**3GPP TSG-RAN4 WG4 Meeting #** **100-e *R4-2115843***

**Electronic meeting, August 16- 27, 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.145-2** | **CR** | xxxx | **rev** | **-** | **Current version:** | **17.2.0** |  |
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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 | **x** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Big CR for TS 37.145-2 Maintenance (Rel-17, CAT A) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Huawei | | | | | | | | | |
| ***Source to TSG*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Perf | | | | |  | ***Date:*** | | | 2021-08-29 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This big CRs merge the mutile endorsed draf CRs. The reason for change in each endorsed draft CR is copied below.  **R4-2113088 OTA transmitter intermodulation 37.145-2 R17**  <Reason for change>  On OTA tranmitter intermodulation, very high power Prated,t,TRP is not feasible for the test chamber. And the power transmitted in closest column could be far below the power Prated,t,TRP since AAS always use multi-column antenna. For co-location blocking requirements, 46 dBm is adopted in terms of TRP. The same interferer level as used for co-location blocking should be re-used  **R4-2114001 TS 37.145-2: Clarifications and corrections on extreme test environment**  <Reason for change>  Testing under extreme conditions is not aligned with recent changes adopted for other BS specifications, especially TS 38.141-2  **R4-2114404 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17**  <Reason for change>  During RAN4#98-e meeting, OBUE tables were corrected for the MSR and AAS specifications in a series of CRs (in particular Rel-15 CRs to TS 37.145-2 in R4-2103792 and R4-2103887).  During review of the CRs implementation, it was identified that some of the agreed modifications were not fully aligned among the CRs.  In this CR, additional OBUE table header corrections are provided to correct identified misalignments, and Table 6.7.5.5.2-2c is added in Table 6.7.5.5.2-0.  **R4-2113995 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**  <Reason for change>  The current emission limits were specified based on declared values at the antenna port. However, absolute values are available in the ECC Dec 17(06) and ECC Dec 13(03) This requirements are also applicable in spurious domain.  **R4-2114407 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-17**  <Reason for change>  During review of the TS 37.145-2, it was found that there is an outstanding TBD value (and [] brackets) in the test procedure for radiated performance requirements for NR.  Referring to TS 37.145-2, section 8.5.5.2 step 8, there is an empty placeholder for the AWGN power level at the BS in Table 8.2.1.4.2-2 (which is left TBD). It shall be the noted that the sentence above that table refers to the reader to the NR specification TS 38.141-2, e.g. Table 8.2.1.4.2-2 of TS 38.141-2 provides related AWGN power levels, reduced already by the - ΔOTAREFSENS. Please note that there are multiple tables specifying the AWGN power levels for various BS demodulation tests.  As this AAS BS specification refers to the Single RAT specifications for the details of the radiated BS demodulation requirements, there is no need to double the information among the NR and AAS BS specifications. Therefore that missing table 8.2.1.4.2-2 is proposed to be Voided.  In this Draft CR, TBD value (and [] brackets) for the AWGN power level at the BS inputs is resolved for the NR radiated performance requirements. | | | | | | | | |
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| ***Summary of change:*** | | The summary of change in each each endorsed draft CR is copied below.  **R4-2113088 OTA transmitter intermodulation 37.145-2 R17**  <Summary of change>  The max interfereing power is defined as 46 dBm which is the same as co-location blocking for Macro BS  **R4-2114001 TS 37.145-2: Clarifications and corrections on extreme test environment**  <Summary of change>  Introduce similar changes as were approved for TS 38.141-2  **R4-2114404 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17**  <Summary of change>  Table headers for 6.7.5.5.2-2b and table 6.7.5.5.2-2c were aligned with approach agreed for the other OBUE tables. Table 6.7.5.5.2-2c is added in Table 6.7.5.5.2-0.  **R4-2113995 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**  <Summary of change>  Added a statement in the general section in spurious emissions.  Change the limit to -42 dBm/27MHz.  Change table titles. Remove “declared”  Added bands n74 and n75 to the emissionslimits above 1518 MHz  Limits as EIRP in line with spectrum decision  Remove duplicate text in E-UTRA clause and refer to the MSR requirements instead.  Added 0dB test tolerance for the respective requirements in annex C.1  **R4-2114407 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-17**  <Summary of change>  Table 8.2.1.4.2-2 is Voided.  Outstanding [] brackets are removed. | | | | | | | | |
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| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  **R4-2113088 OTA transmitter intermodulation 37.145-2 R17**  <Consequences if not approved>  OTA tranmitter intermodulation can not be tested in the test chamber.  **R4-2114001 TS 37.145-2: Clarifications and corrections on extreme test environment**  <Consequences if not approved>  Unclear conditions for testing under extreme conditions  **R4-2114404 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17**  <Consequences if not approved>  Misalignment among the OBUE table headers would exist, and the requirements coverage would not be complete.  **R4-2113995 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**  <Consequences if not approved>  Wrong value for unwanted emissions limit and lack of compliance with a European spectrum decisions  R4-2114407 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-17  <Consequences if not approved>  Forbidden TBD value would exist in the frozen release of the TS 37.145-2 specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | **R4-2113087 OTA transmitter intermodulation 37.145-2 R16**  <Clauses affected>  6.8.5  **R4-2114001 TS 37.145-2: Clarifications and corrections on extreme test environment**  <Clauses affected>  6.2.1, 6.2.4.1  **R4-2114404 Draft CR to TS 37.145-2: Additional OBUE table header corrections, Rel-17**  <Clauses affected>  6.7.5.5.2  **R4-2113995 TS 37.145-2: Correction of additional spurious emission limits for bands 50, 51, 75, 76**  <Clauses affected>  6.7.5.1, 6.7.5.5.4.6, 6.7.5.5.7, 6.7.6.1, C2  **R4-2114407 Draft CR to TS 37.145-2: AWGN noise level for BS demodulation requirements for NR, Rel-17**  <Clauses affected>  8.5.5.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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| ***This CR’s revision history:*** |  |

***<Start of change1>***

This is an output power accuracy requirement defined at the RIB during the *transmitter ON period*.

