**3GPP TSG-RAN4 Meeting #97-e *R4-2017579***

**Online, , 2nd Nov 2020 - 13th Nov 2020**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.941** | **CR** | **0015** | **rev** | **1** | **Current version:** | **15.1.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | OTA\_BS\_testing-Perf | | | | |  | ***Date:*** | | | 2020-10-23 |
|  |  | | | |  | |  | | |  |
| ***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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | It was observed that there were some inconsistencies across the MU and TT values in requirements specific sections and in the summary tables in cluase 17 and 18.  Regulatory decision is incorporated for the TT of the OTA RX spur requirement. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * 2: new reference added * 12.3.4: updated of the motivation for the TT value of the OTA RX spur requirement as per recent regulatory decisions which were already implemented in AAS BS and NR BS specifications, i.e. 0 instead of MU * 13.2.4: correction of the TT values to align with MU. * 13.3.3, 13.3.4: value rounding corrections, TT and MU alignments * 15.6, 15.7: addtion of missing information on MU and TT values for the OTA BS demodulation requirements, which are also in the scope of this technical report. * 17, 18:   + Cross-reference corrections to the requirement clauses   + Notes added, to reflect the asssumption on Normal test conditions   + Text consistency improvements and editorials   + TT for OTA RX spur: corrected to reflect latest regulations. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Multiple inconsistencies and incorrect values for MU and TT would exist in the TR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 12.3.4, 13.2.4, 15.6, 15.7, 17, 18 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ------------------------------*

# 2 References

*----------------------------- Unchanged part omitted ------------------------------*

[24] 3GPP TR 25.914: "Measurements of radio performances for UMTS terminals in speech mode"

[25] ERC Recommendation 74-01: "Unwanted emissions in the spurious domain"

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

### 12.3.4 Test Tolerance for OTA RX spurious emissions

The conduced test tolerance for the receiver spurious emissions requirements is zero. However for OTA BS the receiver spurious emissions requirements only apply to TTD in OFF mode. As such the limit is set by RAN4 to be considerably lower than the equivalent regulatory requirement.

In addition due to the difficulty in measuring low levels of TRP close to the measurement system noise floor the risk of false failures is high. As the risk is due to the noise floor of the measurement system it cannot be mitigated by BS design.

Hence it has been agreed that for receiver spurious emissions the TT = MU.

From December 2019, the regulation around receiver spurious emissions has been clarified in ERC recommendation 74-01 [25] and the requirement has been updated. Since then OTA RX spurious emissions is a regulatory requirement with TT = 0.

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

### 13.2.3 Maximum accepted test system uncertainty

Maximum test system uncertainties derivation methodology was described in clause 5.1. The maximum accepted test system uncertainty values was derived based on test system specific values in clause 13.2.2.

Table 13.2.3-1: Common maximum accepted test system uncertainty value derivation for TDD OFF power level measurement

|  |  |  |  |
| --- | --- | --- | --- |
|  | Expanded uncertainty (dB) | | |
| f≤3 GHz | 3<f≤ 4.2 GHz | 4.2<f≤ 6 GHz |
| General Chamber | 3.37 | 3.59 | 3.64 |
| **Common maximum accepted test system uncertainty** | **3.40** | **3.60** | **3.60** |

Fulfilling the criteria for CLTA selection and placement in is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the CLTA and its alignment as shall be used for evaluating the test system uncertainty.

### 13.2.4 Test Tolerance for OTA TX OFF power

Considering the methodology described in clause 5.1, Test Tolerance values for TX OFF were derived based on values captured in clause 13.2.2.

The TT was decided to be the same as the MU for TX OFF in FR1.

Table 13.2.4-1: Test Tolerance values for the TX OFF in Normal test conditions

|  |  |  |  |
| --- | --- | --- | --- |
|  | f≤3 GHz | 3<f≤4.2 GHz | 4.2<f≤6 GHz |
| Test Tolerance (dB) | 3.4 | 3.6 | 3.6 |

An overview of the TT values for all the requirements is captured in clause 18.

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

### 13.3.3 Maximum accepted test system uncertainty

Maximum test system uncertainties derivation methodology was described in clause 5.1. The maximum accepted test system uncertainty values was derived based on test system specific values in clause 13.3.2.

