**3GPP TSG-RAN WG4 Meeting #103-e *R4-2211294***

**Electronic Meeting, 9 – 20 May, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **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:*** | Big CR for TS 37.141 Maintenance (Rel-15, CAT F) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MB\_MSR\_RF-Perf, NR\_newRAT-Perf | | | | |  | ***Date:*** | | | 2022-05-25 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | This big CR merges the multiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.  **R4-2210694 CR to 37.141: Corrections to notes in OBUE requirements**  Errors in note numbers, missing notes and incorrect note numbering in some tables. In some cases this leads to wrong interpretation of the specification as same note number has multiple definitions.  **R4-2210820 CR for TS 37.141 On sweep time for unwanted emission testing (Rel-15)**  Sweep time has critical impact for some emission test. However there is no definition on the sweep time for the concerning test in the current specification. | | | | | | | | |
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| ***Summary of change:*** | | The summary of change in each each endorsed draft CR is copied below.  **R4-2210694 CR to 37.141: Corrections to notes in OBUE requirements**  Missing notes added, note numbering corrected.  **R4-2210820 CR for TS 37.141 On sweep time for unwanted emission testing (Rel-15)**  Add the clarification on sweep time for true RMS detection mode. | | | | | | | | |
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| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are copied below.  **R4-2210694 CR to 37.141: Corrections to notes in OBUE requirements**  Wrong interpretation of the specification is possible as same note number can have multiple definitions.  **R4-2210820 CR for TS 37.141 On sweep time for unwanted emission testing (Rel-15)**  Sweep time for true RMS detection mode is not clear, which will affect measurement accuracy of unwanted emission. | | | | | | | | |
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| ***Clauses affected:*** | | **R4-2210694 CR to 37.141: Corrections to notes in OBUE requirements**  6.6.2.5.1, 6.6.2.5.2  **R4-2210820 CR for TS 37.141 On sweep time for unwanted emission testing (Rel-15)**  6.6.1.4.1, 6.6.2.4.1, 6.6.4.4.1, 7.6.4.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

#### 6.6.1.4 Method of test

##### 6.6.1.4.1 Initial conditions

Test environment: normal; see Annex B.2.

Base Station RF Bandwidth positions to be tested: BRFBW, MRFBW and TRFBW single-band operation, see clause 4.9.1; BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

1) Connect the BS antenna connector to a measurement receiver according to Annex D.1.1 using an attenuator or a directional coupler if necessary

2) Measurements shall use a measurement bandwidth in accordance to the conditions in TS 37.104 [2] clause 6.6.1.

3) Detection mode: True RMS.

The emission power should be averaged over an appropriate time duration to ensure the measurement is within the measurement uncertainty in Table 4.1.2-1.

##### 6.6.1.4.2 Procedure

1) Set the Base Station to transmit at maximum power according to the applicable test configuration in clause 5 using the corresponding test models or set of physical channels in clause 4.9.2.

2) Measure the emission at the specified frequencies with specified measurement bandwidth and note that the measured value does not exceed the specified value.

In addition, for a multi-band capable BS, the following step shall apply:

4) For multi-band capable BS and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carrier activated in the other band. For multi-band capable BS with separate antenna connector, the antenna connector not being under test in case of SBT or MBT shall be terminated.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.6.2.4.1 Initial conditions

Test environment: normal; see Annex B.2.

Base Station RF Bandwidth positions to be tested: BRFBW, MRFBW and TRFBW in single-band operation, see clause 4.9.1; BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

1) Connect the signal analyzer to the Base Station antenna connector as shown in Annex D.1.1.

As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity, efficiency and to avoid e.g. carrier leakage, the resolution bandwidth may 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.

2) Detection mode: True RMS.

The emission power should be averaged over an appropriate time duration to ensure the measurement is within the measurement uncertainty in Table 4.1.2-1.

