3GPP TSG-RAN WG4 Meeting # 95-e DRAFT R4-2008741

Electronic Meeting, 25 May – 5 June, 2020

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.105** | **CR** | **0183** | **rev** | **1** | **Current version:** | **15.8.0** |  |
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| *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 to TS 37.105: brackets removal, Rel-15 | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2020-05-15 |
|  |  | | | |  | |  | | |  |
| ***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-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:*** | | Referring to the RAN4#94-e-bis meeting arrangements and guidelines shared by RAN4 chairman, the following was provided:  *• ITU submission requires no TBD or [] in core specification in the June version*  Based on this, the AAS BS specification TS 37.105 was reviewed and it was found that it requires some corrections before the IMT submission.  This CR provides removal of outstanding [], with additional editorials corrections introduced. | | | | | | | | |
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| ***Summary of change:*** | | * 9.7.4.3.2: removal of []. * Other editorial corrections. * 10.7.1: sentence including FFS was modified. | | | | | | | | |
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| ***Consequences if not approved:*** | | The specification would include [] and FFS, which are not allowed for the ITU submission. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 3.2, 8.1.1, 9.7.4.3.2, 10.7.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*------------------------------ Modified section ------------------------------*

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

NOTE: Multi-word definitions are treated as linguistic expressions and printed in italic font throughout this requirement specification. Linguistic expressions may not be split and are to be printed in their entirety.

**AAS BS receiver:** composite receiver function of an AAS BS receiving in an *uplink operating band*

**active antenna system base station:** base station system which combines an antenna array with a transceiver unit array and a *radio distribution network*

**active transmitter unit:** transmitter unit which is ON, and has the ability to send modulated data streams that are parallel and distinct to those sent from other transmitter units to one or more *TAB connectors* at the *transceiver array boundary*

**band category:** group of *operating bands* for which the same MSR scenarios apply

**Base Station RF Bandwidth:** bandwidth in which a base station transmits and/or receives single or multiple carrier(s) and/or RATs simultaneously within a supported *operating band*

NOTE: In single carrier operation, the *Base Station RF Bandwidth* is equal to the *channel bandwidth*.

**Base Station RF Bandwidth edge:** frequency of one of the edges of the *Base Station RF Bandwidth*

**basic limit:** emissions limit taken from the *non-AAS BS* specifications that is converted into a per *TAB connector TX min cell group* AAS BS emissions limit, or into a per *TAB connector RX min cell group* AAS BS emissions limit by scaling, depending on the context

**beam:** main lobe of a radiation pattern from an AAS BS

NOTE: For certain AAS BS antenna array, there may be more than one beam.

**beam centre direction:** direction equal to the geometric centre of the half-power EIRP contour of the beam

**beam direction pair:** data set consisting of the *beam centre direction* and the related *beam peak direction*

**beam peak direction:** direction where the maximum EIRP is supposed to be found

**beamwidth:** angles describing the major and minor axes of an ellipsoid closest fit to an essentially elliptic half-power EIRP contour of the beam

**carrier:** modulated waveform conveying the E-UTRA or UTRA physical channels

**carrier aggregation:** aggregation of two or more NR or E-UTRA component carriers in order to support wider *transmission bandwidth*s

**channel bandwidth:** RF bandwidth supporting a single RF carrier with the *transmission bandwidth* configured in the uplink or downlink of a cell

NOTE 1: The *channel* *bandwidth* is measured in MHz and is used as a reference for transmitter and receiver RF requirements.

NOTE 2: For UTRA FDD, the *channel* *bandwidth* is the nominal channel spacing specified in 3GPP TS 25.104 [2], For UTRA TDD 1,28 Mcps, the *channel* *bandwidth* is the nominal channel spacing specified in 3GPP TS 25.105 [3].

NOTE 3: For E-UTRA, the *channel* *bandwidths* are specified in 3GPP TS 36.104 [4]. Standalone NB-IoT *channel bandwidths* specified in 3GPP TS 36.104 [4] are not applicable to AAS BS.

NOTE 4: In TS 38.104 [28] for NR, *channel bandwidths* are referred to as BS channel bandwidths, since for NR BS and UE channel bandwidths may differ.