An AAS BS is declared to support one or more beams. Radiated transmit power is defined as the EIRP level for a declared beam at a specific *beam peak direction*.

For each beam, the requirement is based on declarations (see table 4.10-1) of a beam identifier (D9.3), *reference beam direction pair* (D9.7), *rated beam EIRP* (D9.10) at the *reference beam direction pair*, *OTA peak directions set* (D9.8), the *beam direction pairs* at the maximum steering directions (D9.9) and their associated *rated beam EIRP* and *beamwidth(s)* (D9.11)for *reference beam direction pair* and maximum steering directions.

For a declared beam identifier and *beam direction pair*, the *rated beam EIRP* level is the maximum power that the base station is declared to radiate at the associated *beam peak direction* during the *transmitter ON period*.

For each *beam peak direction* associated with a *beam direction pair* within the *OTA peak directions set*, a specific *rated beam EIRP* level may be claimed. Any claimed value shall be met within the accuracy requirement as described below. *Rated beam EIRP* is only required to be declared for the *beam direction pairs* subject to conformance testing as detailed in clause 6.2.4.1.

NOTE 1: The *OTA peak directions set* for a beam is the complete continuous or discrete set of all *beam direction* for which the EIRP accuracy is intended to be achieved for the beam.

NOTE 2: A *beam direction pair* consists of a *beam centre direction* and an associated *beam peak direction*.

NOTE 3: A declared EIRP value is a value provided by the manufacturer for verification according to the conformance specification declaration requirements, whereas a claimed EIRP value is provided by the manufacturer to the equipment user for normal operation of the equipment and is not subject to formal conformance testing.

For *operating bands* where the supported *fractional bandwidth* (FBW) is larger than 6%, two rated carrier EIRP may be declared by manufacturer:

- Prated,c,FBWlow for lower supported frequency range, and

- Prated,c,FBWhigh for higher supported frequency range.

For frequencies in between FFBWlow and FFBWhigh the rated carrier EIRP is:

- Prated,c,FBWlow, for the carrier whose carrier frequency is within frequency range FFBWlow ≤ f < (FFBWlow +FFBWhigh) / 2,

- Prated,c,FBWhigh, for the carrier whose carrier frequency is within frequency range (FFBWlow +FFBWhigh) / 2 ≤ f ≤FFBWhigh.

### 6.2.2 Minimum Requirement

For AAS BS in *MSR operation* the minimum requirement is defined in TS 37.105 [6], clause 9.2.2.

For AAS BS in *single RAT UTRA operation* the minimum requirement is defined in TS 37.105 [6], clause 9.2.3.

For AAS BS in *single RAT E-UTRA operation* the minimum requirement is defined in TS 37.105 [6], clause 9.2.4.

### 6.2.3 Test purpose

The test purpose is to verify the ability to accurately generate and direct radiated power per beam, across the frequency range and under normal conditions, for all declared beamsof the AAS BS.

### 6.2.4 Method of test

#### 6.2.4.1 Initial conditions

Test environment:

* Normal; see annex G.2.
* Extreme (applies only to OTA AAS BS), see annexes G.3 and G.5.

RF bandwidth positions to be tested: BRFBW, MRFBW and TRFBW in single-band operation, see clause 4.12.1.

BRFBW\_T'RFBW and B'RFBW\_TRFBW in multi-band operation, see clause 4.12.1.

Directions to be tested:

* The *reference beam direction pair* (D9.7)
* The maximum steering directions (D9.9).

Beams to be tested: Declared beam with the highest intended EIRP for the narrowest intended beam corresponding to the smallest BeWθ, or for the narrowest intended beam corresponding to the smallest BeWϕ (D9.3, D9.10).

Under extreme test environment, for OTA AAS BS only, it is sufficient to test on one RF channel or one *Base Station RF Bandwidth* position, and with one applicable test configuration defined in clauses 4.11 and 5. The direction to be tested is only at *reference beam direction pair* (D9.7). Testing shall be performed under extreme power supply conditions, as defined in annex G.5.

NOTE: Tests under extreme power supply conditions also test extreme temperatures.

#### 

#### 6.2.4.2 Procedure

1) Place the AAS BS at the positioner.

***<End of change1>***

***<Start of change2>***

### 6.7.5 OTA Operating band unwanted emission

#### 6.7.5.1 Definition and applicability

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

For BS operating in bands n50, n51, n74, n75 and n76 additional emission limits that might be applicable outside OBUE frequency domain are specified in clause 6.7.5.5.4.6.

#### 6.7.5.2 Minimum Requirement

For AAS BS in *MSR operation* the minimum requirement is defined in TS 37.105 [6], clause 9.7.5.2

***<End of change2>***

***<Start of change3>***

Table 6.7.5.5.2-0: Applicability of operating band unwanted emission requirements for BC1 and BC3 Wide Area BS

|  |  |  |
| --- | --- | --- |
| NR band operation | UTRA supported | Applicable requirement table |
| None | Y/N | 6.7.5.5.2-1/2 (option 2) |
| In certain regions (NOTE 2), band 1, 65 | N | 6.7.5.5.2-1/2 (option 2) |
| Any below 1 GHz | N | 6.7.5.5.2-2a (option 1) |
| Any above 1 GHz except for certain regions (NOTE 2), band 1, 65 | N | 6.7.5.5.2-2b/2c (option 1) |
| NOTE 1: Void  NOTE 2: Applicable only for operation in regions where Category B limits as defined in ITU-R Recommendation SM.329 [16] are used for which category B option 2 operating band unwanted emissions requirements as defined in TS 36.104 [4] and TS 38.104 [33] are applied. | | |

