**3GPP TSG-RAN WG4 Meeting #** **100-eR4-2115666**

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

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.175** | **CR** | **0017** | **rev** | **1** | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_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 | **X** | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR to TS 38.175: IAB test configurations | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_IAB-Perf | | | | |  | ***Date:*** | | | 2021-08-06 |
|  |  | | | |  | |  | | |  |
| ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The IAB conformance specifications TS 38.176-1 and TS 38.176-2 are not referenced.  The test configurations for IAB need to be added.  Some editorial errors in clause 8 and clause 9. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add TS 38.176-1 and TS 38.176-2 into the references.  Add test configurations for IAB EMC test conditions.  Correct the editorial errors in clause 8 and clause 9. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | TS 38.176-1 and TS 38.176-2 are missing for references.  Test configurations for IAB EMC test conditions are missing.  Some editorial errors exist in clause 8 and clause 9. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.5, 8.2.1.2, 9.2.3, 9.3.3, 9.4.3, 9.5.2, 9.5.3, 9.6.2, 9.7.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 text changes -------------**

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications"

[2] 3GPP TS 38.174: "NR; Integrated access and backhaul radio transmission and reception".

[3] 3GPP TR 38.809: "NR; Background for Integrated access and backhaul radio transmission and reception".

[4] IEC 61000-6-1: "Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments".

[5] IEC 61000-6-3: "Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments".

[6] CISPR 32: "Electromagnetic compatibility of multimedia equipment - Emission requirements".

[7] IEC 60050-161: "International Electrotechnical Vocabulary (IEV) - Part 161: Electromagnetic compatibility".

[8] IEC 61000-3-2: "Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)".

[9] IEC 61000-3-12: "Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage system with input current >16 A and ≤ 75 A per phase".

[10] IEC 61000-3-3: "Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection".

[11] IEC 61000-3-11: "Electromagnetic compatibility (EMC) - Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connections".

[12] IEC 61000-4-2: "Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test".

[13] IEC 61000-4-3: "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".

[14] IEC 61000-4-4: "Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test".

[15] IEC 61000-4-5: "Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test".

[16] IEC 61000-4-6: "Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio frequency fields".

[17] IEC 61000-4-11: "Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests".

[18] IEC 61000-4-21: "Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods".

[19] ETSI EN 301 489-1: "ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU".

[20] Recommendation ITU-R SM.329: "Unwanted emissions in the spurious domain".

[21] Recommendation ITU-R SM.1539: "Variation of the boundary between the out-of-band and spurious domains required for the application of Recommendations ITU-R SM.1541 and ITU-R SM.329".

[22] 3GPP TS 38.104: “NR; Base Station (BS) radio transmission and reception”

[23] CISPR 16-1-4: 2019-01: "Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements"

[24] 3GPP TS 38.176-1: "NR; Integrated access and backhaul (IAB) conformance testing; Part 1: Conducted conformance testing".

[25] 3GPP TS 38.176-2: "NR; Integrated Access and Backhaul (IAB) conformance testing; Part 2: Radiated conformance testing;".

**--------------Next changes -------------**

## 4.5 IAB test configurations

The present clause defines the IAB test configurations that shall be used for demonstrating conformance. A single IAB carrier shall be used for testing of single-carrier capable IAB.

Single carrier configuration (SC) tests shall be performed using signal with narrowest supported *IAB channel bandwidth* with the smallest supported subcarrier spacing declared per *operating band* in TS 38.176-1 [24] clause 4.6, and TS 38.176-2 [25] clause 4.6.

For other IAB node, the test configurations in table 4.5-1 and table 4.5-2 shall be used. The IAB test configurations (IABTCx) are defined in TS 38.176-1 [24], clause 4.7 for *IAB type 1-H* and in TS 38.176-2 [25], clause 4.7 for *IAB type 1-O* and *IAB type 2-O*.

Table 4.5-1: Test configurations for *IAB type 1-H*

| IAB test case | IAB capable of multi-carrier and/or CA in a single band | | | IAB capable of multi-band operation | |
| --- | --- | --- | --- | --- | --- |
|  | Contiguous spectrum capable IAB | C and NC capable IAB with identical parameters | C and NC capable IAB with different parameters | Common connector | Separate connectors |
| Emission tests | IABTC1 | IABTC3 | IABTC1, IABTC3 | IABTC1/3 (Note 1), IABTC5 | IABTC1/3 (Note 1, 2), IABTC5 (Note 2) |
| Immunity tests | IABTC1 | IABTC3 | IABTC1, IABTC3 | IABTC5 | IABTC1/3 (Note 1), IABTC5 (Note 3) |
| Note 1: IABTC1 and/or IABTC3 shall be applied in each supported *operating band*.  Note 2: For single-band operation test, other TAB connector(s) is (are) terminated.  Note 3: IABTC5 is only applicable for multi-band receiver. | | | | | |

Table 4.5-2: Test configurations for *IAB type 1-O*

| **IAB test case** | single-band RIB | | | multi-band RIB |
| --- | --- | --- | --- | --- |
|  | **Contiguous spectrum capable IAB** | **C and NC capable IAB with identical parameters** | **C and NC capable IAB with different parameters** |  |
| Emission tests | IABTC1 | IABTC3 | IABTC1, IABTC3 | IABTC1/3 (Note 1), IABTC5 |
| Immunity tests | IABTC1 | IABTC3 | IABTC1, IABTC3 | IABTC5 |
| NOTE 1: IABTC1 and/or IABTC3 shall be applied in each supported *operating band*. | | | | |