**code domain power:** part of the mean power which correlates with a particular (OVSF) code channel in a UTRA signal

NOTE: The sum of all powers in the code domain equals the mean power in a bandwidth of (1+) times the chip rate of the radio access mode.

**co-location reference antenna**: a passive antenna used as reference for base station to base station co-location requirements.

**demodulation branch:** single input of the *AAS BS receiver* to the demodulation algorithms.

NOTE 1: For UTRA *non-AAS BS* a *demodulation branch* is referred to as a receive diversity branch or an UL MIMO branch. For E-UTRA *non-AAS BS* a *demodulation branch* is referred to as an RX antenna in the performance requirement tables.

NOTE 2: The term "RX antenna" in chapter 8 (i.e. Performance requirements) of the E-UTRA specification 3GPP TS 36.104 [4] does not refer to physical receiver antennas.

**downlink operating band:** part of the (FDD) *operating band* designated for downlink transmission

**equivalent isotropic radiated power:** equivalent power radiated from an isotropic directivity device producing the same field intensity at a point of observation as the field intensity radiated in the direction of the same point of observation by the discussed device

NOTE: Isotropic directivity is equal in all directions (i.e. 0 dBi).

**equivalent isotropic sensitivity:** sensitivity for an isotropic directivity device equivalent to the sensitivity of the discussed device exposed to an incoming wave from a defined AoA

NOTE 1: The sensitivity is the minimum received power level at which a RAT specific requirement is met.

NOTE 2: Isotropic directivity is equal in all directions (i.e. 0 dBi).

**hybrid AAS BS**: AAS BS which has both a conducted RF interface and a radiated RF interface in the far field and conforms to a *hybrid requirements set*

**hybrid requirements set**: complete set of requirements applied to a *hybrid AAS BS* with both conducted and radiated requirements

**inter-band gap:** frequency gap between two supported consecutive operating bands

**Inter RF Bandwidth gap:** frequency gap between two consecutive *Base Station RF Bandwidth*s that are placed within two supported *operating bands*

**maximum carrier output power per TAB connector:** mean power level measured on a particular carrier at the *TAB connector(s)*, during the *transmitter ON period* in a specified reference condition

**maximum throughput:** maximum achievable throughput for a reference measurement channel

**minSENS RoAoA**: the *reference RoAoA* associated with the OSDD with the lowest declared EIS value.

**MSR operation:** operation of AAS BS declared to be MSR in particular *operating band(s)* (including any of UTRA, E-UTRA and/or NR operation as SR or multi-RAT based on 37.104)

**multi-band requirements:**  requirements applying per one single *operating band* with exclusion bands or other multi-band provisions as defined for each requirement

**multi-band RIB:** operating band specific RIB associated with a transmitter or receiver that is characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band than the other carrier(s) and where this different operating band is not a sub-band or superseding-band of another supported operating band in which the same RAT is operated.

**multi-band TAB connector:** *TAB connector* associated with a transmitter or receiver that is characterized by the ability to process two or more carriers in common active RF components simultaneously, where at least one carrier is configured at a different operating band than the other carrier(s) and where this different operating band is not a sub-band or superseding-band of another supported operating band in which the same RAT is operated.

**non-AAS BS:** BS conforming to one of the specifications in 3GPP TS 25.104 [2], 3GPP TS 25.105 [3], 3GPP TS 36.104 [4] or 3GPP TS 37.104 [5]

NOTE: For AAS BS in *single RAT E-UTRA operation* or in *MSR operation* using E-UTRA, the NB-IoT operation (including in-band, guard band and standalone operation) is excluded from the consideration in the performance comparison among AAS BS and *non-AAS BS* in this specification.

**non-contiguous spectrum:** spectrum consisting of two or more *sub-blocks* separated by *sub-block gap(s)*

**OTA AAS BS:** AAS BS which has ≥8 *transceiver units* for E-UTRA or MSR and ≥4 *transceiver units* for UTRA per cell and has a radiated RF interface only and conforms to the *OTA requirements set.*

**OTA coverage range**: a common range of directions within which TX OTA requirements that are neither specified in the *OTA peak directions sets* nor as TRP requirement are intended to be met

**OTA peak directions set**: set(s) of *beam peak directions* within which certain TX OTA requirements are intended to be met, where all *OTA peak directions set(s)* are subsets of the *OTA coverage range*

NOTE 1: The *beam peak directions* are related to a corresponding contiguous range or discrete list of *beam centre directions* by the *beam direction pairs* included in the set.

