**3GPP TSG-RAN WG4 Meeting #100-eR4-2115654**

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.105** | **CR** |  | **rev** | **-** | **Current version:** | **15.13.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | OTA transmitter intermodulation 37.105 R15 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AASenh\_BS\_LTE\_UTRA-Core | | | | |  | ***Date:*** | | | 2021-08-23 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-15 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 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 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The max interfereing power is defined as 46 dBm which is the same as co-location blocking for Macro BS | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | OTA tranmitter intermodulation can not be tested in the test chamber. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 9.8 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 37.145-2 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## **<Start of Changes>**

## 9.8 OTA Transmitter intermodulation

### 9.8.1 General

The OTA transmitter intermodulation requirement is a measure of the capability of the transmitter unit to inhibit the generation of signals in its non-linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter unit via the RDN and antenna array from a co-located base station. The requirement applies during the *transmitter ON period* and the *transmitter transient period*.

The requirement applies at each RIB supporting transmission in the operating band.

The transmitter intermodulation level is the *total radiated power* of the intermodulation products when an interfering signal is injected into the *co-location reference antenna*.

### 9.8.2 Minimum requirement for MSR operation

#### 9.8.2.1 General minimum requirement

The transmitter intermodulation level shall not exceed the unwanted emission limits specified for OTA transmitter spurious emission in subclause 9.7.6.1, 9.7.6.2.1 and 9.7.6.2.3, OTA operating band unwanted emission in subclause 9.7.5 and OTA ACLR in subclause 9.7.3 in the presence of a wanted signal and an interfering signal according to table 9.8.2.1‑1 for *OTA AAS BS* operation in BC1, BC2 and BC3.

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

For RIB*s* 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 9.8.2.1-1: Interfering signal 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 *co-location reference antenna* | 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*, 3GPP TS 37.141 [19] 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 *co-location reference antenna*. | |

#### 9.8.2.2 Additional minimum requirement (BC1 and BC2)

The transmitter intermodulation level shall not exceed the unwanted emission limits specified for transmitter spurious emission in subclause 9.7.6.1, 9.7.6.2.1 and 9.7.6.2.3 operating band unwanted emission in subclause 9.7.5 and ACLR in subclause 9.7.3 in the presence of a wanted signal and an interfering signal according to table 9.8.2.2-1 for BS operation in BC2.

The requirement is applicable outside the *Base Station RF Bandwidth* edges 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 RIBssupporting 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 9.8.2.2-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal type | E-UTRA or NR or UTRA signal |
| Interfering signal type | CW |
| Interfering signal level applied to the *co-location reference antenna* | 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 *co-location reference antenna*. | |

#### 9.8.2.3 Additional minimum requirement (BC3)

The transmitter intermodulation level shall not exceed the unwanted emission limits specified for OTA transmitter spurious emission in subclause 9.7.6.1, 9.7.6.2.1 and 9.7.6.2.3 OTA operating band unwanted emission in subclause 9.7.5 and OTA ACLR in subclause 9.7.3 in the presence of a wanted signal and an interfering signal according to table 9.8.2.3-1 for AAS BS operation 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 9.8.2.3-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement (BC3)

| Parameter | Value |
| --- | --- |
| Wanted signal type | E-UTRA or NR or UTRA signal |
| Interfering signal type | 1,28 Mcps UTRA TDD signal of *channel bandwidth* 1,6 MHz |
| Interfering signal level applied to the *co-location reference antenna* | 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 *co-location reference antenna*. | |

#### 9.8.2.4 Additional minimum requirements

### 9.8.3 Minimum requirement for single RAT UTRA operation

#### 9.8.3.1 General minimum requirement for FDD UTRA

The transmitter intermodulation level shall not exceed the OTA out of band emission or the OTA spurious emission requirements of subclause 9.7.5 and subclause 9.7.6.1, 9.7.6.3.1 and 9.7.6.3.3, in the presence of interfering signal according to table 9.8.3.1-1.

Table 9.8.3.1-1: 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 *co-location reference antenna* | 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 subclause 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 1 495.9MHz, in certain regions.  NOTE 3: The Prated,t,TRP is split between polarizations at the *co-location reference antenna*. | |

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 *Base Station RF Bandwidth* gap for interfering signal offsets where the interfering signal falls completely within the inter *Base Station RF Bandwidth* gap.

### 9.8.4 Minimum requirement for single RAT E-UTRA operation

#### 9.8.4.1 General minimum requirement

The transmitter intermodulation level shall not exceed the unwanted emission limits in subclauses 9.7.6.1, 9.7.6.4.1, 9.7.6.4.3, 9.7.5 and 9.7.3 in the presence of an E-UTRA interfering signal according to table 9.8.4.1‑1.

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 *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.

The wanted signal and interfering signal centre frequency is specified in table 9.8.4.1‑1.

Table 9.8.4.1-1: 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 *co-location reference antenna* | 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*, 3GPP TS 36.141 [20] 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, 74.  NOTE 3: The Prated,t,TRP is split between polarizations at the *co-location reference antenna*. | |

#### 9.8.4.2 Void

Table 9.8.4.2-1: Void

## **<End of Changes>**