Table 13.3.3-1: Common maximum accepted test system uncertainty value derivation for co-location emissions level measurement

|  |  |  |  |
| --- | --- | --- | --- |
|  | Expanded uncertainty (dB) | | |
| f≤3 GHz | 3<f≤ 4.2 GHz | 4.2<f≤ 6 GHz |
| General Chamber | 3.05 | 3.29 | 3.34 |
| **Common maximum accepted test system uncertainty** | **3.1** | **3.3** | **3.4** |

Fulfilling the criteria for CLTA selection and placement in is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the CLTA and its alignment as shall be used for evaluating the test system uncertainty.

### 13.3.4 Test Tolerance co-location spurious emissions

Considering the methodology described in clause 5.1, Test Tolerance values for co-location emissions were derived based on values captured in clause 13.3.2.

The TT was decided to be the same as the MU for TX OFF in FR1.

Table 13.3.4-1: Test Tolerance values for the co-location emissions in Normal test conditions

|  |  |  |  |
| --- | --- | --- | --- |
|  | f≤3 GHz | 3<f≤4.2 GHz | 4.2<f≤6 GHz |
| Test Tolerance (dB) | 3.1 | 3.3 | 3.4 |

An overview of the TT values for all the requirements is captured in clause 18.

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

## 15.6 Maximum accepted test system uncertainty

Measurement Uncertainties for the OTA BS demodulation requirements are the same as for the conducted requirements.

For maximum accepted OTA test system uncertainty values for the OTA demodulation requirements, refer to the following RAT-specific specifications:

* For UTRA demodulation requirements refer to TS 25.141 [2], clause 4.1.4,
* For E-UTRA demodulation requirements, refer to TS 36.141 [3], clause 4.1.2.3,
* For NR demodulation requirements, refer to TS 38.141-2 [6], clause 4.1.2.4.

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

## 15.7 Test Tolerance for OTA demodulation requirements

Test Tolerance values for the OTA BS demodulation requirements are the same as for the conducted requirements.

For Test Tolerance values used for the OTA demodulation requirements derivation, refer to the following RAT-specific specifications:

* For UTRA demodulation requirements refer to TS 25.141 [2], clause 4.2.3,
* For E-UTRA demodulation requirements, refer to TS 36.141 [3], annex G.3,
* For NR demodulation requirements, refer to TS 38.141-2 [6], annex C.3.

