**3GPP TSG- Meeting #**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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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:*** | DraftCR to 38.181: Additional correction on FR2-NTN introduction MU table | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In RAN4#110bis, R4-2405999 was endorsed for introducing FR2-NTN in Clause 4.1. In this draftCR, proposing to add additional clarification on applicable frequency range for FR2-NTN in MU table.   1. Currently agreed values are for frequency range 17.3 GHz – 20.2 GHz, not for all of FR2-NTN frequncy range for some MU values 2. There is no need to define value for f > 60 GHz of spurious measurement   First point is to avoid confusion and add clarifty of defined value, as 38.141-2 shows applicable frequency range, it’s necessary to add applicable frequnecy range.  Second point is to avoid confusion because there is no need to define MU value for f > 60 GHz. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | On top of R4-2405999, further updating clause 4.1.2 MU Table for FR2-NTN   * Adding applicable frequncy range 17.3 GHz ≤ f ≤ 20.2 GHz on some MU values (for Table 4.1.2.2-3 for Tx), 27.5 GHz ≤ f ≤ 30.0 GHz for Rx (Table 4.1.2.3-3 for Rx) * Removing unnecessary value from spurious measurement (for Table 4.1.2.2-3 for Tx)   Other changes are from original draftCR (R4-2405999) | | | | | | | | |
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| ***Consequences if not approved:*** | | Applicable frequncy range of some MU values are confusing and mis-leading. | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### 4.1.2 Acceptable uncertainty of Test System

#### 4.1.2.1 General

The maximum acceptable uncertainty of the Conducted Test System and OTA Test System are specified below for each test defined explicitly in the present specification, where appropriate. The maximum acceptable uncertainty of the Test System for test requirements included by reference is defined in the respective referred test specification.

The Test System shall enable the stimulus signals in the test case to be adjusted to within the specified tolerance and 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.

For conducted RF tests, it should be noted that the uncertainties in clause 4.1.2 apply to the Test System operating into a nominal 50 ohm load and do not include system effects due to mismatch between the EUT and the Test System.

For details on measurement uncertainty budget calculation, measurement methodology description (including calibration and measurement stage for each test range), MU budget format and its contributions, refer to TR 37.941 [13], where MU analyses for the BS radiated testing were captured. The maximum OTA Test System uncertainty for FR1-NTN and FR2-NTN OTA transmitter and receiver tests were reused from BS MU budgets in TR 37.941 [13]. Reuse of TR 37.941 [13] MU values for SAN LEO radiated conformance testing is subject to the following conditions:

- EUT suitability to fit OTA chambers considered in TR 37.941 [13], and

- Environmental test conditions assumed for BS testing in TR 37.941 [13].

Reuse of TR 37.941 [13] TTOTA values for SAN GEO radiated conformance testing may not be justified for some products due to too large SAN GEO antenna array dimensions, and required OTA RF chamber size.

#### 4.1.2.2 Measurement of transmitter

The maximum conducted Test System uncertainty for conducted transmitter tests minimum requirements is given in table 4.1.2.2-1. The maximum OTA Test System uncertainty for OTA transmitter tests minimum requirements is given in table 4.1.2.2-2 for FR1-NTN and in table 4.1.2.2-3 fro FR2-NTN.

Table 4.1.2.2-1: Maximum Test System uncertainty for conducted transmitter tests

| Clause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| --- | --- | --- |
| 6.2 SAN output power | ±0.7 dB, f ≤ 3 GHz |  |
| 6.3 Output power dynamics | ± 0.4 dB |  |
| 6.5.2 Frequency error | ± 12 Hz |  |
| 6.5.3 EVM | ± 1% |  |
| 6.6.2 Occupied bandwidth | 5 MHz, 10 MHz SAN Channel BW: ±100 kHz  15 MHz, 20 MHz SAN Channel BW: ±300 kHz |  |
| 6.6.3 Adjacent Channel Leakage power Ratio (ACLR) | ACLR  BW ≤ 20MHz: ±0.8 dB |  |
| 6.6.4 Out-of-band emissions | ±1.5 dB, f ≤ 3 GHz |  |
| 6.6.5.5.1.1 Transmitter spurious emissions, Mandatory Requirements | 9 kHz < f ≤ 4 GHz: ±2.0 dB  4 GHz < f ≤ 15 GHz: ±4.0 dB |  |
| 6.6.5.5.1.2 Transmitter spurious emissions, Protection of SAN receiver | ±3.0 dB |  |