Table 6.7.5.5.2-1: WA BS OBUE in BC1 and BC3 bands ≤ 3 GHz applicable for: BS not supporting NR; or BS supporting NR in Band n1 or n65 - option 2

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz | -3.2 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | -3.2-15(f\_offset/MHz-0.215)dBm (Note 6) | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -15.2 dBm (Note 6) | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -2.2 dBm (Note 6) | 1 MHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (NOTE 5, 6) | 1 MHz |
| NOTE 1: For MSR RIB 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 ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the test requirement within sub-block gaps shall be -6 dBm/MHz (for MSR *multi-band TAB connector* 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 < 1 GHz).  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the test requirementwithin the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz.  NOTE 6: For MSR *multi-band TAB connector* 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 < 1 GHz. | | | |

Table 6.7.5.5.2-2: WA BS OBUE in BC1 and BC3 bands > 3 GHz applicable for: BS not supporting NR; or BS supporting NR in Band n1 or n65 - option 2

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Test requirement (Notes 1 and 2) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.2 MHz | 0.015 MHz ≤ f\_offset < 0.215 MHz | -3 dBm | 30 kHz |
| 0.2 MHz ≤ Δf < 1 MHz | 0.215 MHz ≤ f\_offset < 1.015 MHz | -3-15(f\_offset/MHz-0.215)dBm | 30 kHz |
| (Note 3) | 1.015 MHz ≤ f\_offset < 1.5 MHz | -15 dBm | 30 kHz |
| 1 MHz ≤ Δf ≤  min(Δfmax, 10 MHz) | 1.5 MHz ≤ f\_offset < min(f\_offsetmax, 10.5 MHz) | -2 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 *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 ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the *test requirement* within sub-block gaps shall be -6 dBm/MHz.  NOTE 2: For MSR *multi-band RIB* with *Inter RF Bandwidth gap* < 2×ΔfOBUE MHz the *test requirement* within the *Inter RF Bandwidth gap*s is calculated as a cumulative sum of contributions from adjacent sub-blocks on each side of the *Inter RF Bandwidth gap*.  NOTE 3: This frequency range ensures that the range of values of f\_offset is continuous.  NOTE 5: The requirement is not applicable when Δfmax < 10 MHz. | | | |

Table 6.7.5.5.2-2a: WA BS OBUE in BC1 and BC3 bands ≤ 1 GHz applicable for: BS supporting NR and not supporting UTRA - option 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 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 3.8 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) | -3.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.05 MHz ≤ f\_offset < f\_offsetmax | -7 dBm (Note 5) | 100 kHz |
| NOTE 1: For AAS 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 or RF Bandwidth shall be scaled according to the measurement bandwidth of the near-end sub-block or RF Bandwidth. Exception is f ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -7dBm/100 kHz.  NOTE 2: For AAS 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 6.7.5.5.2-2b: WA BS OBUE in BC1 and BC3 bands > 3 GHz applicable for: BS supporting NR, and not supporting UTRA

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement (Note 1, 2) | Measurement bandwidth (Note 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 4 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) | -3 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (Note 5) | 1 MHz |
| NOTE 1: For AAS 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 ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -6dBm/1 MHz.  NOTE 2: For AAS 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 6.7.5.5.2-2c: WA BS OBUE in BC1 and BC3 bands > 1GHz and ≤ 3 GHz applicable for: BS supporting NR, not supporting NR operation in Band n1 or n65, 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 7) |
| 0 MHz ≤ Δf < 5 MHz | 0.05 MHz ≤ f\_offset < 5.05 MHz | 3.8 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) | -3.2 dBm | 100 kHz |
| 10 MHz ≤ Δf ≤ Δfmax | 10.5 MHz ≤ f\_offset < f\_offsetmax | -6 dBm (Note 5) | 1 MHz |
| NOTE 1: For AAS 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 ≥ 10 MHz from both adjacent sub blocks on each side of the sub-block gap, where the minimum requirement within sub-block gaps shall be -6dBm/1 MHz.  NOTE 2: For AAS 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. | | | |

***<End of change3>***

***<Start of change4>***

6.7.5.5.4.6 Additional band 32, 50, 51, 74, 75 and 76 unwanted emissions

In certain regions, the following requirements may apply to BS operating in Band 32 within 1452-1492 MHz, in Band 75 within 1432-1517 MHz and in Band 76 within 1427-1432 MHz. The maximum level of unwanted emissions, measured as EIRP, on centre frequencies f\_offset with filter bandwidth, according to table 6.7.5.5.4.6-1, shall not exceed the EIRP limits indicated in the table.

For Band 32, this requirement applies in the frequency range 1452-1492 MHz when non-Mobile/Fixed Communications Network (MFCN) services are deployed in adjacent frequency ranges, while it applies also within 1427-1452 MHz and/or 1492-1517 MHz when MFCN services are deployed in such frequency ranges, even though part of the ranges falls in the spurious domain. For Band 75, this requirement applies in the frequency range 1427-1517 MHz. For Band 76, this requirement applies in the frequency range 1432-1517 MHz even though part of the range falls in the spurious domain.