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

# 17 Measurement Uncertainty values summary

Table 17-1: TX Measurement Uncertainty values derivation – FR1

| Requirement | Maximum OTA Test System uncertainty | Clause |
| --- | --- | --- |
| Radiated transmit power | Normal condition:  ±1.1 dB, f ≤ 3 GHz  ±1.3 dB, 3 GHz < f ≤ 6 GHz | 9.2.7 |
| Extreme condition:  ±2.5 dB, f ≤ 3 GHz  ±2.6 dB, 3 GHz < f ≤ 6 GHz | 9.3.4 |
| OTA base station output power | ±1.4 dB, f ≤ 3 GHz  ±1.5 dB, 3 GHz < f ≤ 6 GHz | 11.2.7 |
| OTA E-UTRA DL RS power | ±1.3 dB, f ≤ 3 GHz  ±1.5 dB, 3 GHz < f ≤ 6 GHz | 9.4.6 |
| OTA UTRA inner loop power control in the downlink | ±0.1 dB | 9.5.6 |
| OTA UTRA power control dynamic range | ±1.1 dB | 9.5.6 |
| OTA total power dynamic range | ±0.3 dB UTRA  ±0.4 dB E-UTRA & NR | 9.5.6 |
| OTA UTRA IPDL time mask | ±0.7 dB | 9.5.6 |
| OTA RE power control dynamic range (NR) | N/A |  |
|  |  |  |
| OTA transmitter OFF power | ±3.4 dB, f ≤ 3 GHz  ±3.6 dB, 3 GHz < f ≤ 6 GHz  (NOTE 1) | 13.2.3 |
| OTA transmitter transient period | N/A |  |
| OTA frequency error | ±12 Hz | 9.6.6 |
| OTA modulation quality | ±1 % | 9.7.6 |
| OTA time alignment error | ±25 ns | 9.8.5 |
| OTA occupied bandwidth | ±100 kHz, BWChannel 5 MHz, 10 MHz  ±300 kHz, BWChannel 15 MHz, 20 MHz, 25 MHz, 30 MHz, 40 MHz, 50 MHz  ±600 kHz, BWChannel 60 MHz, 70 MHz, 80 MHz, 90 MHz, 100 MHz | 9.9.6 |
| OTA ACLR/CACLR | f ≤ 3 GHz  ±1 dB  3 GHz < f ≤ 6 GHz  ±1.2 dB  Absolute power ±2.2 dB, f ≤ 3 GHz  Absolute power ±2.7 dB, 3 GHz < f ≤ 6 GHz | 11.3.7 |
| OTA operating band unwanted emissions (E-UTRA, NR) | Absolute power ±1.8 dB, f ≤ 3 GHz  Absolute power ±2 dB, 3 GHz < f ≤ 6 GHz | 11.4.7 |
| OTA SEM (UTRA only) | Absolute power ±1.8 dB, f ≤ 3 GHz  Absolute power ±2 dB, 3 GHz < f ≤ 6 GHz | 11.4.7 |
| OTA transmitter spurious emissions, mandatory requirements | ±2.3 dB, 30 MHz < f ≤ 6 GHz  ±4.2 dB, 6 GHz < f ≤ 26 GHz | 12.2.5 |
| OTA transmitter spurious emissions, protection of BS receiver | ±3.1 dB, f ≤ 3 GHz  ±3.3 dB, 3 GHz < f ≤ 4.2 GHz  ±3.4 dB, 4.2 GHz < f ≤ 6 GHz  (NOTE 1) | 13.3.3 |
| OTA transmitter spurious emissions, additional spurious emissions requirements | ±2.6 dB, f ≤ 3 GHz  ±3.0, 3 GHz < f ≤ 4.2 GHz  ±3.5, 4.2 GHz < f ≤ 6 GHz | 12.4.3 |
| OTA transmitter spurious emissions, co-location | ±3.1 dB, f ≤ 3 GHz  ±3.3 dB, 3 GHz < f ≤ 4.2 GHz  ±3.4, 4.2 GHz < f ≤ 6 GHz  (NOTE 1) | 13.3.3 |
| OTA transmitter intermodulation | The value below applies only to the interfering signal and is unrelated to the measurement uncertainty of the tests (11.3 for ACLR, 11.4 for OBUE and 12.2 for TX spurious emissions) which have to be carried out in the presence of the interferer.  ±3.2 dB, f ≤ 3 GHz  ±3.4 dB, 3 GHz < f ≤ 4.2 GHz  ±3.5 dB, 4.2 GHz < f ≤ 6 GHz  (NOTE 1) | 13.4.3 |
| NOTE 1: Fulfilling the criteria for CLTA selection and placement in clause 6.4 is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the co-location test antenna and its alignment as specified in the appropriate measurement uncertainty budgets in this TR shall be used for evaluating the test system uncertainty.  NOTE 2: Test system uncertainty values are applicable for normal condition unless otherwise stated. | | |

