**3GPP TSG-RAN WG4 Meeting # 107 R4-2309834**

**Incheon, KR, May 22 – May 26, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.174** | **CR** | **0043** | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:*** | CR for TS 38.174, Correction on OTA IAB output power etc. | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_IAB-Core | | | | |  | ***Date:*** | | | 2023-05-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. The “*IAB-DU type 1-O*” in in sub-clauses 9.5.2.3 and 9.5.2.5 is not correct. 2. Some [] need to be removed. 3. Clause 9.7.5.2.5 did not exist. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Change “*IAB-DU type 1-O*” to “*IAB-DU type 2-O*” in sub-clauses 9.5.2.3 and 9.5.2.5. 2. Remove “and clause 9.7.5.2.5” in sub-clause 9.8.2. 3. Change title of sub-clause 10.3.3.1 from “Minimum requirement for *IAB-MT type 1-O*” to “General”. 4. Remove [] in sub-clause 9.8.2 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Specifications would be incorrect | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 9.5.2.3, 9.5.2.5, 9.8.2, 10.3.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Revised from R4-2307376. | | | | | | | | |

## **<Start of Change 1>**

## 9.5 OTA transmit ON/OFF power

### 9.5.1 General

OTA transmit ON/OFF power requirements apply to TDD operation of IAB-DU and TDD operation of IAB-MT.

### 9.5.2 OTA transmitter OFF power

#### 9.5.2.1 General

OTA transmitter OFF power is defined as the mean power measured over 70/N µs filtered with a square filter of bandwidth equal to the *transmission bandwidth configuration* of the IAB (BWConfig) centred on the assigned channel frequency during the *transmitter OFF period*. N = SCS/15, where SCS is Sub Carrier Spacing in kHz.

For IAB supporting intra-band contiguous CA, the OTA transmitter OFF power is defined as the mean power measured over 70/N us filtered with a square filter of bandwidth equal to the *Aggregated IAB-DU* or *IAB-MT Channel Bandwidth* BWChannel\_CA centred on (Fedge,high+Fedge,low)/2 during the *transmitter OFF period*. N = SCS/15, where SCS is the smallest supported Sub Carrier Spacing in kHz in the *Aggregated IAB-DU Channel Bandwidth* or *Aggregated IAB-MT Channel Bandwidth*.

For *IAB type 1-O*, the transmitter OFF power is defined as the output power at the *co-location reference antenna* conducted output(s). For *IAB type 2-O* the transmitter OFF power is defined as TRP.

For *multi-band* *RIBs* and *single band RIBs* supporting transmission in multiple bands, the requirement is only applicable during the *transmitter OFF period* in all supported *operating bands*.

#### 9.5.2.2 Minimum requirement for IAB-DU type 1-O

The BS requirements specified in 9.5.2.2 in TS 38.104 [2] apply to *IAB-DU type 1-O*.

#### 9.5.2.3 Minimum requirement for IAB-DU type 2-O

The BS requirements specified in 9.5.2.3 in TS 38.104 [2] apply to *IAB-DU type 2-O*.

#### 9.5.2.4 Minimum requirement for IAB-MT type 1-O

The BS requirements specified in 9.5.2.2 in TS 38.104 [2] apply to *IAB-MT type 1-O*.

#### 9.5.2.5 Minimum requirement for IAB-MT type 2-O

The BS requirements specified in 9.5.2.3 in TS 38.104 [2] apply to *IAB-DU type 2-O*.

## **<End of Change 1>**

## **<Start of Change 2>**

## 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 or IAB. The requirement applies during the *transmitter ON period* and the *transmitter transient period.*

The requirement shall apply 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*.

The OTA transmitter intermodulation requirement is not applicable for *IAB type 2-O*.

### 9.8.2 Minimum requirement for *IAB-DU type 1-O* and *IAB-MT type 1-O*

For *IAB type 1-O* the transmitter intermodulation level shall not exceed the TRP unwanted emission limits specified for OTA transmitter spurious emission in clause 9.7.5.2 (except clause 9.7.5.2.3), OTA operating band unwanted emissions in clauses 9.7.4.2 and 9.7.4.3, and OTA ACLR in clause 9.7.3.2 in the presence of a wanted signal and an interfering signal, defined in table 9.8.2-1.

The requirement is applicable outside the *IAB RF Bandwidth edges*. The interfering signal offset is defined relative to the *IAB 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 RIBs supporting operation in multiple *operating bands*, the requirement shall apply relative to the *IAB RF Bandwidth* *edges* of each *operating band*. In case the *inter RF Bandwidth gap* is less than 3\*BWChannel (where BWChannel is the minimal *IAB-DU Channel Bandwidth* or IAB-MT Channel Bandwidth of the band), the requirement in the gap shall apply only for interfering signal offsets where the interfering signal falls completely within the *inter RF Bandwidth gap*.