NOTE 2: *OTA peak directions set* definition (applicabile to multiple *directional requirements*) is replacing the Rel‑13/14 *EIRP accuracy directions set* definition (which was applicable to EIRP requirement only).

**OTA REFSENS RoAoA**: Is the RoAoA determined by the contour defined by the points at which the achieved EIS is 3dB higher than the achieved EIS in the reference direction assuming that for any AoA, the receiver gain is optimized for that AoA.

NOTE: This contour will be related to the average element/sub-array radiation pattern 3dB beam width.

**OTA requirements set:** complete set of OTA requirements applied to an *OTA AAS BS*.

**OTA sensitivity directions declaration:** set of manufacturer declarations comprising at least one set of declared minimum EIS values (with related RAT and *channel bandwidth*), and related directions over which the EIS applies

NOTE: All the directions apply to all the EIS values in an OSDD.

**output power at a TAB connector:** mean power delivered to a load with resistance equal to the nominal load impedance of the *TAB connector*

**polarization match:** condition that exists when a plane wave, incident upon an antenna from a given direction, has a polarization that is the same as the receiving polarization of the antenna in that direction

**radiated interface boundary**: operating band specific radiated requirements reference where the radiated requirements apply.

NOTE: For requirements based on EIRP/EIS, the *radiated interface boundary* is associated to the far-field region.

**Radio Bandwidth:** frequency difference between the upper edge of the highest used carrier and the lower edge of the lowest used carrier

**radio distribution network:** linear passive network which distributes the RF power generated by the transceiver unit array to the antenna array, and/or distributes the radio signals collected by the antenna array to the transceiver unit array

NOTE: In the case when the active transceiver units are physically integrated with the array elements of the antenna array, the *radio distribution network* is a one-to-one mapping.

**rated beam EIRP:** EIRP that is declared as being achieved in the *beam peak direction* associated with a particular *beam direction pair*

**rated carrier output power per TAB connector:** mean power level associated with a particular carrier the manufacturer has declared to be available at the *TAB connector*, during the *transmitter ON period* in a specified reference condition

**rated total output power per TAB connector:** mean power level associated with a particular *operating band* the manufacturer has declared to be available at the *TAB connector*, during the *transmitter ON period* in a specified reference condition

**receive period:** time during which the AAS BS is receiving data sub-frames (or UpPTS in case of E-UTRA frame Type2) on a (TDD) carrier

**receiver target:** AoA in which reception is performedby AAS BS

**receiver target redirection range:** union of all the *sensitivity RoAoA* achievable through redirecting the *receiver target* related to particular OSDD

**receiver target reference direction:** direction inside the *OTA sensitivity directions declaration* declared by the manufacturer for conformance testing. For an OSDD without *receiver target redirection range*, this is a direction inside the *sensitivity RoAoA*

**reference beam direction pair:** declared *beam direction pair*, including reference *beam centre direction* and reference *beam peak direction* where the reference *beam peak direction* is the direction for the intended maximum EIRP within the *OTA peak* *directions set*

**reference RoAoA**: the *sensitivity RoAoA* associated with the *receiver target reference direction* for each OSDD.

**sensitivity RoAoA:** RoAoA within the *OTA sensitivity directions declaration*, within which the declared EIS(s) of an OSDD is intended to be achieved at any instance of time for a specific AAS BS direction setting

**single band requirements:** requirements applying per one single *operating band* without exclusion bands or other multi-band provisions

**single** **band RIB:** operating band specific RIB supporting operation either in a single *operating band* only, or in multiple *operating bands* but does not meet the conditions for a *multi-band connector*.

**single band TAB connector:** *TAB connector* supporting operation either in a single *operating band* only, or in multiple *operating bands* but does not meet the conditions for a *multi-band RIB*.