Table 17-2: Tx Measurement Uncertainty values derivation – FR2

|  |  |  |
| --- | --- | --- |
| Requirement | Maximum OTA Test System uncertainty | Clause |
| Radiated transmit power | Normal condition:  ±1.7 dB (24.25 – 29.5 GHz)  ±2.0 dB (37 – 40 GHz) | 9.2.7 |
| Extreme condition:  ±3.1 dB (24.25 – 29.5 GHz)  ±3.3 dB (37 – 40 GHz) | 9.3.4 |
| OTA base station output power | ±2.1 dB (24.25 – 29.5 GHz)  ±2.4 dB (37 – 40 GHz) | 11.2.7 |
| OTA RE power control dynamic range | N/A |  |
| OTA total power dynamic range | ±0.4 dB | 9.5.6 |
| OTA transmitter OFF power | ±2.9 dB (24.25 – 29.5 GHz)  ±3.3 dB (37 – 40 GHz) | 9.10.3 |
| OTA transmitter transient period | N/A |  |
| OTA frequency error | ±12 Hz | 9.6.6 |
| OTA modulation quality | 1% | 9.7.6 |
| OTA time alignment error | ±25 ns | 9.8.5 |
| OTA occupied bandwidth | 600 kHz | 9.9.6 |
| OTA ACLR | Relative ACLR:  ±2.3 dB (24.25 – 29.5 GHz)  ±2.6 dB (37 – 40 GHz)  Absolute ACLR:  ±2.7 dB (24.25 – 29.5 GHz)  ±2.7 dB (37 – 40 GHz) | 11.3.7 |
| OTA operating band unwanted emissions | ±2.7 dB (24.25 – 29.5 GHz)  ±2.7 dB (37 – 40 GHz) | 11.4.7 |
| OTA transmitter spurious emissions, mandatory requirements | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.7 dB, 6 GHz < f ≤ 40 GHz  ±5.0 dB, 40 GHz < f ≤ 60 GHz | 12.2.5 |
| OTA transmitter spurious emissions, additional requirements | ±2.3 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.7 dB, 6 GHz < f ≤ 40 GHz  ±5.0 dB, 40 GHz < f ≤ 60 GHz | 12.2.5 |
| NOTE: Test system uncertainty values are applicable for normal condition unless otherwise stated. | | |

Table 17-3: RX Measurement Uncertainty values derivation – FR1

|  |  |  |
| --- | --- | --- |
| Requirement | Maximum OTA Test System uncertainty | Clause |
| OTA sensitivity | ±1.3 dB, f ≤ 3 GHz  ±1.4 dB, 3 GHz < f ≤ 4.2 GHz  ±1.6 dB, 4.2 GHz < f ≤ 6 GHz | 10.2.7 |
| OTA reference sensitivity level | ±1.3 dB, f ≤ 3 GHz  ±1.4 dB, 3 GHz < f ≤ 4.2 GHz  ±1.6 dB, 4.2 GHz < f ≤ 6 GHz | 10.3 |
| OTA dynamic range | ±0.3 dB | 10.4.4 |
| OTA adjacent channel selectivity | ±1.7 dB, f ≤ 3 GHz  ±2.1 dB, 3 GHz < f ≤ 4.2 GHz  ±2.4 dB, 4.2 GHz < f ≤ 6 GHz | 10.5.4 |
| In-band blocking (General) | ±1.9 dB, f ≤ 3 GHz  ±2.2 dB, 3 GHz < f ≤ 4.2 GHz  ±2.5 dB, 4.2 GHz < f ≤ 6 GHz | 10.5.4 |
| In-band blocking (Narrowband) | ±1.7 dB, f ≤ 3 GHz  ±2.1 dB, 3 GHz < f ≤ 4.2 GHz  ±2.4 dB, 4.2 GHz < f ≤ 6 GHz | 10.5.4 |
| OTA out-of-band blocking (General) | fwanted ≤ 3 GHz:  ±2.0 dB, finterferer ≤ 3 GHz  ±2.1 dB, 3 GHz < finterferer ≤ 6 GHz  ±3.5 dB, 6 GHz < finterferer ≤ 12.75 GHz  3 GHz < fwanted ≤ 4.2 GHz:  ±2.0 dB, finterferer ≤ 3 GHz  ±2.1 dB, 3 GHz < finterferer ≤ 6 GHz  ±3.6 dB, 6 GHz < finterferer ≤ 12.75 GHz  4.2 GHz < fwanted ≤ 6 GHz:  ±2.2 dB, finterferer ≤ 3 GHz  ±2.3 dB, 3 GHz < finterferer ≤ 6 GHz  ±3.6 dB, 6 GHz < finterferer ≤ 12.75 GHz | 14.3 |
| OTA out-of-band blocking (Co-location)  (NOTE 1) | fwanted ≤ 3 GHz:  ±3.4 dB, finterferer ≤ 3 GHz  ±3.5 dB, 3 GHz < finterferer ≤ 4.2 GHz  ±3.7 dB, 4.2 GHz < finterferer ≤ 6 GHz  3 GHz < fwanted ≤ 4.2 GHz:  ±3.5 dB, finterferer ≤ 3 GHz  ±3.6 dB, 3 GHz < finterferer ≤ 4.2 GHz  ±3.7 dB, 4.2 GHz < finterferer ≤ 6 GHz  4.2 GHz < fwanted ≤ 6 GHz:  ±3.6 dB, finterferer ≤ 3 GHz  ±3.7 dB, 3 GHz < finterferer ≤ 4.2 GHz  ±3.8 dB, 4.2 GHz < finterferer ≤ 6 GHz | 13.5.4 |
| OTA receiver spurious emissions | ±2.5 dB, 30 MHz ≤ f ≤ 6 GHz  ±4.2 dB, 6 GHz < f ≤ 26 GHz | 12.3.3 |
| OTA receiver intermodulation | ±2.0 dB, f ≤ 3 GHz  ±2.6 dB, 3 GHz < f ≤ 4.2 GHz  ±3.2 dB, 4.2 GHz < f ≤ 6 GHz | 10.6.4 |
| OTA in-channel selectivity | ±1.7 dB, f ≤ 3 GHz  ±2.1 dB, 3 GHz < f ≤ 4.2 GHz  ±2.4 dB, 4.2 GHz < f ≤ 6 GHz | 10.7.4 |
| NOTE 1: Fulfilling the criteria for CLTA selection and placement in clause 6.4 is deemed sufficient for the test purposes. When these criteria are met, the measurement uncertainty related to the selection of the co-location test antenna and its alignment as specified in the appropriate measurement uncertainty budget in this TR shall be used for evaluating the test system uncertainty.  NOTE 2: Test system uncertainty values are applicable for normal condition unless otherwise stated. | | |