Table 4.1.2.2-2: Maximum OTA Test System uncertainty for FR1-NTN OTA transmitter tests

| Clause | Maximum OTA Test System uncertainty |
| --- | --- |
| 9.2 Radiated transmit power | Normal condition:  [±1.1] dB, f ≤ 3 GHz |
| 9.3 OTA base station output power | [±1.4] dB, f ≤ 3.0 GHz |
| 9.4.3 OTA total power dynamic range | [±0.4] dB |
| 9.6.2 OTA frequency error | [±12] Hz |
| 9.6.3 OTA modulation quality | [±1 %] |
| 9.7.2 OTA occupied bandwidth | [±100] kHz, BWChannel 5 MHz, 10 MHz  [±300] kHz, BWChannel 15 MHz, 20 MHz |
| 9.7.3 OTA ACLR | f ≤ 3.0 GHz  [±1] dB, BW ≤ 20MHz |
| 9.7.4 OTA out-of-band emissions | Absolute power [±1.8] dB, f ≤ 3.0 GHz |
| 9.7.5.2 OTA transmitter spurious emissions, mandatory requirements | [±2.3] dB, 30 MHz < f ≤ 6 GHz  [±4.2] dB, 6 GHz < f ≤ 15 GHz |
| NOTE: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

Table 4.1.2.2-3: Maximum OTA Test System uncertainty for FR2-NTN OTA transmitter tests

| Clause | Maximum OTA Test System uncertainty |
| --- | --- |
| 9.2 Radiated transmit power | Normal condition:  [±1.7] dB, 17.3 GHz ≤ f ≤ 20.2 GHz |
| 9.3 OTA base station output power | [±2.1] dB, 17.3 GHz ≤ f ≤ 20.2 GHz |
| 9.4.3 OTA total power dynamic range | [±0.4] dB |
| 9.6.2 OTA frequency error | [±12] Hz |
| 9.6.3 OTA modulation quality | [±1 %] |
| 9.7.2 OTA occupied bandwidth | 600 kHz |
| 9.7.3 OTA ACLR | [±2.3] dB, 17.3 GHz ≤ f ≤ 20.2 GHz |
| 9.7.4 OTA out-of-band emissions | Absolute power [±2.7] dB, 17.3 GHz ≤ f ≤ 20.2 GHz |
| 9.7.5.2 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 |
| NOTE: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

#### 4.1.2.3 Measurement of receiver

The maximum conducted Test System uncertainty for conducted receiver tests minimum requirements are given in table 4.1.2.3-1. The maximum OTA Test System uncertainty for OTA receiver tests minimum requirements are given in table 4.1.2.3-2 for FR1-NTN and in table 4.1.2.3-3 for FR2-NTN.