**single direction requirement:** AASBS requirement which is applied in a specific direction within the *OTA coverage range* for the Tx and when the AoA of the incident wave of a received signal is within the OTA REFSENS RoAoA or the minSENS RoAoA as appropriate for the receiver.

*----------------------------- Next modified section ------------------------------*

## 3.2 Symbols

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

BeWθ,REFSENS The beamwidth equivalent to the OTA REFSENS RoAoA in the θ-axis in degrees.

BeWφ,REFSENS The beamwidth equivalent to the OTA REFSENS RoAoA in the φ-axis in degrees.

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

ΔfOOB Maximum offset of the out-of-band boundary from the uplink *operating band* edge

ΔminSENS Difference between conducted reference sensitivity and EISminsens

ΔOTAREFSENS Difference between conducted reference sensitivity and OTA REFSENS

EISminsens The EIS declared for the minSENS RoAoA

FDL\_low The lowest frequency of the downlink *operating band*

FDL\_high The highest frequency of the downlink *operating band*

Ncells The declared number corresponding to the minimum number of cells that can be transmitted by an AAS BS in a particular band with transmission on all *TAB connectors* supporting the operating band.

NRXU,active The number of active receiver units. The same as the number of *demodulation branches* to which compliance is declared for chapter 8 performance requirements.

NRXU,counted The number of active receiver units that are taken into account for unwanted emission scaling, as calculated in subclause 7.1.

NRXU,countedpercell The number of active receiver units that are taken into account for unwanted emissions scaling per cell, as calculated in subclause 7.6. The number is defined in subclause 7.1.

NTXU, active The number of *active transmitter units*.

NTXU,counted The number of *active transmitter units,* as calculated in subclause 6.1, that are taken into account for conducted TX power limit in subclause 6.2, and for unwanted emissions scaling.

NTXU,countedpercell The number of *active transmitter units*  that are taken into account for emissions scaling per cell, as calculated in subclause 6.6. The number is defined in subclause 6.1.

*----------------------------- Next modified section ------------------------------*

### 8.1.1 UTRA operation

Performance requirements for *single RAT UTRA operation* in FDD are specified for the measurement channels defined in 3GPP TS 25.104 [2] and 3GPP TS 25.105 [3]. The requirements only apply to those measurement channels that are supported by AAS BS. For FRC8 in 3GPP TS 25.104 [2] the non E-DPCCH boosting and E-DPCCH boosting requirement only apply for the option supported by the AAS BS. The performance requirements for the high speed train scenarios defined in 3GPP TS 25.104 [2] and 3GPP TS 25.105 [3] are optional.

Unless stated otherwise, performance requirements apply for a single cell only. Performance requirements for an AAS BS supporting UTRA FDD DC-HSUPA or DB-DC-HSUPA and UTRA TDD MC-HSUPA are defined in terms of single carrier requirements. For FDD operation the requirements in clause 8 shall be met with the transmitter unit(s) associated with the *TAB connectors(s)* in the operating band ON.

*----------------------------- Next modified section ------------------------------*

Table 9.7.4.3.2-8: Emissions levels for protection of DTT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case | Measurement filter centre frequency | Condition on BS maximum aggregate EIRP / 10 MHz, PEIRP\_10MHz  (NOTE) | Maximum Level  PEIRP,N,MAX | Measurement Bandwidth |
| A: for DTT frequencies where broadcasting is protected | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz ≥ 59 dBm | 0 dBm | 8 MHz |
| N\*8 + 306 MHz,  21 ≤ N ≤ 60 | 36 ≤ PEIRP\_10MHz < 59 dBm | PEIRP\_10MHz – 59 dBm | 8 MHz |
| N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz < 36 dBm | -23 dBm | 8 MHz |
| B: for DTT frequencies where broadcasting is subject to an intermediate level of protection | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz ≥ 59 dBm | 10 dBm | 8 MHz |
| N\*8 + 306 MHz,  21 ≤ N ≤ 60 | 36 ≤ PEIRP\_10MHz < 59 dBm | PEIRP\_10MHz – 49 dBm | 8 MHz |
| N\*8 + 306 MHz,  21 ≤ N ≤ 60 | PEIRP\_10MHz < 36 dBm | -13 dBm | 8 MHz |
| C: for DTT frequencies where broadcasting is not protected | N\*8 + 306 MHz,  21 ≤ N ≤ 60 | N.A. | 22 dBm | 8 MHz |
| NOTE: PEIRP\_10MHz (dBm) is defined by the expression PEIRP\_10MHz = P10MHz + Gant + 6 dB for UTRA and PEIRP\_10MHz = P10MHz + Gant + 9 dB for E-UTRA, where Gant is 17 dBi. | | | | |