Table 6.7.5.5.4.6-1: Unwanted emission limits within 1427-1517 MHz

|  |  |  |
| --- | --- | --- |
| Frequency offset of measurement filter centre frequency, f\_offset | EIRP limit [dBm] | Measurement bandwidth |
| 2.5 MHz | 16.3 | 5 MHz |
| 7.5 MHz | 11 | 5 MHz |
| 12.5 MHz ≤ f\_offset ≤ f\_offsetmax | 9 | 5 MHz |
| NOTE: For Band 32, when non-MFCN services are deployed in the adjacent bands, f\_offsetmax denotes the frequency difference between the lower Base Station RF Bandwidth edge and 1454.5 MHz, and the frequency difference between the upper Base Station RF Bandwidthl edge and 1489.5 MHz for the set channel position. For Band 32, when MFCN services are deployed in the adjacent frequencies, Band 75 and Band 76, f\_offsetmax denotes the frequency difference between the lower Base Station RF Bandwidth edge and 1429.5 MHz, and the frequency difference between the upper Base Station RF Bandwidth edge and 1514.5 MHz for the set channel position. | | |

In certain regions, the following requirement may apply to BS operating in Band 32 within 1452-1492 MHz for the protection of non-MFCN services in spectrum adjacent to the frequency range 1452-1492 MHz. The maximum level of emissions, measured as EIRP, on centre frequencies Ffilter with filter bandwidth according to Table 6.7.5.5.4.6-2, shall not exceed the EIRP limits indicated in the table. This requirement applies in the frequency range 1429-1518 MHz even though part of the range falls in the spurious domain.

Table 6.7.5.5.4.6-2: Unwanted emission emission limits outside 1452-1492 MHz

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | EIRP limit [dBm] | Measurement bandwidth |
| 1429.5 MHz ≤ Ffilter ≤ 1448.5 MHz | -20 | 1 MHz |
| Ffilter = 1450.5 MHz | 14 | 3 MHz |
| Ffilter = 1493.5 MHz | 14 | 3 MHz |
| 1495.5 MHz ≤ Ffilter ≤ 1517.5 MHz | -20 | 1 MHz |

In certain regions, the following requirement may apply to BS operating in Band 50 and Band 75 within 1492-1517 MHz and in Band 74 within 1492-1518 MHz. The maximum level of emissions, measured as EIRP, on centre frequencies Ffilter with filter bandwidth according to table 6.7.5.5.4.6-3, shall not exceed the EIRP limits indicated in the table.

Table 6.7.5.5.4.6-3: Operating band 50, 74 and 75 emission test limits above 1518 MHz

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

In certain regions, the following requirement may apply to E-UTRA BS operating in Band 50 and Band 75 within 1432-1452 MHz, and in Band 51 and Band 76. Emissions shall not exceed the test level specified in table 6.7.5.5.4.6-4.

Table 6.7.5.5.4.6-4: Additional unwanted emission limits for BS operating in Band 50 and 75 within 1432-1452 MHz, and in Band 51 and 76

|  |  |  |
| --- | --- | --- |
| Filter centre frequency, Ffilter | Maximum Level [dBm] | Measurement Bandwidth |
| Ffilter = 1413.5 MHz | -42 | 27 MHz |

6.7.5.5.4.7 Additional requirements for band 45

In certain regions the following requirement may apply to E-UTRA BS operating in Band 45. Emissions shall not exceed the maximum levels specified in table 6.7.5.5.4.7-1.

***<End of change4>***

***<Start of change5>***

In regions where FCC regulation applies, requirements for protection of GPS according to FCC Order DA DA 20-48 applies for operation in Band 24. The following normative requirement covers the base station, to be used together with other information about the site installation to verify compliance with the requirement in FCC Order DA DA 20-48. The requirement applies to BS operating in Band 24 to ensure that appropriate interference protection is provided to the GPS. This requirement applies in the frequency range 1541-1650 MHz even though part of the range falls in the spurious domain.

The level of emissions in the 1541 - 1650 MHz band, measured in measurement bandwidth according to table 6.7.5.5.5.7-5 shall not exceed the maximum TRP limits indicated in the table.

Table 6.7.5.5.5.7-5: Emissions test requirements for protection of the 1541-1650 MHz band

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Band | Frequency range (MHz) | Emission level (dBW)  (Measurement bandwidth = 1 MHz) | Emission level (dBW) of discrete emissions of less than 700 Hz bandwidth  (Measurement bandwidth = 1 kHz) | Emission level (dBW) of discrete emissions of less than 2 kHz bandwidth  (Measurement bandwidth = 1 kHz) |
| 24 | 1541 - 1559 | PEIRP – 17 dBi + 9 dB |  | PEIRP – 17 dBi + 9 dB |
| 1559 - 1610 | PEIRP – 17 dBi + 9 dB | PEIRP – 17 dBi + 9 dB |  |
| 1610 - 1650 | PEIRP – 17 dBi + 9 dB | PEIRP – 17 dBi + 9 dB |  |

NOTE: The regional requirements, included in FCC Order DA 20-48 are defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The method outlined in TS 37.105 [6], Annex B1 indicates how the limit in table 6.7.5.5.5.7-5 demonstrates compliance to the regional requirement in DA 20-48. PEIRP values in table 6.7.5.5.5.7-5 are the effective isotropic power (or radiated power spectral density) set in the FCC Order DA 20-48 for the specified frequency ranges and bandwidths.

Table 6.7.5.5.5.7-6: Void

For BS operating in bands n50, n51, n74, n75 and n76 additional emission limits are specified in clauses 6.7.5.5.4.6.

Table 6.7.5.5.5.7-7: void



Table 6.7.5.5.5.7-8: void



Table 6.7.5.5.5.7-8a: void



Table 6.7.5.5.5.7-8b: void



In certain regions the following requirement may apply to E-UTRA BS operating in Band 45. Emissions shall not exceed the maximum levels specified in table 6.7.5.5.5.7-9.