##### 6.6.2.4.2 Procedure

1) Set the Base Station to transmit at maximum power according to the applicable test configuration in clause 5 using the corresponding test models or set of physical channels in clause 4.9.2.

2) Step the centre frequency of the measurement filter in contiguous steps and measure the emission within the specified frequency ranges with the specified measurement bandwidth. For BS operating in multiple bands or non-contiguous spectrum, the emission within the Inter RF Bandwidth or sub-block gap shall be measured using the specified measurement bandwidth from the closest RF Bandwidth or sub block edge.

3) Repeat the test for the remaining test cases with channel set-up according to clause 5 and clause 4.9.2.

In addition, for a multi-band capable BS, the following step shall apply:

4) For multi-band capable BS and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carrier activated in the other band. For multi-band capable BS with separate antenna connector, the antenna connector not being under test in case of SBT or MBT shall be terminated.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 6.6.2.5 Test requirement

##### 6.6.2.5.1 Test requirements for Band Categories 1 and 3

For a Wide Area BS 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 a Wide Area BS operating in multiple bands, it applies inside any Inter RF Bandwidth gap.

For a Medium Range BS 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 a Medium Range BS operating in multiple bands, it applies inside any Inter RF Bandwidth gap.

For a Local Area BS 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 a Local Area BS operating in multiple bands, it applies inside any Inter RF Bandwidth gap.

Outside the Base Station RF Bandwidth edges, emissions shall not exceed the maximum levels specified in Tables 6.6.2.5.1-1 to 6.6.2.5.1-4b 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 BS operating in multiple bands, inside any Inter RF Bandwidth gaps with Wgap < 2\* ΔfOBUE, emissions shall not exceed 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 test requirement for Base Station RF Bandwidth edge is specified in Table 6.6.2.5.1-1 to 6.6.2.5.1-4b 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 BS capable of multi-band operation where multiple bands are mapped on the same antenna 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 other supported 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 clause for the largest frequency offset (Δfmax), of a band where there are no carriers transmitted 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. And no cumulative limits are applied in the inter-band gap between a supported downlink band with carrier(s) transmitted and a downlink band without any carrier transmitted.

Inside any sub-block gap for a BS operating in non-contiguous spectrum, emissions shall not exceed the cumulative sum of the test requirements specified for the adjacent sub blocks on each side of the sub block gap. The test requirement for each sub block is specified in Tables 6.6.2.5.1-1 to 6.6.2.5.1-4b 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 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 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 Band 41 NR operation in Japan, the operating band unwanted emissions limits shall be applied to the sum of the emission power over all *antenna connectors.*

Applicability of Wide Area operating band unwanted emission requirements in Tables 6.6.2.5.1-1/1a, 6.6.2.5.1-1c and 6.6.2.5.1-1d/1e is specified in Table 6.6.2.5.1-0.

Table 6.6.2.5.1-0: Applicability of operating band unwanted emission requirements for BC1 and BC3 Wide Area BS

|  |  |  |  |
| --- | --- | --- | --- |
| NR Band operation | Standalone NB-IoT carrier adjacent to the BS RF bandwidth edge | UTRA supported (Note 1) | Applicable requirement table |
| None | Y/N | Y/N | 6.6.2.5.1-1/1a |
| In certain regions (NOTE 2), bands 1, 7, 38 | N | N | 6.6.2.5.1-1/1a |
| Any | Y | N | 6.6.2.5.1-1/1a |
| Any below 1GHz | N | N | 6.6.2.1-1c |
| Any above 1GHz except for, in certain regions (NOTE 2), bands 1, 7, 38 | N | N | 6.6.2.1-1d/1e |
| NOTE 1: NR operation with UTRA is not supported in this specification.  NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [13] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [5] and TS 38.104 [27] are applied. | | | |

