**3GPP TSG-RAN WG4 Meeting #** **97-eR4-2017442**

**Electronic Meeting, 2-13 Nov., 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.175** | **CR** | **0002** | **rev** | **1** | **Current version:** | **16.0.0** |  |
|  |
| *For* ***[HELP](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 | **X** | Core Network |  |

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|  |
| ***Title:***  | CR to TS 38.175: Radiated emission, IAB |
|  |  |
| ***Source to WG:*** | ZTE, Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_IAB-Core |  | ***Date:*** | 2020-10-23 |
|  |  |  |  |  |
| ***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 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-12 (Release 12)Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | The radiated eimssion IAB requirements need to be added. |
|  |  |
| ***Summary of change:*** | Add radiated eimssion IAB requirements |
|  |  |
| ***Consequences if not approved:*** | Radiated emission IAB requirements are missing.  |
|  |  |
| ***Clauses affected:*** | 3.2, 8.2.1 |
|  |  |
|  | **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:*** |  |

**--------------Start of change-------------**

# 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"

**-------------Next change-------------**

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

BWChannel Channel bandwidth

ΔfOBUE  Maximum offset of the *operating band* unwanted emissions mask from the downlink *operating band* edge

FDL,low  The lowest frequency of the downlink *operating band*

FDL,high The highest frequency of the downlink *operating band*

**-------------Next change-------------**

### 8.2.1 Radiated emission, IAB

This test is applicable to *IAB type 1-H*. This test shall be performed on a representative configuration of IAB node.

For *IAB type 1-O* and *IAB type 2-O*, the radiated emission is covered by radiated spurious emission requirement in TS 38.174 [2], conforming to the test requirement in TS 38.174[2].

#### 8.2.1.1 Definition

This test assesses the ability of IAB node to limit unwanted emission from the *enclosure port*.

#### 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 [xx].

 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 [xx], 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).

#### 8.2.1.3 Limits

The frequency boundary and reference bandwidths for the detailed transitions of the limits between the requirements for out of band emissions and spurious emissions are based on ITU-R Recommendations SM.329 [20] and SM.1539 [21]. The *IAB type 1-H* shall meet the limits below:

Table 8.2.1.3-1: Limits for radiated emissions from IAB type 1-H

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Frequency Range | e.r.p.(dBm) | Field strength at 3 m (dBµV/m)(NOTE 4) | Field strength at 10 m(dBµV/m)(NOTE 4) | Reference bandwidth | NOTE |
| 30 MHz ≤ f < 1000 MHz | -36 | 65.4 (NOTE 5) | 54.9 (NOTE 5) | 100 kHz |  |
| 1 GHz ≤ f < 12.75 GHz | -30 | 67.4 | Not applicable | 1 MHz |  |
| 12.75 GHz ≤ f < 5th harmonic of the upper frequency edge of the DL operating band in GHz | -30 | 67.4 | Not applicable | 1 MHz | 1 |
| FDL,low - ΔfOBUE < f < FDL,high +ΔfOBUE | Not defined | Not defined | Not defined | Not defined | 2,3 |
| NOTE 1: For IAB-DU, this spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the DL *operating band* is reaching beyond 12.75 GHz.For IAB-MT, this spurious frequency range applies only for *operating bands* for which the 5th harmonic of the upper frequency edge of the UL *operating band* is reaching beyond 12.75 GHz.NOTE 2: For IAB node capable of multi-band operation, the frequency ranges relating to the RF bandwidths of all supported *operating bands* apply.NOTE 3: ΔfOBUE is defined in clause 6.6.1 of TS 38.174 [2].NOTE 4: The field strength measurements shall be conducted on OATS or SAC for frequencies up to 1 GHz, or on FSOATS or FAR for frequencies above 1 GHz.NOTE 5: Limits for radiated emissions are translated from the e.r.p. limit of -36 dBm into the field strength limit of 61.4 dBµV/m (at 3m) or 50.9 dBµV/m (at 10m), and increased by the site gain value of 4 dB. The value of the site gain is based on ITU-R Recommendations SM.329 [20]. |

#### 8.2.1.4 Interpretation of the measurement results

The interpretation of the results recorded in a test report for the radiated emission measurements described in the present document shall be as follows:

- the measured value related to the corresponding limit will be used to decide whether an equipment meets the requirements of the present document;

- the value of the measurement uncertainty for the measurement of each parameter shall be included in the test report;

- the recorded value of the measurement uncertainty shall be, for each measurement, equal to or lower than the values in table 8.2.1.4-1 for IAB node.

Table 8.2.1.4-1 specifies the maximum measurement uncertainty of the test system. The test system shall enable the equipment under test to be measured with an uncertainty not exceeding the specified values. All tolerances and uncertainties are absolute values, and are valid for a confidence level of 95 %, unless otherwise stated.

A confidence level of 95 % is the measurement uncertainty tolerance interval for a specific measurement that contains 95% of the performance of a population of test equipment.

Table 8.2.1.4-1: Maximum measurement uncertainty (IAB node)

|  |  |  |
| --- | --- | --- |
| Parameter | Uncertainty for EUT dimension ≤ 1 m | Uncertainty for EUT dimension >1 m |
| Effective radiated RF power between 30 MHz to 180 MHz | ±6 dB | ±6 dB |
| Effective radiated RF power between 180 MHz to 4 GHz | ±4 dB | ±6 dB |
| Effective radiated RF power between 4 GHz to 12,75 GHz | ±6 dB | ±9 dB (NOTE) |
| Field strength between 30 MHz to 12,75 GHz | ±6 dB | ±6 dB |
| NOTE: This value may be reduced to ±6 dB when further information on the potential radiation characteristic of the EUT is available. |

NOTE: If the test system for a test is known to have a measurement uncertainty greater than that specified in table 8.2.1.4-1, this equipment can still be used, provided that an adjustment is made follows:

 Any additional uncertainty in the test system over and above that specified in table 8.2.1.4-1 is used to tighten the test requirements - making the test harder to pass.

This procedure will ensure that a test system not compliant with table 8.2.1.4-1 does not increase the probability of passing an EUT that would otherwise have failed a test if a test system compliant with table 8.2.1.4-1 had been used.

**-------------End of second change-------------**