Table 17-4: RX Measurement Uncertainty values derivation – FR2

|  |  |  |
| --- | --- | --- |
| Requirement | Maximum OTA Test System uncertainty | Clause |
| OTA reference sensitivity level | ±2.4 dB, 24.25 GHz < f ≤ 29.5 GHz  ±2.4 dB, 37 GHz < f ≤ 40 GHz | 10.2.7 |
| OTA adjacent channel selectivity | ±3.4 dB, 24.25 GHz < f ≤ 29.5 GHz  ±3.4 dB, 37 GHz < f ≤ 40 GHz | 10.5.4 |
| OTA in-band blocking (General) | ±3.4 dB, 24.25 GHz < f ≤ 29.5 GHz  ±3.4 dB, 37 GHz < f ≤ 40 GHz | 10.5.4 |
| OTA out-of-band blocking | ±4.1 dB | 14.3 |
| OTA receiver spurious emissions | ±2.5 dB, 30 MHz ≤ f ≤ 6 GHz  ±2.7 dB, 6 GHz < f ≤ 40 GHz  ±5.0 dB, 40 GHz < f ≤ 60 GHz | 12.3.3 |
| OTA receiver intermodulation | ±3.9 dB, 24.25 GHz < f ≤ 29.5 GHz  ±3.9 dB, 37 GHz < f ≤ 40 GHz | 10.6.4 |
| OTA in-channel selectivity | ±3.4 dB, 24.25 GHz < f ≤ 29.5 GHz  ±3.4 dB, 37 GHz < f ≤ 40 GHz | 10.7.4 |
| NOTE: Test System uncertainty values are applicable for normal condition unless otherwise stated. | | |

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

# 18 Test Tolerance values summary

Considering the methodology described in clause 5.1, Test Tolerance values for all the considered requirements are captured in this clause, based on the maximum accepted test system uncertainty values derived for each specific requirement. Frequency range specific Test Tolerance values are captured in table 18-1.