Table 6.6.2.5.1-1: WA BS OBUE in BC1 and BC3 bands ≤ 3 GHz 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)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015MHz ≤ f\_offset < 0.215MHz | -12.5 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215MHz ≤ f\_offset < 1.015MHz | (Note 4) | 30 kHz |
| (Note 5) | 1.015MHz ≤ f\_offset < 1.5 MHz | -24.5 dBm (Note 4) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.5 dBm (Note 4) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 4, 7) | 1 MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -15dBm/MHz (for MSR BS supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands <1GHz).  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-1b apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 4: For MSR BS supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands <1GHz. | | | |

Table 6.6.2.5.1-1a: WA BS OBUE in BC1 and BC3 bands > 3 GHz applicable for: BS not supporting NR; BS with standalone NB-IoT at the BS RF bandwidth edge (irrespective of NR support)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015MHz ≤ f\_offset < 0.215MHz | -12.2 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 5) | 1.015MHz ≤ 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 7) | 1 MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -15dBm/MHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.1-1b: WA BS OBUE in BC1 and BC3 bands ≤ 3 GHz applicable for: BS with standalone NB-IoT carrier 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 | Minimum requirement (Note 1, 2, 3, 4) | Measurement bandwidth (Note 6) |
| 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS 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.  NOTE 3: For MSR BS supporting multi-band operation 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.  NOTE 4: In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 43, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

Table 6.6.2.5.1-1c: WA BS OBUE in BC1 and BC3 bands ≤ 1 GHz applicable for: BS supporting NR, not supporting UTRA, and with no standalone NB-IoT carrier at the BS RF bandwidth edge

|  |  |  |  |
| --- | --- | --- | --- |
| 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 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 5.5dBm - 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 7) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 -16dBm/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-1d: WA BS OBUE in BC1 and BC3 bands > 1 GHz and ≤ 3 GHz for: BS supporting NR, not operating NR in Band 1, 7 and/or 38 in Europe, not supporting UTRA, and with no standalone NB-IoT carrier at the BS RF bandwidth edge

|  |  |  |  |
| --- | --- | --- | --- |
| 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 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 5.5dBm - 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 7) | 1MHz |
| NOTE 1: For MSR BS 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 -15dBm/1MHz.  NOTE 2: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-1e: WA BS OBUE in BC1 and BC3 bands above 3 GHz for: BS supporting NR, not supporting UTRA, and with no standalone NB-IoT carrier at the BS RF bandwidth edge

