**3GPP TSG-RAN WG4 Meeting #104e *R4-2212478***

**Electronic meeting, 15th – 26th Aug, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.176-2** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.1.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <http://www.3gpp.org/Change-Requests>.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | × | Core Network |  |

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| ***Title:***  | Draft CR to TS38.176-2 on IAB output power  |
|  |  |
| ***Source to WG:*** |  ZTE |
| ***Source to TSG:*** |  R4 |
|  |  |
| ***Work item code:*** |  NR\_IAB\_enh-Perf |  | ***Date:*** | 2022-08-15 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 canbe 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:*** | To update the test method for simultaneous Tx between IAB-MT and IAB-DU |
|  |  |
| ***Summary of change:*** | Test method is updated for simultaneous TX between IAB-MT and IAB-DU in requirement of output power.  |
|  |  |
| ***Consequences if not approved:*** | No corresponding test method for IAB node supporting simultaneous TX operation.  |
|  |  |
| ***Clauses affected:*** | 6.3 |
|  |  |
|  | **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:*** |  |

***<Start of change 1>***

## 6.3 IAB output power

### 6.3.1 Definition and applicability

OTA IAB output power is declared as the TRP radiated requirement, with the output power accuracy requirement defined at the RIB during the *transmitter ON period*. TRP does not change with beamforming settings as long as the *beam peak direction* is within the *OTA peak directions set*. Thus the TRP accuracy requirement must be met for any beamforming setting for which the *beam peak direction* is within the *OTA peak directions set*. Declarations are made separately for IAB-DU and IAB-MT.

The IAB *rated carrier TRP output power* for *IAB type 1-O* shall be within limits as specified in table 6.3.1-1 for *IAB-DU type 1-O* and in table 6.3.1-2 for *IAB-MT type 1-O*.

Table 6.3.1-1: IAB-DU *rated carrier TRP output power* limits for *IAB-DU type 1-O*

|  |  |
| --- | --- |
| **IAB-DU class** | **Prated,c,TRP** |
| Wide Area IAB-DU  | (Note) |
| Medium Range IAB-DU | ≤ + 47 dBm |
| Local Area IAB-DU | ≤ + 33 dBm |
| NOTE: There is no upper limit for the Prated,c,TRP of the Wide Area IAB-DU |

Table 6.3.1-2: IAB-MT *rated carrier TRP output power* limits for *IAB-MT type 1-O*

|  |  |
| --- | --- |
| **IAB-MT class** | **Prated,c,TRP** |
| Wide Area IAB-MT  | (Note) |
| Local Area IAB-MT | ≤ 24 dBm + 10log(NTXU,counted) |
| NOTE: There is no upper limit for the Prated,c,TRP of the Wide Area IAB-MT. |

There is no upper limit for the *rated carrier TRP output power* of *IAB type 2-O*.

Despite the general requirements for the IAB output power described in clauses 6.3.2 – 6.3.3, additional regional requirements might be applicable.

NOTE: In certain regions, power limits corresponding to IAB classes may apply for *IAB type 2-O*.

### 6.3.2 Minimum requirement

The minimum requirement for *IAB-DU type 1-O* and *IAB-MT type 1-O* is in TS 38.174 [2], clause 6.3.2.

The minimum requirement for *IAB type 2-O* is in TS 38.174 [2], clause 6.3.3.

### 6.3.3 Test purpose

The test purpose is to verify the accuracy of the *maximum carrier TRP* (Pmax,c,TRP) across the frequency range for all *RIBs*.

### 6.3.4 Method of test

#### 6.3.4.1 Initial conditions

Test environment: Normal, see annex B.2.

RF channels to be tested for single carrier: B, M, T; see clause 4.9.1.

*IAB RF Bandwidth* positions to be tested for multi-carrier and/or CA:

- 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.

Beams to be tested:

As the requirement is TRP the beam pattern(s) may be set up to optimise the TRP measurement procedure (see annex I) as long as the required TRP level is achieved.

#### 6.3.4.2 Procedure

The following procedure for measuring TRP is based on the directional power measurements as described in annex I. An alternative method to measure TRP is to use a characterized and calibrated reverberation chamber if so follow steps 1, 3, 5, and 7.

1) Place the IAB at the positioner.

2) Align the manufacturer declared coordinate system orientation (D.2) of the IAB with the test system.

3) Configure the IAB such that the beam peak direction(s) applied during the power measurement step 6 are consistent with the grid and measurement approach for the TRP test.

4) Set the IAB to transmit according to the applicable test configuration in clause 4.8 using the corresponding test model(s) in clause 4.9.2.

 For a IAB declared to be capable of multi-carrier and/or CA operation use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 on all carriers configured.

For an IAB node declared to be capable of Simultaneous transmission between IAB-DU and IAB-MT (D.XX), use the applicable test signal configuration and corresponding power setting specified in clauses 4.7.2 and 4.8 using the corresponding test model(s) in clause 4.9.2 for IAB-MT and IAB-DU.

5) Orient the positioner (and IAB) in order that the direction to be tested aligns with the test antenna such that measurements to determine TRP can be performed (see annex I).

6) Measure the radiated power for any two orthogonal polarizations (denoted p1 and p2) and calculate total radiated transmit power for particular beam direction pair as EIRP = EIRPp1 + EIRPp2.

If the test chamber is a reverberation chamber measure TRP directly.

7) Repeat step 6-7 for all directions in the appropriated TRP measurement grid needed for full TRP estimation (see annex I).

8) Calculate TRP using the EIRP measurements.

For *multi-band RIBs* and single band tests, repeat the steps above per involved band where single band test configurations and test models shall apply with no carriers activated in the other band.

### 6.3.5 Test requirement

#### 6.3.5.1 *IAB type 1-O*

The final TRP measurement result in clause 6.3.4.2 shall remain:

- within +3.4 dB and -3.4 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP carrier frequency f ≤ 3.0 GHz;

- within +3.5 dB and –3.5 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 3.0 GHz < f ≤ 4.2 GHz.

- within +3.5 dB and –3.5 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 4.2 GHz < f ≤ 6.0 GHz.

#### 6.3.5.2 *IAB type 2-O*

The final TRP measurement result in clause 6.3.4.2 shall remain:

- within +5.1 dB and -5.1 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP carrier frequency 24.25 GHz < f ≤ 29.5 GHz.

- within +5.4 dB and –5.4 dB of the manufacturer's declared *rated carrier TRP* Prated,c,TRP for carrier frequency 37 GHz < f ≤ 43.5 GHz.

***<End of change 1>***