Table 6.7.5.5.5.7-9: Emissions limits for protection of adjacent band services

|  |  |  |  |
| --- | --- | --- | --- |
| Operating Band | Filter centre frequency, Ffilter | Maximum Level [dBm] | Measurement Bandwidth |
| 45 | Ffilter = 1467.5 | -11 | 1 MHz |
|  | Ffilter = 1468.5 | -14 | 1 MHz |
|  | Ffilter = 1469.5 | -17 | 1 MHz |
|  | Ffilter = 1470.5 | -24 | 1 MHz |
|  | Ffilter = 1471.5 | -31 | 1 MHz |
|  | 1472.5 MHz ≤ Ffilter ≤ 1491.5 MHz | -38 | 1 MHz |

The following requirement may apply to BS operating in Band 48 in certain regions. Emissions shall not exceed the maximum levels specified in table 6.7.5.5.5.7-10.

Table 6.7.5.5.5.7-10: Additional operating band unwanted emission limits for Band 48

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel bandwidth | Frequency offset of measurement filter ‑3dB point, Δf | Frequency offset of measurement filter centre frequency, f\_offset | Testrequirement | Measurement bandwidth |
| All | 0 MHz ≤ Δf < 10 MHz | 0.5 MHz ≤ f\_offset < 9.5 MHz | -4 dBm | 1 MHz |

### 6.7.6 OTA Spurious emission

#### 6.7.6.1 General

The OTA spurious emissions limits are specified as TRP per cell unless otherwise specified.

The OTA transmitter spurious emission limits apply from 30 MHz to 12.75 GHz, excluding the following RAT-specific frequency ranges:

- UTRA FDD BS as specified in TS 25.104 [2]: from 12.5 MHz below the lowest carrier frequency used up to 12.5 MHz above the highest carrier frequency used.

- E-UTRA BS as specified in TS 36.104 [4]: from ΔfOBUE below the lowest frequency of the *downlink operating band* up to ΔfOBUE above the highest frequency of the *downlink operating band*, where ΔfOBUE is defined in clause 6.7.1.

- MSR BS as specified in TS 37.104 [5]: from ΔfOBUE below the lowest frequency of the *downlink operating band* up to ΔfOBUE above the highest frequency of the *downlink operating band*, where ΔfOBUE is defined in clause 6.7.1. For some operating bands the upper frequency limit is higher than 12.75 GHz in order to comply with the 5th harmonic limit of the *downlink operating band*, as specified in ITU-R recommendation SM.329 [16]. In some exceptional cases, requirements apply also closer than 10 MHz from the *downlink operating band*; these cases are highlighted in the requirement tables in respective referenced UTRA, E-UTRA, NR or MSR specifications. For operating bands supported by *multi-band RIB* each supported band including the ΔfOBUE around the band are excluded from the spurious emissions requirements.

The requirements apply for both *single band* *RIBs* and *multi-band* *RIBs* (except for frequencies at which exclusion bands or other multi-band provisions apply) and for all transmission modes foreseen by the manufacturer's specification. Unless otherwise stated, all requirements are measured as mean power.

For operation in Region 2, where the FCC guidance for MIMO systems in [17] is applicable, the emissions limits are the same regardless of the number of transceiver units so the limits are equivalent to those for a single transceiver unit as specified in the as the corresponding applicable *non-AAS BS* per transmitter requirement specified in TS 25.104 [2], TS 25.105 [3], TS 36.104 [4], TS 37.104 [5] or TS 38.104 [33]. For E-UTRA and NR the limits will be 9dB lower and for UTRA FDD the limits will be 6dB lower, unless stated differently in regional regulation.

The AAS BS requirements for spurious emissions limits which are specified for Band 46 in TS 37.104 [5], are applicable for AAS BS.

For BS operating in bands n50, n51, n74, n75 and n76 additional emission limits that might be applicable in the spurious emissions frequency domain are specified in clause 6.7.5.5.4.6.

#### 6.7.6.2 Mandatory Requirements

##### 6.7.6.2.1 Definition and applicability

The OTA spurious emissions mandatory requirements include the CAT A, CAT B and additional minimum requirements for BC2, limits are specified as TRP per cell unless otherwise specified.

***<End of change5>***

***<Start of change6>***

### 6.8.5 Test Requirement

#### 6.8.5.1 MSR test requirements

##### 6.8.5.1.1 General test requirement

In the frequency range relevant for this test the transmitter intermodulation level shall not exceed the unwanted emission limits specified for transmitter spurious emission in clause 6.7.6 (except co-location spurious emission), operating band unwanted emission in clause 6.7.5 and ACLR in clause 6.7.3 in the presence of a wanted signal and an interfering signal according to table 6.8.5.1.1-1 for an *OTA AAS BS* operating in BC1, BC2 and BC3.

The requirement is applicable outside the edges of the *Base Station RF Bandwidth*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *radio bandwidth* edges.

For *RIB* supporting operation in *non-contiguous spectrum*, the requirement is also applicable inside a *sub-block gap* for interfering signal offsets where the interfering signal falls completely within the *sub-block gap*. The interfering signal offset is defined relative to the *sub-block* edges.

For *multi-band RIBs*, the requirement applies relative to the *Base Station RF Bandwidth edges* of each operating band. In case the inter *Base Station RF Bandwidth* gap is less than 15 MHz, the requirement in the gap applies only for interfering signal offsets where the interfering signal falls completely within the inter *Base Station RF Bandwidth* gap.