|  |  |  |  |
| --- | --- | --- | --- |
| 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 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 5.2dBm - 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) | -12.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 7) | 1MHz |
| NOTE 1: For MSR BS 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 -15dBm/1MHz.  NOTE 2: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-2: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 31 < PRated,c ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015MHz ≤ f\_offset < 0.615MHz | PRated,c - 56.5dB - 7/5(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz | PRated,c - 51.5dB - 15(f\_offset/MHz-0.215)dB | 30 kHz |
| (Note 5) | 1.015MHz ≤ f\_offset < 1.5 MHz | PRated,c – 63.5 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | PRated,c – 50.5 dB | 1 MHz |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(PRated,c – 50.5 dB, -13.5dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10MHz) | 5.5 MHz ≤ f\_offset < min (f\_offsetmax, 10.5 MHz) | PRated,c – 54.5 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | PRated,c -56dB (Note 7) | 1MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be (PRated,c – 56 dB)/MHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-2b apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.1-2a: MR BS OBUE in BC1 bands > 3 GHz applicable for: BS with maximum output power 31 < PRated,c ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015MHz ≤ f\_offset < 0.615MHz | PRated,c - 56.2dB - 7/5(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz | PRated,c - 51.2dB - 15(f\_offset/MHz-0.215)dB | 30 kHz |
| (Note 5) | 1.015MHz ≤ f\_offset < 1.5 MHz | PRated,c – 63.2 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.6 MHz | 1.5 MHz ≤ f\_offset < 3.1 MHz | PRated,c – 50.2 dB | 1 MHz |
| 2.6 MHz ≤ Δf ≤ 5 MHz | 3.1 MHz ≤ f\_offset < 5.5 MHz | min(PRated,c – 50.2 dB, -13.2dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax ,10.5MHz) | PRated,c – 54.2 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | PRated,c -56dB (Note 7) | 1MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be (PRated,c – 56 dB)/MHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.1-2b: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 31 < PRated ≤ 38 dBm and with standalone NB-IoT carrier 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 | Minimum requirement (Note 1, 2, 3) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.05 MHz  (Note 1) | 0.015 MHz ≤ f\_offset < 0.065 MHz | PRated,c - 36.5dB - 60(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz | PRated,c - 39.5dB - 160(f\_offset/MHz-0.065)dB | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS 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.  NOTE 3: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-2c: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power 31 < PRated,c ≤ 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 | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | PRated,c – 51.5dB - 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-58.5dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(PRated,c-60dB, -25dBm) (Note 7) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 Min(PRated,c-60dB, -25dBm)/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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.  NOTE 3: For operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-2b apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.1-2d: MR BS OBUE in BC1 bands >3 GHz applicable for: BS with maximum output power 31 < PRated,c ≤ 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 | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | PRated,c – 51.2dB - 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-58.2dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(PRated,c-60dB, -25dBm) (Note 7) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 Min(PRated,c-60dB, -25dBm)/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-3: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power PRated,c ≤ 31 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015MHz ≤ f\_offset < 0.615MHz |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 5) | 1.015MHz ≤ 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,10MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5MHz) | -23.5 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 7) | 1MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -25dBm/MHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-3b apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.1-3a: MR BS OBUE in BC1 bands > 3 GHz applicable for: BS with maximum output power PRated,c ≤ 31 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.6 MHz | 0.015MHz ≤ f\_offset < 0.615MHz |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 5) | 1.015MHz ≤ 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,10MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5MHz) | -23.2 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25 dBm (Note 7) | 1MHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -25dBm/MHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.1-3b: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power PRated,c ≤ 31 dBm BS and standalone NB-IoT carrier 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 | Minimum requirement (Note 1, 2, 3, 4) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.05 MHz  (Note 1) | 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS 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.  NOTE 3: For MSR BS supporting multi-band operation 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.  NOTE 4: In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 31, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

Table 6.6.2.5.1-3c: MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with maximum output power PRated,c ≤ 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 | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 20.5dBm - 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 7) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 -29dBm/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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.  NOTE 3: For operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-3b apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.1-3d: MR BS OBUE in BC1 bands >3 GHz applicable for: BS with maximum output power PRated,c ≤ 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 | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 20.2dBm - 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) | -27.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -29 dBm (Note 7) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 -29dBm/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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. | | | |

Table 6.6.2.5.1-4: LA BS OBUE in BC1 bands ≤ 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2) | Measurement bandwidth (Note 6) |
| 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 7) | 100 kHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be -37dBm/100 kHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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.  NOTE 3: For operation with a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.1-4b apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.1-4a: LA BS OBUE in BC1 bands > 3 GHz

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 1, 2 | Measurement bandwidth (Note 6) |
| 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 7) | 100 kHz |
| NOTE 1: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be -37dBm/100 kHz.  NOTE2: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.1-4b: LA MR BS OBUE in BC1 bands ≤ 3 GHz applicable for: BS with standalone NB-IoT carrier 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 | Minimum requirement (Note 1, 2, 3, 4) | Measurement bandwidth (Note 6) |
| 0 MHz ≤ Δf < 0.05 MHz  (Note 1) | 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 a standalone NB-IoT carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS 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.  NOTE 3: For MSR BS supporting multi-band operation 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.  NOTE 4: In case the carrier adjacent to the RF bandwidth edge is a standalone NB-IoT carrier, the value of X = PNB-IoTcarrier – 24, where PNB-IoTcarrier is the power level of the standalone NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

NOTE 5: This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 6: As a general rule for the requirements in the present clause, 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 may 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.