Table 4.1.2.3-1: Maximum Test System Uncertainty for conducted receiver tests

| Clause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| --- | --- | --- |
| 7.2 Reference sensitivity level | ±0.7 dB, f ≤ 3 GHz |  |
| 7.3 Dynamic range | ±0.3 dB |  |
| 7.4.1 Adjacent channel selectivity | ±1.4 dB, f ≤ 3 GHz | Overall system uncertainty comprises three quantities:  1. Wanted signal level error  2. Interferer signal level error  3. Additional impact of interferer leakage  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The interferer leakage effect is systematic, and is added arithmetically.  Test System uncertainty = SQRT (wanted\_level\_error2 + interferer\_level\_error2) + leakage effect.  f ≤ 3 GHz  Wanted signal level ±0.7 dB  Interferer signal level ±0.7 dB  f ≤ 6 GHz  Impact of interferer leakage 0.4 dB |
| 7.5.5.1 Out-of-band blocking | fwanted ≤ 3GHz  1MHz < finterferer ≤ 3 GHz: ±1.3 dB  3 GHz < finterferer ≤ 4.2 GHz: ±1.5 dB  4.2GHz < finterferer ≤ 12.75 GHz: ±3.2 dB | Overall system uncertainty comprises three quantities:  1. Wanted signal level error  2. Interferer signal level error  3. Interferer broadband noise  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared to provide the ratio error of the two signals. The Interferer Broadband noise effect is systematic, and is added arithmetically.  Test System uncertainty = SQRT (wanted\_level\_error2 + interferer\_level\_error2) + Broadband noise effect.  Out of band blocking, using CW interferer:  Wanted signal level:  ±0.7 dB up to 3 GHz  Interferer signal level:  ±1.0 dB up to 3 GHz  Impact of interferer Broadband noise 0.1 dB |
| 7.8 In-channel selectivity | ±1.4 dB, f ≤ 3 GHz |  |
| NOTE: Unless otherwise noted, only the Test System stimulus error is considered here. The effect of errors in the throughput measurements due to finite test duration is not considered. | | |

Table 4.1.2.3-2: Maximum OTA Test System uncertainty for FR1-NTN OTA receiver tests

|  |  |
| --- | --- |
| Clause | Maximum OTA Test System uncertainty |
| 10.2 OTA sensitivity | [±1.3] dB, f ≤ 3 GHz |
| 10.3 OTA reference sensitivity level | [±1.3] dB, f ≤ 3 GHz |
| 10.4 OTA dynamic range | [±0.3] dB |
| 10.5.1 OTA adjacent channel selectivity | [±1.7] dB, f ≤ 3 GHz |
| 10.6 OTA out-of-band blocking | 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 |
| 10.9 OTA in-channel selectivity | [±1.7] dB, f ≤ 3 GHz |
| NOTE: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

Table 4.1.2.3-3: Maximum OTA Test System uncertainty for FR2-NTN OTA receiver tests

|  |  |
| --- | --- |
| Clause | Maximum OTA Test System uncertainty |
| 10.3 OTA reference sensitivity level | [±2.4] dB, 27.5 GHz ≤ f ≤ 30.0 GHz |
| 10.5.1 OTA adjacent channel selectivity | [±3.4] dB, 27.5 GHz ≤ f ≤ 30.0 GHz |
| 10.6 OTA out-of-band blocking | [±3.6] dB, 27.5 GHz ≤ f ≤ 30.0 GHz |
| 10.9 OTA in-channel selectivity | [±3.4] dB, 27.5 GHz ≤ f ≤ 30.0 GHz |
| NOTE: Test system uncertainty values are applicable for normal condition unless otherwise stated. | |

#### 4.1.2.4 Measurement of performance requirements

Table 4.1.2.4-1: Maximum Test System Uncertainty for FR1-NTN conducted performance requirements

| **Clause** | **Maximum Test System Uncertainty** | **Derivation of Test System Uncertainty** |
| --- | --- | --- |
| 8 PUSCH, PUCCH, PRACH with single antenna port and fading channel | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 8 PRACH with single antenna port and AWGN | ± 0.3 dB | Signal-to-noise ratio uncertainty ±0.3 dB |

**Table 4.1.2.4-2: Maximum Test System Uncertainty for FR1-NTN OTA performance requirements**

| Clause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| --- | --- | --- |
| 11 PUSCH, PUCCH, PRACH with single antenna port and fading channel | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 11 PRACH with single antenna port and AWGN | ± 0.3 dB | Signal-to-noise ratio uncertainty ±0.3 dB |

**Table 4.1.2.4-3: Maximum Test System Uncertainty for FR2-NTN OTA performance requirements**

| Clause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| --- | --- | --- |
| 11 PUSCH, PUCCH, PRACH with single antenna port and fading channel | ± 0.6 dB | Overall system uncertainty for fading conditions comprises two quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  Items 1 and 2 are assumed to be uncorrelated so can be root sum squared:  Test System uncertainty = [SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2)]  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB |
| 11 PRACH with single antenna port and AWGN | ± 0.3 dB | Signal-to-noise ratio uncertainty ±0.3 dB |