Table 9.8. 2-1: Interfering and wanted signals for the OTA transmitter intermodulation requirement

| Parameter | Value |
| --- | --- |
| Wanted signal | NR signal or multi-carrier, or multiple intra-band contiguously or non-contiguously aggregated carriers |
| Interfering signal type | NR signal the minimum *IAB-DU Channel Bandwidth* (BWChannel) with or *IAB-MT Channel Bandwidth* (BWChannel) 15 kHz SCS of the band defined in clause 5.3.5 |
| Interfering signal level | The interfering signal level is the same power level as the IAB (Prated,t,TRP) fed into a *co-location reference antenna*. |
| Interfering signal centre frequency offset from the lower (upper) edge of the wanted signal or edge of *sub-block* inside a gap | , for n=1, 2 and 3 |
| NOTE 1: Interfering signal positions that are partially or completely outside of any downlink *operating band* of the RIB are excluded from the requirement, unless the interfering signal positions fall within the frequency range of adjacent downlink *operating bands* in the same geographical area.  NOTE 2: In Japan, NOTE 1 is not applied in Band n77, n78, n79.  NOTE 3: The Prated,t,TRP is split between polarizations at the *co-location reference antenna*. | |

## **<End of Change 2>**

## **<Start of Change 3>**

### 10.3.3 IAB-MT OTA reference sensitivity level

#### 10.3.3.1 General

The OTA REFSENS requirement is a *directional requirement* and is intended to ensure the minimum OTA reference sensitivity level for a declared *OTA REFSENS RoAoA*. The OTA reference sensitivity power level EISREFSENS is the minimum mean power received at the RIB at which a reference performance requirement shall be met for a specified reference measurement channel.

#### 10.3.3.2 Minimum requirement for *IAB-MT type 1-O*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in the corresponding table and annex A.1 when the OTA test signal is at the corresponding EISREFSENS level and arrives from any direction within the *OTA REFSENS RoAoA.*

Table 10.3.3.2-1: Wide Area IAB-MT type 1-O reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *IAB-MT channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS  (dBm) |
| 10, 15 | 30 | G-FR1-A1-22 | -102.0 - ΔOTAREFSENS |
| 10, 15 | 60 | G-FR1-A1-23 | -99.0 - ΔOTAREFSENS |
| 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-25 | -95.4 - ΔOTAREFSENS |
| 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-26 | -95.6 - ΔOTAREFSENS |
| NOTE: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *IAB-MT channel bandwidth*. | | | |

Table 10.3.3.2-2: Local Area IAB-MT type 1-O reference sensitivity levels

|  |  |  |  |
| --- | --- | --- | --- |
| *IAB-MT channel bandwidth* (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS  (dBm) |
| 10, 15 | 30 | G-FR1-A1-22 | -94.0 - ΔOTAREFSENS |
| 10, 15 | 60 | G-FR1-A1-23 | -91.0 - ΔOTAREFSENS |
| 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | 30 | G-FR1-A1-25 | -87.4 - ΔOTAREFSENS |
| 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 | 60 | G-FR1-A1-26 | -87.6 - ΔOTAREFSENS |
| NOTE: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *IAB-MT channel bandwidth*. | | | |

#### 10.3.3.3 Minimum requirement for *IAB-MT type 2-O*

The throughput shall be ≥ 95% of the maximum throughput of the reference measurement channel as specified in the corresponding table and annex A.1 when the OTA test signal is at the corresponding EISREFSENS level and arrives from any direction within the *OTA REFSENS RoAoA*.

EISREFSENS levels are derived from a single declared basis level EISREFSENS\_50M, which is based on a reference measurement channel with 50 MHz *IAB-MT channel bandwidth*. EISREFSENS\_50M itself is not a requirement and although it is based on a reference measurement channel with 50 MHz *IAB-MT channel bandwidth* it does not imply that IAB-MT has to support 50 MHz *IAB-MT channel bandwidth*.

For Wide Area IAB-MT, EISREFSENS\_50M is an integer value in the range -96 to -119 dBm. The specific value is declared by the vendor.

For Local Area IAB-MT, EISREFSENS\_50M is an integer value in the range -86 to -114 dBm. The specific value is declared by the vendor.

Table 10.3.3.2-1: FR2 OTA reference sensitivity requirement

|  |  |  |  |
| --- | --- | --- | --- |
| *IAB-MT channel Bandwidth*  (MHz) | Sub-carrier spacing (kHz) | Reference measurement channel | OTA reference sensitivity level, EISREFSENS (dBm) |
| 50, 100, 200 | 60 | G-FR2-A1-21 | EISREFSENS\_50M + ΔFR2\_REFSENS |
| 50 | 120 | G-FR2-A1-22 | EISREFSENS\_50M + ΔFR2\_REFSENS |
| 100, 200, 400 | 120 | G-FR2-A1-23 | EISREFSENS\_50M + 3+ ΔFR2\_REFSENS |
| NOTE 1: EISREFSENS is the power level of a single instance of the reference measurement channel. This requirement shall be met for each consecutive application of a single instance of the reference measurement channel mapped to disjoint frequency ranges with a width corresponding to the number of resource blocks of the reference measurement channel each, except for one instance that might overlap one other instance to cover the full *IAB-MT channel bandwidth*.  NOTE 2: The declared EISREFSENS\_50M shall be within the range specified above. | | | |

## **<End of Change 3>**