Table 6.8.5.1.1-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | E-UTRA or NR signal |
| Interfering signal type | E-UTRA signal of *channel bandwidth* 5 MHz |
| Interfering signal level applied to the CLTA | min(46 dBm, Prated,t,TRP) |
| Interfering signal centre frequency offset from *Base Station RF Bandwidth* edge or edge of *sub-block* inside a gap | ±2.5 MHz  ±7.5 MHz  ±12.5 MHz |
| NOTE 1: Interfering signal positions that are partially or completely outside of any *downlink operating band* of the RIB is excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent *downlink operating band*s in the same geographical area. In case that none of the interfering signal positions fall completely within the frequency range of the *downlink operating band*, TS 37.141 provides further guidance regarding appropriate test requirements.  NOTE 2: In certain regions, NOTE 1 is not applied in Band 1, 3, 8, 9, 11, 18, 19, 21, 28, 32 operating within 1 475.9 MHz to 1 495.9 MHz, 34.  NOTE 3: The Prated,t,TRP is split between supported polarizations at the CLTA input ports. | |

##### 6.8.5.1.2 Additional test requirement (BC1 and BC2)

In the frequency range relevant for this test the transmitter intermodulation level shall not exceed the unwanted emission limits specified for transmitter spurious emission in clause 6.7.6 (except co-location spurious emission), operating band unwanted emission in clause 6.7.5 and ACLR in clause 6.7.3 in the presence of a wanted signal and an interfering signal according to table 6.8.5.1.2-1 for an *OTA AAS BS* operating in BC2.

The requirement is applicable outside the edges of the *Base Station RF Bandwidth* for BC2. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges*.

For *RIBs* supporting operation in *non-contiguous spectrum* in BC1 or BC2, the requirement is also applicable inside a *sub-block gap* with a gap size larger than or equal to two times the interfering signal centre frequency offset. For *RIBs* supporting operation in *non-contiguous spectrum* in BC1, the requirement is not applicable inside a *sub-block gap* with a gap size equal to or larger than 5 MHz. The interfering signal offset is defined relative to the *sub-block* edges.

For *multi-band RIBs*, the requirement applies relative to the *Base Station RF Bandwidth edges* of a BC2 operating band. The requirement is also applicable for BC1 and BC2 inside an inter *Base Station RF Bandwidth* gap equal to or larger than two times the interfering signal centre frequency offset. For *RIBs* supporting operation in multiple operating bands, the requirement is not applicable for BC1 band inside an inter *Base Station RF Bandwidth* gap with a gap size equal to or larger than 5 MHz.

Table 6.8.5.1.2-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | E-UTRA and/or NR UTRA signal |
| Interfering signal type | CW |
| Interfering signal level applied to the CLTA | min(46 dBm, Prated,t,TRP) |
| Interfering signal centre frequency offset from *Base Station RF Bandwidth* edge or edge of *sub-block* inside a gap | > abs(800) kHz for CW interferer |
| NOTE 1: Interfering signal positions that are partially or completely outside of any *downlink operating band* of the RIB are excluded from the requirement.  NOTE 2: The Prated,t,TRP is split between polarizations at the CLTA. | |

##### 6.8.5.1.3 Additional test requirement (BC3)

In the frequency range relevant for this test, the transmitter intermodulation level shall not exceed the unwanted emission limits specified for transmitter spurious emission in clause 6.7.6 (except co-location spurious emission), operating band unwanted emission in clause 6.7.5 and ACLR in clause 6.7.3 in the presence of a wanted signal and an interfering signal according table 6.8.5.1.3-1 an *OTA AAS BS* operating in BC3.

For *multi-band RIBs*, the requirement applies relative to *the Base Station RF Bandwidth edges* of each operating band. In case the *Inter RF Bandwidth gap* is less than 3.2 MHz, the requirement in the gap applies only for interfering signal offsets where the interfering signal falls completely within the inter *Base Station RF Bandwidth* gap.

Table 6.8.5.1.3-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement (BC3)

| Parameter | Value |
| --- | --- |
| Wanted signal type | E-UTRA and/or UTRA and/or NR signal |
| Interfering signal type | 1,28 Mcps UTRA TDD signal of *channel bandwidth* 1,6 MHz |
| Interfering signal level applied to the CLTA | min(46 dBm, Prated,t,TRP) |
| Interfering signal centre frequency offset from *Base Station RF Bandwidth* edge or edge of *sub-block* inside a gap | ±0,8 MHz  ±1,6 MHz  ±2,4 MHz |
| NOTE 1: Interfering signal positions that are partially or completely outside of any *downlink operating band* of the base station are excluded from the requirement.  NOTE 2: The Prated,t,TRP is split between polarizations at the CLTA. | |

#### 6.8.5.2 Single RAT UTRA operation

##### 6.8.5.2.1 General test requirement for UTRA FDD

In the frequency range relevant for this test, the transmitter intermodulation level shall not exceed the out of band emission or the spurious emission requirements of clause 6.7.4 (OTA spectrum mask) and clause 6.7.6 (OTA spurious emission, except co-location spurious emission), in the presence of interfering signal according to table 6.8.5.2.1-1.

For *RIBs* supporting operation in *non-contiguous spectrum*, the requirement is also applicable inside a *sub-block gap* for interfering signal offsets where the interfering signal falls completely within the *sub-block gap*. The interfering signal offset is defined relative to the *sub-block* edges.

For *multi-band RIBs*, the requirement is also applicable inside an *Inter RF Bandwidth gap* for interfering signal offsets where the interfering signal falls completely within the *Base Station RF Bandwidth* gap.

NOTE: If the above Test Requirement differs from the Minimum Requirement then the Test Tolerance applied for this test is non-zero. The Test Tolerance for this test is defined in clause 4.1.2 and the explanation of how the Minimum Requirement has been relaxed by the Test Tolerance is given in annex C.