Table 18-1: Test Tolerance values derivation, TX FR1

| Requirement | Test Tolerance (TTOTA) | Clause |
| --- | --- | --- |
| Radiated transmit power | Normal condition:  1.1 dB, f ≤ 3 GHz  1.3 dB, 3 GHz < f ≤ 6 GHz | 9.2.8 |
| Extreme condition:  2.5 dB, f ≤ 3 GHz  2.6 dB, 3 GHz < f ≤ 6 GHz | 9.3.5 |
| OTA base station output power | 1.4 dB, f ≤ 3 GHz  1.5 dB, 3 GHz < f ≤ 6 GHz | 11.2.8 |
| OTA E-UTRA DL RS power | 1.3 dB, f ≤ 3 GHz  1.5 dB, 3 GHz < f ≤ 6 GHz | 9.4.7 |
| OTA UTRA inner loop power control in the downlink | 0.1 dB | 9.5.7 |
| OTA UTRA power control dynamic range | 1.1 dB | 9.5.7 |
| OTA total power dynamic range | 0.3 dB UTRA  0.4 dB E-UTRA & NR | 9.5.7 |
| OTA UTRA IPDL time mask | 0.7 dB | 9.5.7 |
| OTA RE power control dynamic range (NR) | N/A |  |
|  |  |  |
| OTA transmitter OFF power | 3.4 dB, f ≤ 3 GHz  3.6 dB, 3 GHz < f ≤ 6 GHz  (NOTE) | 13.2.4 |
| OTA transmitter transient period | N/A |  |
| OTA frequency error | 12 Hz | 9.6.7 |
| OTA modulation quality | 1 % | 9.7.7 |
| OTA time alignment error | 25 ns | 9.8.6 |
| OTA occupied bandwidth | 0 Hz | 9.9.7 |
| OTA ACLR/CACLR | Relative:  1.0 dB, f ≤ 3 GHz  1.2 dB, 3 GHz < f ≤ 6 GHz  Absolute:  0 dB | 11.3.8 |
| OTA operating band unwanted emissions (E-UTRA, NR) | Offsets < 10 MHz  1.8 dB, f ≤ 3 GHz  2 dB, 3.0GHz < f ≤ 6 GHz  Offsets ≥ 10 MHz  0 dB | 11.4.8 |
| SEM (UTRA only) | 1.8 dB, f ≤ 3 GHz  2.0 dB, 3 GHz < f ≤ 4.2 GHz | 11.4.8 |
| OTA transmitter spurious emissions, mandatory requirements | 0 dB | 12.2.6 |
| OTA transmitter spurious emissions, protection of BS receiver | 3.1 dB, f ≤ 3 GHz  3.3 dB, 3 GHz < f ≤ 4.2 GHz  3.4 dB, 4.2 GHz < f ≤ 6 GHz | 13.3.4 |
| OTA transmitter spurious emissions, additional spurious emissions requirements | 2.6 dB, f ≤ 3 GHz  3.0 dB, 3 GHz < f ≤ 4.2 GHz  3.5 dB, 4.2 GHz < f ≤ 6 GHz  For co-existence with PHS and public safety bands.  0 dB | 12.4.4 |
| OTA transmitter spurious emissions, co-location | 3.1 dB, f ≤ 3 GHz  3.3 dB, 3 GHz < f ≤ 4.2 GHz  3.4 dB, 4.2 GHz < f ≤ 6 GHz | 13.3.4 |
| OTA transmitter intermodulation | 0 dB | 13.4.4 |
| NOTE: TTOTA values are applicable for normal condition unless otherwise stated. | | |

