitted shall apply from 10 MHz below the lowest frequency, up to 10 MHz above the highest frequency of the supported downlink operating band without any carrier transmitted. And 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.

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 *basic limit* 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 6.6.5.2.3-1 to 6.6.5.2.3-8 below, 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 minus half of the bandwidth of the measuring filter.

- 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 6.6.5.2.31, 6.6.5.2.3-1a and 6.6.5.2.3-1b is specified in table 6.6.5.2.3-0.

Table 6.6.5.2.3-0: Applicability of operating band unwanted emission requirements for BC2 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported (NOTE 1) | Applicable requirement table |
| None | Y/N | 6.6.5.2.3-1 |
| In certain regions (NOTE 2), bands 3, 8 | N | 6.6.5.2.3-1 |
| Any | N | 6.6.5.2.3-1 |
| Any below 1 GHz except for certain regions (NOTE 2), band 8 | N | 6.6.5.2.3-1a |
| Any above 1 GHz except for certain regions (NOTE 2), band 3 | N | 6.6.5.2.3-1b |
| 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 [14] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [8] and TS 38.104 [27] are applied. | | |

Table 6.6.5.2.3-1: Wide Area operating band unwanted emission mask (UEM) for BC2 for BS not supporting NR (except for BS operating in Band 3 or 8 in Europe)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | *Basic Limit* (NOTE 2, 3) | Measurement bandwidth (NOTE 10) |
| 0 MHz ≤ Δf < 0.2 MHz  (NOTE 1) | 0.015 MHz ≤ f\_offset < 0.215 MHz | -14 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | (Note 13) | 30 kHz |
| (NOTE 9) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -26 dBm (Note 13) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -13 dBm (Note 13) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 11, 13) | 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 6.6.5.2.3-2 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*, 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/MHz (for MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz).  NOTE 3: For a MSR *multi-band TAB connector* with *Inter RF Bandwidth gap* < 2×ΔfOBUE operation the *basic limit* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *Base Station RF Bandwidth* on each side of the *Inter RF Bandwidth gap*, where the contribution from the far-end sub-block or *Base Station RF Bandwidth* shall be scaled according to the measurement bandwidth of the near-end sub-block or *Base Station RF Bandwidth*.  NOTE 13: For MSR *multi-band TAB connector*, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands < 1 GHz. | | | |

Table 6.6.5.2.3-1a: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR (except operation in band n8 in Europe) but not supporting UTRA in BC2 bands below 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| 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 |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 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 6.6.5.2.3-1b: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR (except operation in band n3 in Europe) but not supporting UTRA in BC2 bands above 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| 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 |  | 100 kHz |
| 5 MHz ≤ Δf <  min(10 MHz, Δfmax) | 5.05 MHz ≤ f\_offset <  min(10.05 MHz, f\_offsetmax) | -14 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 6.6.5.2.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

*------------------------------ Next modified section ------------------------------*

### 9.7.5 OTA Operating band unwanted emission

#### 9.7.5.1 General

Unless otherwise stated, for E-UTRA single band and MSR the operating band unwanted emission limits are defined from ΔfOBUE below the lowest frequency of each supported *downlink operating band* to the lower *Base Station RF Bandwidth edge* located at FBW RF,low and from the upper *Base Station RF Bandwidth edge* located at FBW RF,high up to ΔfOBUE above the highest frequency of each supported *downlink operating band*. The values of ΔfOBUE are defined in table 9.7.1-1.

The requirements shall apply whatever the type of transmitter considered and for all transmission modes foreseen by the manufacturer's specification.

The operating band unwanted emissions minimum requirements are quoted as TRP per *RIB* unless otherwise stated.

The requirements shall apply whatever the type of RIBis considered (single carrier or multi-carrier) and for all transmission modes foreseen by the manufacturer's specification. In addition, for a RIB operating in *non-contiguous spectrum*, the requirements apply inside any *sub-block gap*. In addition, for a *multi-band RIB* the requirements apply inside any *Inter RF Bandwidth gap*.

The unwanted emission limits in the part of the *downlink operating band* that falls in the spurious domain are consistent with ITU-R Recommendation SM.329 [14].

Emissions shall use the minimum requirements specified in the tables below, where:

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

- f\_offset is the separation between the channel 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 RIB* inside any *Inter RF Bandwidth gaps* with Wgap < 2×ΔfOBUE, emissions shall not exceed the cumulative sum of the minimum requirements specified at the *Base Station RF Bandwidth edges* on each side of the *Inter RF Bandwidth gap*. The minimum requirement for *Base Station RF Bandwidth edge* is specified in the subclause 9.7.5.4.2 to 9.7.5.4.7 below, 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 *Base Station RF Bandwidth edge*.

- 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* minus half of the bandwidth of the measuring filter.

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

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

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

For a multicarrier E-UTRA RIB or a RIB configured for intra-band contiguous or non-contiguous *carrier aggregation* the definitions above apply to the lower edge of the carrier transmitted at the lowest carrier frequency and the upper edge of the carrier transmitted at the highest carrier frequency within a specified frequency band.

In addition inside any *sub-block gap* for a RIB operating in *non-contiguous spectrum*, emissions shall not exceed the cumulative sum of the minimum requirements specified for the adjacent sub blocks on each side of the *sub-block gap*. The minimum requirement for each sub block is specified in the tables sub-cluase 9.7.5.4.2 to 9.7.5.4.7 below, 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 minus half of the bandwidth of the measuring filter.

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

ΔfOBUE is defined in clause 6.6.1.