Table 6.8.5.2.1-1: Interfering and wanted signal frequency offset for OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | UTRA |
| Interfering signal type | UTRA |
| Interfering signal level applied to the CLTA | min(46 dBm, Prated,t,TRP) |
| Interfering signal centre frequency offset from the lower (upper) edge of the wanted signal or edge of *sub-block* inside a gap | -2,5 MHz  -7,5 MHz  -12,5 MHz  +2,5 MHz  +7,5 MHz  +12,5 MHz |
| NOTE 1: Interference frequencies that are outside of any allocated frequency band for UTRA-FDD downlink specified in clause 4.6 are excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent *downlink operating band*s in the same geographical area.  NOTE 2: NOTE 1 is not applied in Band I, III, VI, VIII, IX, XI, XIX, XXI, and XXXII operating within 1 475.9 MHz to 1 495.9 MHz, in certain regions.  NOTE 3: The Prated,t,TRP is split between polarizations at the CLTA. | |

#### 6.8.5.3 Single RAT E-UTRA operation

##### 6.8.5.3.1 General test requirement

In the frequency range relevant for this test, the transmitter intermodulation level shall not exceed the unwanted emission limits in clauses 6.7.6 (OTA spurious emission, except co-location spurious emission), 6.7.5 (OTA OBUE) and 6.7.3 (OTA ACLR) in the presence of an E-UTRA interfering signal according to according to table 6.8.5.3.1-1.

The requirement is applicable outside the *Base Station RF Bandwidth* or *radio bandwidth*. The interfering signal offset is defined relative to the *Base Station RF Bandwidth edges* or *radio bandwidth* edges.

For *RIBs* supporting operation in *non-contiguous spectrum*, the requirement is also applicable inside a *sub-block gap* for interfering signal offsets where the interfering signal falls completely within the *sub-block gap*. The interfering signal offset is defined relative to the *sub-block* edges.

For *multi-band RIBs*, the requirement applies relative to the *Base Station RF Bandwidth edges* of each supported operating band. In case the *Inter RF Bandwidth gap* is less than 15 MHz, the requirement in the gap applies only for interfering signal offsets where the interfering signal falls completely within the inter *Base Station RF Bandwidth* gap.

Table 6.8.5.3.1-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal | E-UTRA single carrier, or multi-carrier, or multiple intra-band contiguously or non-contiguously aggregated carriers |
| Interfering signal type | E-UTRA signal of *channel bandwidth* 5 MHz |
| Interfering signal level applied to the CLTA | min(46 dBm, Prated,t,TRP) |
| Interfering signal centre frequency offset from the lower (upper) edge of the wanted signal or edge of *sub-block* inside a *sub-block gap* | ±2,5 MHz  ±7,5 MHz  ±12,5 MHz |
| NOTE 1: Interfering signal positions that are partially or completely outside of any *downlink operating band* of the base station are excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent *downlink operating band*s in the same geographical area. In case that none of the interfering signal positions fall completely within the frequency range of the *downlink operating band*, TS 36.141 provides further guidance regarding appropriate test requirements.  NOTE 2: In certain regions, NOTE 1 is not applied in Band 1, 3, 8, 9, 11, 18, 19, 21, 28, 32 operating within 1 475.9 MHz to 1 495.9 MHz, 34.  NOTE 3: The Prated,t,TRP is split between polarizations at the CLTA. | |

##### 6.8.5.3.2 Void

Table 6.8.5.3.2-1: Void

***<End of change6>***

***<Start of change7>***

#### 8.5.5.2 Procedure

1) Place the OTA AAS BS with its manufacturer declared coordinate system reference point in the same place as calibrated point in the test system, as shown in annex D.3.

2) Align the manufacturer declared coordinate system orientation of the OTA AAS BS with the test system.

3) Set the OTA AAS BS in the declared direction to be tested.

4) Connect the BS tester generating the wanted signal, interference signal(s), multipath fading simulators and/or AWGN generators (depending on the required OTA test procedure) to a test antenna via a combining network in OTA test setup, as shown in annex D.3.

5) Apply the performance test procedure appropriate to the requirement as described in clause 8 of TS 38.141-2 [34]. One of the RX antenna signals should be transmitted on each polarization of the test antenna(s).

6) The characteristics of the wanted/interfering signal shall be configured according to the corresponding UL reference measurement channel defined in annex A in TS 38.141-2 [34], and according to additional test parameters listed in respective performance test procedures. In case of PUCCH requirements, the characteristics of the wanted signal shall be configured according to TS 38.211 [36].

7) The multipath fading emulators shall be configured according to the corresponding channel model defined in TS 38.141-2 [34], annex J.

8) Adjust the test signal mean power so the calibrated radiated SNR value at the BS receiver is as specified in requirement's specific clause 8 of TS 38.141-2 [34], and that the SNR at the BS receiver is not impacted by the noise floor.

The power level for the transmission may be set such that the AWGN level at the RIB is set according to the respective PUSCH, PUCCH, or PRACH test procedures of TS 38.141-2 [34].

Table 8.2.1.4.2-2: Void

9) If RX diversity is not supported, ensure the *polarisation match* is achieved among test antenna(s) and the OTA AAS BS under test, in order to maximize the power at the BS receiver.

10) For reference channels applicable to the BS, measure the appropriate performance metric for the requirement as described in clause 8 of TS 38.141-2 [34].

***<End of change7>***

***<Start of change8>***

Annex C (informative):  
Test tolerances and derivation of test requirements

# C.1 General

The test requirements explicitly defined in this specification have been calculated by relaxing the minimum requirements of the core specification using the Test Tolerances defined here. When the Test Tolerance is non-zero, the test requirements will differ from the minimum requirements, and the formula used for this relaxation is given in the following tables.

The Test Tolerances are derived from Test System uncertainties.

The Test Tolerances should not be modified for any reason e.g. to take account of commonly known test system errors (such as mismatch, cable loss, etc.).