NOTE 7: The requirement is not applicable when Δfmax < ΔfOBUE.

##### 6.6.2.5.2 Test requirements for Band Category 2

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

Outside the Base Station RF Bandwidth edges, emissions shall not exceed the maximum levels specified in Table 6.6.2.5.2-1 to 6.6.2.5.2-8 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 BS operating in multiple bands, inside any Inter RF Bandwidth gaps with Wgap < 2\* ΔfOBUE, emissions shall not exceed 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 test requirement for Base Station RF Bandwidth edge is specified in Table 6.6.2.5.2-1 to 6.6.2.5.2-8 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 BS capable of multi-band operation 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 clause for the largest frequency offset (Δfmax), of a band where there are no carriers transmitted 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. And no cumulative 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 BS operating in non-contiguous spectrum, emissions shall not exceed the cumulative sum of the test requirement specified for the adjacent sub blocks on each side of the sub block gap. The test requirement for each sub block is specified in Tables 6.6.2.5.2-1 to 6.6.2.5.2-8 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 6.6.2.5.2-1, 6.6.2.5.2-2a and 6.6.2.5.2-2b is specified in Table 6.6.2.5.2-0.

Table 6.6.2.5.2-0: Applicability of operating band unwanted emission requirements for BC2 Wide Area BS

|  |  |  |  |
| --- | --- | --- | --- |
| NR Band operation | Standalone NB-IoT carrier adjacent to the BS RF bandwidth edge | UTRA or GSM supported (Note 1) | Applicable requirement table |
| None | Y/N | Y/N | 6.6.2.5.2-1 |
| In certain regions (NOTE 2), bands 3, 8 | N | N | 6.6.2.5.2-1 |
| Any | Y | N | 6.6.2.5.2-1 |
| Any below 1GHz except for, in certain regions (NOTE 2), band 8 | N | N | 6.6.2.5.2-2a |
| Any above 1GHz except for, in certain regions (NOTE 2), bands 3 | N | N | 6.6.2.5.2-2b |
| NOTE 1: NR operation with UTRA or GSM is not supported in this specification.  NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [13] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [5] and TS 38.104 [27] are applied. | | | |

Table 6.6.2.5.2-1: WA BS OBUE in BC2 bands applicable for: BS not supporting NR; BS operating NR in Band 3 or 8 in Europe; or BS with standalone NB-IoT at the BS RF bandwidth edge (irrespective of NR support)

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 2, 3) | Measurement bandwidth (Note 9) |
| 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 | (Note 4) | 30 kHz |
| (Note 8) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -24.5 dBm (Note 4) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -11.5 dBm (Note 4) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -15 dBm (Note 4, 10) | 1 MHz |
| NOTE 1: For operation with a GSM/EDGE or standalone NB-IoT or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5-2 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -15dBm/MHz (for MSR BS supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands <1GHz).  NOTE3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE operation the test 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 4: For MSR BS supporting multi-band operation, either this limit or -16dBm/100kHz with correspondingly adjusted f\_offset shall apply for this frequency offset range for operating bands <1GHz. | | | |

Table 6.6.2.5.2-2: WA BS OBUE in BC2 bands applicable for: BS with GSM/EDGE or standalone NB-IoT or 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 | Test requirement (Note 2, 3, 4, 5) | Measurement bandwidth (Note 9) |
| 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 a GSM/EDGE or standalone NB-IoT or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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.  NOTE 4: In case the carrier adjacent to the Base Station RF Bandwidth edge is a GSM/EDGE carrier, the value of X = PGSMcarrier – 43, where PGSMcarrier is the power level of the GSM/EDGE carrier adjacent to the Base Station RF Bandwidth edge. In other cases, X = 0.  NOTE 5: In case the carrier adjacent to the RF bandwidth edge is a NB-IoT carrier, the value of X = PNB-IoTcarrier – 43, where PNB-IoTcarrier is the power level of the NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