Table 18-2: Test Tolerance values derivation, TX FR2

|  |  |  |
| --- | --- | --- |
| Requirement | Test Tolerance (TTOTA) | Clause |
| Radiated transmit power | Normal condition:  1.7 dB (24.25 – 29.5 GHz)  2.0 dB (37 – 40 GHz) | 9.2.8 |
| Extreme condition:  3.1 dB (24.25 – 29.5 GHz)  3.3 dB (37 – 40 GHz) | 9.3.5 |
| OTA base station output power | 2.1 dB (24.25 – 29.5 GHz)  2.4 dB (37 – 40 GHz) | 11.2.8 |
| OTA total power dynamic range | 0.4 dB | 9.5.6 |
| OTA transmitter OFF power | 2.9 dB (24.25 – 29.5 GHz)  3.3 dB (37 – 40 GHz) | 9.10.4 |
| OTA transmitter transient period | N/A |  |
| OTA frequency error | 12 Hz | 9.6.6 |
| OTA modulation quality | 1% | 9.7.6 |
| OTA time alignment error | 25 ns | 9.8.6 |
| OTA occupied bandwidth | 0 Hz | 9.9.6 |
| OTA ACLR | Relative ACLR:  2.3 dB (24.25 – 29.5 GHz)  2.6 dB (37 – 40 GHz)  Absolute ACLR:  2.7 dB (24.25 – 29.5 GHz)  2.7 dB (37 – 40 GHz) | 11.3.8 |
| OTA operating band unwanted emissions | 2.7 dB (24.25 – 29.5 GHz)  2.7 dB (37 – 40 GHz)  (NOTE 2) | 11.4.8 |
| OTA transmitter spurious emissions, mandatory requirements | 0 dB | 12.2.5 |
| OTA transmitter spurious emissions, additional requirements | NOTE 2 |  |
| NOTE 1: TTOTA values are applicable for normal condition unless otherwise stated.  NOTE 2: There may be additional regional regulatory requirements being applicable, tightening the TTOTA values to 0 dB, e.g. for co-existence with Earth Exploration Satellite Service. For more details refer to e.g. TS 38.141-2 [6]. | | |

Table 18-3: Test Tolerance values derivation, RX FR1

|  |  |  |
| --- | --- | --- |
| Requirement | Test Tolerance (TTOTA) | Clause |
| OTA sensitivity | 1.3 dB, f ≤ 3.0 GHz  1.4 dB, 3.0 GHz < f ≤ 4.2 GHz  1.6 dB, 4.2 GHz < f ≤ 6.0 GHz | 10.2.8 |
| OTA reference sensitivity level | 1.3 dB, f ≤ 3.0 GHz  1.4 dB, 3.0 GHz < f ≤ 4.2 GHz  1.6 dB, 4.2 GHz < f ≤ 6.0 GHz | 10.3 |
| OTA dynamic range | 0.3 dB | 10.4.5 |
| OTA adjacent channel selectivity | 0 dB | 10.5.5 |
| OTA In-band blocking (General) | 0 dB | 10.5.5 |
| OTA In-band blocking (Narrowband) | 0 dB | 10.5.5 |
| OTA out-of-band blocking (General) | 0 dB | 14.4 |
| OTA out-of-band blocking (Co-location) | 0 dB | 13.5.4 |
| OTA receiver spurious emissions | 0 dB (NOTE 2) | 12.3.4 |
| OTA receiver intermodulation | 0 dB | 10.6.5 |
| OTA in-channel selectivity | 1.7 dB, f ≤ 3.0 GHz  2.1 dB, 3.0 GHz < f ≤ 4.2 GHz  2.4 dB, 4.2 GHz < f ≤ 6.0 GHz | 10.7.4 |
| NOTE 1: TTOTA values are applicable for normal condition unless otherwise stated.  NOTE 2: From December 2019, the regulation around receiver spurious emissions has been clarified in ERC recommendation 74-01 [25] and the requirement has been updated. Since then OTA RX spurious emissions is a regulatory requirement with TT = 0 (as opoosed to the previous agreement with TT = MU). | | |

Table 18-4: Test Tolerance values derivation, RX FR2

|  |  |  |
| --- | --- | --- |
| Requirement | Test Tolerance (TTOTA) | Clause |
| OTA reference sensitivity level | 2.4 dB, 24.25 GHz < f ≤ 29.5 GHz  2.4 dB, 37 GHz < f ≤ 40 GHz | 10.2.8 |
| OTA adjacent channel selectivity | 0 dB | 10.5.5 |
| OTA In-band blocking (General) | 0 dB | 10.5.5 |
| OTA out-of-band blocking | 0 dB | 14.4 |
| OTA receiver spurious emissions | 0 dB | 12.3.4 |
| OTA receiver intermodulation | 0 dB | 10.6.5 |
| OTA in-channel selectivity | 3.4 dB, 24.25 GHz < f ≤ 29.5 GHz  3.4 dB, 37 GHz < f ≤ 40 GHz | 10.7.5 |
| NOTE: TTOTA values are applicable for normal condition unless otherwise stated. | | |

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