Note that a formula for applying Test Tolerances is provided for all tests.

NOTE: OTA test requirements for AAS BS are specified for Normal conditions, only.

# C.2 Measurement of transmitter (OTA)

Table C.2-1: Derivation of Test Requirements (OTA transmitter tests)

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Minimum Requirement in TS 37.105 [6] | Test Tolerance (TT) | Test Requirement in the present document |
| 6.2 Radiated transmit power | See TS 37.105 [6], clause 9.2 | 1.1 dB, f ≤ 3.0 GHz  1.3 dB, 3.0 GHz < f ≤ 4.2 GHz | Formula:  Upper limit + TT, Lower limit – TT |
| 6.2 Radiated transmit power (extreme conditions) | See TS 37.105 [6], clause 9.2 | 2.5 dB, f ≤ 3.0 GHz  2.6 dB, 3.0 GHz < f ≤ 4.2 GHz | Formula:  Upper limit + TT, Lower limit – TT |
| 6.3.2 OTA Maximum output power | See TS 37.105 [6], clause 9.3.2 | 1.4 dB, f ≤ 3.0 GHz  1.5 dB, 3.0 GHz < f ≤ 4.2 | Formula:  Upper limit + TT, Lower limit – TT |
| 6.3.3 OTA E-UTRA DL RS power | See TS 37.105 [6], clause 9.3.3 | 1.3 dB, f ≤ 3.0 GHz  1.5 dB, 3.0 GHz < f ≤ 4.2 GHz | Formula:  Upper limit + TT, Lower limit – TT |
| 6.4.2 OTA UTRA Inner loop power control in the downlink | See TS 37.105 [6], clause 9.4.2 | 0.1 dB | Formula:  Upper limit + TT, Lower limit – TT |
| 6.4.3 OTA Power control dynamic range | See TS 37.105 [6], clause 9.4.3 | 1.1 dB | Formula:  Upper limit - TT, Lower limit + TT |
| 6.4.4 OTA Total power dynamic range | See TS 37.105 [6], clause 9.4.4 | 0.3 dB UTRA  0.4 dB E-UTRA & NR | Formula:  limit - TT |
| 6.4.5 OTA IPDL time mask | See TS 37.105 [6], clause 9.4.5 | 0.7 dB | Formula:  limit - TT |
| 6.5 OTA Transmit ON/OFF power | See TS 37.105 [6], clause 9.5 | 3.4 dB, f ≤ 3.0 GHz  3.6 dB, 3.0 GHz < f ≤ 4.2 GHz | Formula:  limit - TT |
| 6.6.2 OTA Frequency Error | See TS 37.105 [6]  clause 9.6.2 | 12 Hz | Limit + TT |
| 6.6.3 OTA Time alignment error | See TS 37.105 [6], clause 9.6.3 | 25 ns | Limit + TT |
| 6.6.4 OTA Modulation quality | See TS 37.105 [6], clause 9.6.3 | 1 % | Limit + TT |
| 6.7.2 OTA occupied bandwidth | See TS 37.105 [6], clause 9.7.2 | 0 Hz | Limit |
| 6.7.3 OTA Adjacent Channel Leakage power Ratio | See TS 37.105 [6], clause 9.7.3 | ACLR / CACLR  1.0 dB, f ≤ 3.0 GHz  1.2 dB, 3.0 GHz < f ≤ 4.2  Absolute limit  0 dB | Limit + TT |
| 6.7.4 OTA Spectrum emission mask | See TS 37.105 [6], clause 9.6.3 | 1.8 dB, f ≤ 3.0 GHz  2.0 dB, 3.0 GHz < f ≤ 4.2 GHz  FFS | Limit + TT |
| 6.7.5 OTA Operating band unwanted emission | See TS 37.105 [6], clause 9.6.3 | close to carrier (<10 MHz)  1.8 dB, f ≤ 3.0 GHz  2.0 dB, 3.0 GHz < f ≤ 4.2 GHz  far from carrier ( ≥10 MHz)  0dB  Additional limits for bands n50, n51, n74, n75, n76: 0 dB | Limit + TT |
| 6.7.6.2 OTA Transmitter spurious emissions, Mandatory Requirements | See TS 37.105 [6], clause 9.7.6.2.1, 9.7.6.3.1 and 9.7.6.4.1 | 0dB | FFS |
| 6.7.6.3 Transmitter spurious emissions, Protection of BS receiver | See TS 37.105 [6], clause 9.7.6.2.2, 9.7.6.3.2 and 9.7.6.4.2 | 3.1 dB, f ≤ 3.0 GHz  3.3 dB, 3.0 GHz < f ≤ 4.2 GHz | Limit + TT |
| 6.7.6.4 Transmitter spurious emissions, Additional spurious emission requirements | See TS 37.105 [6], clause 9.7.6.2.3, 9.7.6.3.3 and 9.7.6.4.3 | 2.6 dB, f ≤ 3.0 GHz  3.0 dB, 3.0 GHz < f ≤ 4.2 GHz  3.5 dB, 4.2 GHz < f ≤ 6.0 GHz  For co-existence with PHS and public safety bands.  0 dB  Additional limits for bands n50, n51, n74, n75, n76: 0 dB | Limit + TT |
| 6.7.6.5 Transmitter spurious emissions, Co-location | See TS 37.105 [6], clause 9.7.6.2.4, 9.7.6.3.4 and 9.7.6.4.4 | 3.1 dB, f ≤ 3.0 GHz  3.3 dB, 3.0 GHz < f ≤ 4.2 GHz  3.4 dB, 4.2 GHz < f ≤ 6.0 GHz | Limit + TT |
| 6.8 OTA Transmitter intermodulation | See TS 37.105 [6] | 0dB |  |

***<End of change8>***