Table 6.6.2.5.2-2a: WA BS OBUE in BC2 bands ≤ 1 GHz applicable for: BS supporting NR, not operating NR in Band 8 in Europe, not supporting UTRA, not supporting GSM, and with no standalone NB-IoT carrier at the BS RF bandwidth edge

|  |  |  |  |
| --- | --- | --- | --- |
| 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 9) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 5.5dBm - 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 10) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 -16dBm/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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.  NOTE 3: For operation with an E-UTRA 1.4 or 3MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-2 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.2-2b: WA BS OBUE in BC2 bands > 1 GHz applicable for: BS supporting NR, not operating NR in Band 3 in Europe, not supporting UTRA, not supporting GSM, and with no standalone NB-IoT carrier at the BS RF bandwidth edge

|  |  |  |  |
| --- | --- | --- | --- |
| 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 9) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 5.5dBm - 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 10) | 1MHz |
| NOTE 1: For MSR BS 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 -15dBm/1MHz.  NOTE 2: For MSR BS supporting multi-band operation 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 3MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-2 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.2-3: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 31 < PRated,c ≤ 38 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 2, 3) | Measurement bandwidth (Note 9) |
| 0 MHz ≤ Δf < 0.6 MHz  (Note 1) | 0.015MHz ≤ f\_offset < 0.615MHz | PRated,c - 56.5dB - 7/5(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz | PRated,c - 51.5dB - 15(f\_offset/MHz-0.215)dB | 30 kHz |
| (Note 8) | 1.015MHz ≤ f\_offset < 1.5 MHz | PRated,c – 63.5 dB | 30 kHz |
| 1 MHz ≤ Δf ≤ 2.8 MHz | 1.5 MHz ≤ f\_offset < 3.3 MHz | PRated,c – 50.5 dB | 1 MHz |
| 2.8 MHz ≤ Δf ≤ 5 MHz | 3.3 MHz ≤ f\_offset < 5.5 MHz | min(PRated,c – 50.5 dB, -13.5dBm) | 1 MHz |
| 5 MHz ≤ Δf ≤ min(Δfmax, 10 MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5MHz) | PRated,c – 54.5 dB | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | PRated,c -56dB (Note 10) | 1MHz |
| NOTE 1: For operation with a GSM/EDGE or standalone NB-IoT or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-5 apply for 0 MHz ≤ Δf < 0.15 MHz.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be (PRated,c – 56 dB)/MHz.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.2-3a: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 31 < PRated,c ≤ 38 dBm, supporting NR, not supporting UTRA, and not supporting GSM

|  |  |  |  |
| --- | --- | --- | --- |
| 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 9) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | PRated,c – 51.5dB - 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-58.5dB | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | Min(PRated,c-60dB, -25dBm) (Note 10) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 Min(PRated,c-60dB, -25dBm)/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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.  NOTE 3: For operation with a standalone NB-IoT or an E-UTRA 1.4 or 3MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-5 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.2-4: MR BS OBUE in in BC2 bands applicable for: BS with maximum output power PRated,c ≤ 31 dBm and not supporting NR

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 2, 3) | Measurement bandwidth (Note 9) |
| 0 MHz ≤ Δf < 0.6 MHz  (Note 1) | 0.015MHz ≤ f\_offset < 0.615MHz |  | 30 kHz |
| 0.6 MHz ≤ Δf < 1 MHz | 0.615MHz ≤ f\_offset < 1.015MHz |  | 30 kHz |
| (Note 8) | 1.015MHz ≤ 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,10MHz) | 5.5 MHz ≤ f\_offset < min(f\_offsetmax,10.5MHz) | -23.5 dBm | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -25dBm (Note 10) | 1MHz |
| NOTE 1: For operation with a GSM/EDGE or standalone NB-IoT or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-6 apply for 0 MHz ≤ Δf < 0.15MHz.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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 test requirement within sub-block gaps shall be -25dBm/MHz.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.2-4a: MR BS OBUE in BC2 bands applicable for: BS with maximum output power PRated,c ≤ 31 dBm BS, supporting NR, not supporting UTRA, and not supporting GSM