#### 9.7.5.2 Minimum requirement for MSR operation

##### 9.7.5.2.1 General

The MSR operating band unwanted emission minimum requirements are given in subclauses 9.7.5.2.2, 9.7.5.2.3, and 9.7.5.2.4.

##### 9.7.5.2.2 Minimum requirements for Band Categories 1 and 3

For an MSR RIB operating in BC1 or BC3 bands, the minimum requirements are specified in tables 9.7.5.2.2-1 to 9.7.5.2.2-4, dependent on BS class and output power.

Applicability of Wide Area operating band unwanted emission requirements in tables 9.7.5.2.2-1, 9.7.5.2.2-1a and 9.7.5.2.2-1b is specified in table 9.7.5.2.2-0.

Table 9.7.5.2.2-0: 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 | 9.7.5.2.2-1 |
| In certain regions (NOTE 2), bands 3, 8 | N | 9.7.5.2.2-1 |
| Any | N | 9.7.5.2.2-1 |
| Any below 1 GHz except for certain regions (NOTE 2), band 8 | N | 9.7.5.2.2-1a |
| Any above 1 GHz except for certain regions (NOTE 2), band 3 | N | 9.7.5.2.2-1b |
| 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 [14] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [8] and TS 38.104 [27] are applied. | | |

Table 9.7.5.2.2-1: Wide Area operating band unwanted emission mask (UEM) for BC1 and BC3 for BS not supporting NR (except for BS operating in Band 1)

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter ‑3dB point, Δf** | **Frequency offset of measurement filter centre frequency, f\_offset** | **Minimum requirement (NOTE 1, 2)** | **Measurement bandwidth (NOTE 4)** |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015MHz ≤ f\_offset < 0.215MHz | -5 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (NOTE 3) | 1.015MHz ≤ f\_offset < 1.5 MHz | -17 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -4 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (NOTE 5) | 1 MHz |
| NOTE 1: For MSR RIB supporting *non-contiguous spectrum* operation within any operating band the *minimum requirement* 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 *minimum requirement* within *sub-block gaps* shall be -6dBm/MHz.  NOTE2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE the *minimum requirement* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *Base Station 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. | | | |

*------------------------------ Unchanged part omitted ------------------------------*

*------------------------------ Next modified section ------------------------------*

##### 9.7.5.2.3 *Minimum requirement* for Band Category 2

For an MSR RIB operating in BC2 bands, the minimum requirements are specified in tables 9.7.5.2.3-1 to 9.7.5.2.3-8.

Applicability of Wide Area operating band unwanted emission requirements in tables 9.7.5.2.3-1, 9.7.5.2.3-1a and 9.7.5.2.3-1b is specified in table 9.7.5.2.3-0.

Table 9.7.5.2.3-0: 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 | 9.7.5.2.3-1 |
| In certain regions (NOTE 2), bands 3, 8 | N | 9.7.5.2.3-1 |
| Any | N | 9.7.5.2.3-1 |
| Any below 1 GHz except for certain regions (NOTE 2), band 8 | N | 9.7.5.2.3-1a |
| Any above 1 GHz except for certain regions (NOTE 2), band 3 | N | 9.7.5.2.3-1b |
| 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 [14] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [8] and TS 38.104 [27] are applied. | | |

Table 9.7.5.2.3-1: Wide Area operating band unwanted emission mask (UEM) for BC2 for BS not supporting NR (except for BS operating in Band 3 or Band 8 in Europe)

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency offset of measurement filter ‑3dB point, Δf** | **Frequency offset of measurement filter centre frequency, f\_offset** | **Minimum requirement (NOTE 2, 3)** | **Measurement bandwidth (NOTE 10)** |
| 0 MHz ≤ Δf < 0.2 MHz  (NOTE 1) | 0.015 MHz ≤ f\_offset < 0.215 MHz | -5 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz |  | 30 kHz |
| (NOTE 9) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -17 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -4 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (NOTE 11) | 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 9.7.5.2.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR RIB supporting *non-contiguous spectrum* operation within any operating band the *minimum requirement* 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 *minimum requirement* within *sub-block gaps* shall be -6dBm/MHz.  NOTE 3: For a MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE operation the *minimum requirement* within the *Inter RF Bandwidth gaps* is calculated as a cumulative sum of contributions from adjacent sub-blocks or *Base Station RF Bandwidth* on each side of the *Inter RF Bandwidth gap*, where the contribution from the far-end sub-block or *Base Station RF Bandwidth* shall be scaled according to the measurement bandwidth of the near-end sub-block or *Base Station RF Bandwidth*. | | | |

Table 9.7.5.2.3-1a: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR (except operation in band n8 in Europe) but not supporting UTRA in BC2 bands below 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 2 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) | -5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 11) | 100 kHz |
| NOTE 1: For MSR *RIB* supporting non-contiguous spectrum operation within any operating band, the *minimum requirement* 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 minimum requirement within sub-block gaps shall be -7 dBm/100 kHz.  NOTE 2: For MSR *multi band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE the minimum requirement 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 9.7.5.2.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 9.7.5.2.3-1b: Wide Area operating band unwanted emission mask (UEM) for BS supporting NR (except operation in band n3 in Europe) but not supporting UTRA in BC2 bands above 1GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 10) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 2 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) | -5 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 11) | 1MHz |
| NOTE 1: For MSR *RIBs* supporting non-contiguous spectrum operation within any operating band, the minimum requirement 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 minimum requirement within sub-block gaps shall be -7dBm/1MHz.  NOTE 2: For MSR *multi band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE the minimum requirement 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 9.7.5.2.3-2 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

*----------------------------- End of modified section ------------------------------*