Table 4.5-3: Test configurations for *IAB type 2-O*

| **IAB test case** | single-band RIB | | |
| --- | --- | --- | --- |
|  | **Contiguous spectrum capable IAB** | **C and NC capable IAB with identical parameters** | **C and NC capable IAB with different parameters** |
| Emission tests | IABTC1 | IABTC3 | IABTC1, IABTC3 |
| Immunity tests | IABTC1 | IABTC3 | IABTC1, IABTC3 |

**--------------Next changes -------------**

#### 8.2.1.2 Test method

a) A test site fulfilling the requirements of ITU-R SM.329 [20] shall be used. The IAB node shall be placed on a non-conducting support and shall be operated from a power source via a RF filter to avoid radiation from the power leads. One of the following two alternative measurement methods shall be used:

1) Field strength method measurement

The test method shall be in accordance with CISPR 32 [6]. The field strength measurements shall be performed on a test site that is validated according to the methods and requirements of CISPR 16-1-4 [23].

Unless otherwise stated, measurements are conducted at 3 m or 10 m on an open area test site (OATS) or semi anechoic chamber (SAC) for frequencies up to 1 GHz, or at 3 m on a free space open area test site (FSOATS) or fully-anechoic room (FAR) for frequencies above 1 GHz. Unless otherwise stated, all measurements are done with RMS detector and with the -3 dB bandwidth of the measuring filter equal to the reference bandwidth in table 8.2.1.3-1.

NOTE 1: Test site validation methods for radiated emissions tests are defined in CISPR 16-1-4 [23], clause 6 and 7. Examples of test site validation methods are listed below:

- 30 - 1000 MHz frequency range: Normalized Site Attenuation (NSA), Reference Site Method (RSM).

- 1 - 18 GHz frequency range: SVSWR standard test procedure, SVSWR reciprocal test procedure.

2) Substitution method measurement (also called a substitution method)

Mean power of any spurious components shall be detected by the test antenna and measuring receiver (e.g. a spectrum analyser). At each frequency at which a component is detected, the IAB node shall be rotated and the height of the test antenna adjusted to obtain maximum response, and the effective radiated power (e.r.p.) of that component determined by a substitution measurement. The measurement shall be repeated with the test antenna in the orthogonal polarization plane.

NOTE: Effective radiated power (e.r.p.) refers to the radiation of a half wave tuned dipole instead of an isotropic antenna. There is a constant difference of 2.15 dB between e.i.r.p. and e.r.p, as defined in ITU-R SM.329 annex 1 [20].

e.r.p. (dBm) = e.i.r.p. (dBm) - 2.15

b) The IAB node shall transmit with maximum power declared by the manufacturer with all transmitters active. Set the base station to transmit a signal as stated in subclause 4.5.

c) The received power shall be measured over the frequency range from 30 MHz to FDL,low - ΔfOBUE and from FDL,high + ΔfOBUE up to 12750 MHz. The video bandwidth shall be approximately three times the resolution bandwidth. If this video bandwidth is not available on the measuring receiver, it shall be the maximum available and at least 1 MHz. For some *operating bands*, the upper 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 [20].Unless otherwise stated, all measurements are done as mean power (RMS).

**--------------Next changes -------------**

### 9.2.3 Performance criteria

**IAB node:**

The performance criteria of clause 6.1 shall apply.

**Ancillary equipment:**

The performance criteria of clause 6.3 shall apply.

**--------------Next changes -------------**

### 9.3.3 Performance criteria

**IAB node:**

The performance criteria of clause 6.2 shall apply.

**Ancillary equipment:**

The performance criteria of clause 6.4 shall apply.

**--------------Next changes -------------**

### 9.4.3 Performance criteria

**IAB node:**

The performance criteria of clause 6.2 shall apply.

**Ancillary equipment:**

The performance criteria of clause 6.4 shall apply.

**--------------Next changes -------------**

9.5.2 Test method and level

The test method shall be in accordance with IEC 61000‑4‑6 [16]:

- The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 kHz;

- The stepped frequency increments shall be 50 kHz in the frequency range 150 kHz to 5 MHz and 1% frequency increment of the momentary frequency in the frequency range 5 MHz to 80 MHz;

- The test level shall be severity level 2 as given in IEC 61000‑4‑6 [16] corresponding to 3 V rms, at a transfer impedance of 150 Ω;

- The test shall be performed over the frequency range 150 kHz - 80 MHz;

- The injection method to be used shall be selected according to the basic standard IEC 61000-4-6 [16];

- Responses of stand-alone receivers or receivers which are part of transceivers occurring at discrete frequencies which are narrow band responses, shall be disregarded, see clause 4.3;

- The frequencies of the immunity test signal selected and used during the test shall be recorded in the test report.

### 9.5.3 Performance criteria

**IAB node:**

The performance criteria of clause 6.1 shall apply.

**Ancillary equipment:**

The performance criteria of clause 6.3 shall apply.

**--------------Next changes -------------**

### 9.6.2 Test method and level

The test method shall be in accordance with IEC 61000‑4‑11 [17], where the test levels shall be:

- Voltage dip: 0 % residual voltage for 0.5 cycle;

- Voltage dip: 0 % residual voltage for 1 cycle;

- Voltage dip: 70 % residual voltage for 25/30 cycles (at 50/60 Hz);

- Voltage interruption: 0 % residual voltage for 250/300 cycles (at 50/60 Hz).

**--------------Next changes -------------**

### 9.7.3 Performance criteria

**IAB node:**

The performance criteria of clause 6.2 shall apply.

**Ancillary equipment:**

The performance criteria of clause 6.4 shall apply.

**-------------End of changes -------------**