|  |  |  |  |
| --- | --- | --- | --- |
| 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 9) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | - 20.5dBm - 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 10) | 100 kHz |
| NOTE 1: For MSR BS 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. 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 -29dBm/100kHz.  NOTE 2: For MSR BS supporting multi-band operation 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.  NOTE 3: For operation with a standalone NB-IoT or an E-UTRA 1.4 or 3MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-6 apply for 0 MHz ≤ Δf < 0.15 MHz. | | | |

Table 6.6.2.5.2-5: MR BS OBUE in BC2 bands applicable for: BS with maximum output power 31 < PRated,c ≤ 38 dBm and with GSM/EDGE or E-UTRA 1.4 or 3 MHz carriers or standalone NB-IoT 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 | Test requirement (Note 2, 3) | Measurement bandwidth (Note 9) |
| 0 MHz ≤ Δf < 0.05 MHz | 0.015 MHz ≤ f\_offset < 0.065 MHz | PRated,c - 36.5dB - 60(f\_offset/MHz-0.015)dB | 30 kHz |
| 0.05 MHz ≤ Δf < 0.15 MHz | 0.065 MHz ≤ f\_offset < 0.165 MHz | PRated,c - 39.5dB - 160(f\_offset/MHz-0.065)dB | 30 kHz |
| NOTE 1: The limits in this table only apply for operation with a GSM/EDGE or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.2-6: MR BS OBUE in BC2 bands applicable for: BS with maximum output power PRated,c ≤ 31 dBm and with GSM/EDGE or E-UTRA 1.4 or 3 MHz carriers or standalone NB-IoT 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 | Test requirement (Note 2, 3, 4) | Measurement bandwidth (Note 9) |
| 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 a GSM/EDGE or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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.  NOTE 4: In case the carrier adjacent to the Base Station RF Bandwidth edge is a GSM/EDGE carrier, the value of X = PGSMcarrier – 31, where PGSMcarrier is the power level of the GSM/EDGE carrier adjacent to the Base Station RF Bandwidth edge. In other cases, X = 0.  NOTE 5: In case the carrier adjacent to the RF bandwidth edge is a NB-IoT carrier, the value of X = PNB-IoTcarrier – 31, where PNB-IoTcarrier is the power level of the NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

Table 6.6.2.5.2-7: LA BS OBUE in BC2 bands

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Note 2, 3) | Measurement bandwidth (Note 9) |
| 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 10) | 100 kHz |
| NOTE 1: For operation with a GSM/EDGE or standalone NB-IoT or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge, the limits in Table 6.6.2.5.2-8 apply for 0 MHz ≤ Δf < 0.16 MHz.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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. Exception is f ≥ 10MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be -37dBm/100 kHz.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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. | | | |

Table 6.6.2.5.2-8: LA BS OBUE in BC2 bands applicable for: BS with GSM/EDGE or E-UTRA 1.4 or 3 MHz carriers or standalone NB-IoT 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 | Test requirement (Note 2, 3, 4) | Measurement bandwidth (Note 9) |
| 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 a GSM/EDGE or an E-UTRA 1.4 or 3 MHz carrier adjacent to the Base Station RF Bandwidth edge.  NOTE 2: For MSR BS supporting non-contiguous spectrum operation within any operating band the test 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.  NOTE 3: For MSR BS supporting multi-band operation with Inter RF Bandwidth gap < 2×ΔfOBUE the test 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.  NOTE 4: In case the carrier adjacent to the Base Station RF Bandwidth edge is a GSM/EDGE carrier, the value of X = PGSMcarrier – 24, where PGSMcarrier is the power level of the GSM/EDGE carrier adjacent to the Base Station RF Bandwidth edge. In other cases, X = 0.  NOTE 5: In case the carrier adjacent to the RF bandwidth edge is a NB-IoT carrier, the value of X = PNB-IoTcarrier – 24, where PNB-IoTcarrier is the power level of the NB-IoT carrier adjacent to the RF bandwidth edge. In other cases, X = 0. | | | |

NOTE 8: This frequency range ensures that the range of values of f\_offset is continuous.