NOTE: The regional requirement is defined in terms of EIRP (effective isotropic radiated power), which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The method outlined in annex B1 Indicates how the limit in table 9.7.4.3.2-8 demonstrates compliance to the regional requirement.

In certain regions, the following *basic limits* may apply to a RIB operating in Band XXXII within 1452-1492 MHz. The level of unwanted emissions, measured on centre frequencies f\_offset with filter bandwidth, according to table 9.7.4.3.2-9, shall not exceed the maximum TRP limits indicated in the table.

Table 9.7.4.3.2-9: Declared frequency band XXXII unwanted emission within 1452-1492 MHz

|  |  |  |
| --- | --- | --- |
| **Frequency offset of measurement filter centre frequency, f\_offset** | **Maximum Level [dBm]** | **Measurement bandwidth** |
| 5 MHz | PEIRP – 17 dBi + 6 dB | 5 MHz |
| 10 MHz | PEIRP – 17 dBi + 6 dB | 5 MHz |
| 15 MHz ≤ f\_offset ≤ f\_offsetmax, B32 | PEIRP – 17 dBi + 6 dB | 5 MHz |
| NOTE: f\_offsetmax, B32 denotes the frequency difference between the lower channel carrier frequency and 1454.5 MHz, and the frequency difference between the upper channel carrier frequency and 1489.5 MHz for the set channel position. | | |

NOTE: The regional requirement, included in CEPT ECC Decision (13)03 [25], is defined in terms of EIRP per antenna, which is dependent on both the BS emissions at the antenna connector and the deployment (including antenna gain and feeder loss). The method outlined in annex B1 Indicates how the limit in table 9.7.4.3.2-9 demonstrates compliance to the regional requirement.

In certain regions, the following *basic limit* may apply to RIB operating in Band XXXII within 1452-1492 MHz for the protection of services in spectrum adjacent to the frequency range 1452-1492 MHz. The level of emissions, measured on centre frequencies Ffilter with filter bandwidth according to table 9.7.4.3.2-10, shall not exceed the maximum emission TRP limits in the table. This requirement applies in the frequency range 1429-1518 MHz even though part of the range falls in the spurious domain.

Table 9.7.4.3.2-10: Frequency band XXXII declared emission outside 1452-1492 MHz

| **Filter centre frequency, Ffilter** | **Maximum level [dBm]** | **Measurement bandwidth** |
| --- | --- | --- |
| 1429.5 MHz ≤ Ffilter ≤ 1448.5 MHz | PEIRP – 17 dBi + 6 dB | 1 MHz |
| Ffilter = 1450.5 MHz | PEIRP – 17 dBi + 6 dB | 3 MHz |
| Ffilter = 1493.5 MHz | PEIRP – 17 dBi + 6 dB | 3 MHz |
| 1495.5 MHz ≤ Ffilter ≤ 1517.5 MHz | PEIRP – 17 dBi + 6 dB | 1 MHz |

*----------------------------- Next modified section ------------------------------*

### 10.7.1 General

The receiver spurious emission requirement is the power of the emissions radiated from the antenna array from a receiver unit. For an *OTA AAS BS* operating in FDD, OTA RX spurious emissions requirement do not apply as they are superseded by the OTA TX spurious emissions requirement. This is due to the fact that TX and RX spurious emissions cannot be distinguished in OTA domain.

NOTE: The OTA receiver spurious emission requirement applicability for the AAS BS with the RX-only capabilities is not covered by the present release of this specification.

*----------------------------- End of modified section ------------------------------*