NOTE 9: As a general rule for the requirements in the present clause, 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 may 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.

NOTE 10: The requirement is not applicable when Δfmax < ΔfOBUE.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.6.4.4.1 Initial conditions

Test environment: normal; see Annex B.2.

Base Station RF Bandwidth positions to be tested: BRFBW, MRFBW and TRFBW in single-band operation; see clause 4.9.1; BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

1) Connect the signal analyzer to the Base Station antenna connector as shown in Annex D.1.1.

2) The measurement device characteristics shall be:

- measurement filter bandwidth: defined in clause 6.6.4.5;

- detection mode: true RMS voltage or true average power.

The emission power should be averaged over an appropriate time duration to ensure the measurement is within the measurement uncertainty in Table 4.1.2-1.

##### 6.6.4.4.2 Procedure

1) Set the Base Station to transmit at maximum power according to the applicable test configuration in clause 5 using the corresponding test models or set of physical channels in clause 4.9.2.

2) For E-UTRA with NB-IoT (in-band and/or guard band operation), measure ACLR outside the Base Station RF Bandwidth edges and ACLR inside sub-block gap or Inter RF Bandwidth gap, in addition, for non-contiguous spectrum operation as specified in clause 6.6.4.5.1. For NB-IoT stand-alone operation, measure ACLR as specified in clause 6.6.4.5.5. For NR, measure ACLR outside the Base Station RF Bandwidth edges and ACLR inside sub-block gap or Inter RF Bandwidth gap, in addition, for non-contiguous spectrum operation as specified in clause 6.6.4.5.6.

3) For UTRA FDD, measure ACLR inside sub-block gap or Inter RF Bandwidth gap as specified in clause 6.6.4.5.2.

4) Measure Cumulative Adjacent Channel Leakage Power Ratio (CACLR) inside sub-block gap or the Inter RF Bandwidth gap as specified in clause 6.6.4.5.4.

In addition, for a multi-band capable BS, the following step shall apply:

5) For multi-band capable BS and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carrier activated in the other band. For multi-band capable BS with separate antenna connector, the antenna connector not being under test in case of SBT or MBT shall be terminated.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 7.6.4 Method of test

#### 7.6.4.1 Initial conditions

Test environment: Normal; see Annex B.2.

Base Station RF Bandwidth positions to be tested: MRFBW in single-band operation, see clause 4.9.1, BRFBW\_T’RFBW and B’RFBW\_TRFBW in multi-band operation, see clause 4.9.1.

1) Set up the equipment as shown in Annex D.2.1.

2) Detection mode: True RMS.

The emission power should be averaged over an appropriate time duration to ensure the measurement is within the measurement uncertainty in Table 4.1.2-2.

#### 7.6.4.2 Procedure

1) Set the measurement equipment parameters as specified in Table 7.6.5.1-1. For BC2, the parameters in Table 7.6.5.2-1 apply in addition.

2) Set the BS to transmit with the carrier set-up and power allocation according to the applicable test configuration(s) (see clause 5).

3) Measure the spurious emissions over each frequency range described in clause 7.6.5.

In addition, for a multi-band capable BS, the following step shall apply:

4) For multi-band capable BS and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carrier activated in the other band. For multi-band capable BS with separate antenna connector, the antenna connector not being under test in case of SBT or MBT shall be terminated.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*