**3GPP TSG-RAN5 Meeting #101 *R5-23XXXX***

**Chicago, United States, Nov 13 - 17, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **Text Proposal** | | | | | | | | |
|  | | | | | | | | |
|  | **36.521-4** | **CR** | **n/a** | **rev** | **-** | **Current version:** | **0.3.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | Update of Annex F Measurement Uncertainties | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CMCC, MediaTek, Keysight Technologies UK Ltd | | | | | | | | | |
| ***Source to TSG:*** | R5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NBIOT\_eMTC\_NTN\_req-UEConTest | | | | |  | ***Date:*** | | | 2023-08-31 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Measurement uncertainties in Annex F for new adding TCs are missing and need to be added. As per R5-235184, legacy eMTC category M1 and NB-IoT categories NB1 and NB2 MU and TT in TS 36.521-1 can be reused. 2. Editorial problems exist in F.1.2, F.1.3 and F.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Measurement uncertainties in Annex F for new adding TCs in TS 36.521-4 have been added. 2. Editorial correction of format issue in F.1.2, F.1.3 and F.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | TCs are incorrect. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | F.1.2, F.1.3**,** F.1.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 CHANGES >>>

## F.1.2 Measurement of transmitter

Table F.1.2-1: Maximum Test System Uncertainty for transmitter tests

|  |  |  |
| --- | --- | --- |
| Subclause | Maximum Test System Uncertainty | Derivation of Test System Uncertainty |
| 6.2A.1 UE maximum output power for category M1 | Same as clause 6.2.2EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2A.2 UE maximum output power reduction for category M1 | Same as clause 6.2.3EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2A.3 UE additional maximum output power reduction for category M1 UE | Same as clause 6.2.4EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2A.4 Configured transmitted Power for category M1 | Same as clause 6.2.5EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2B.1 UE maximum output power for category NB1 and NB2 | Same as clause 6.2.2F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2B.2 UE maximum output power reduction for category NB1 and NB2 | Same as clause 6.2.3F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2B.3 UE additional maximum output power reduction for category NB1 and NB2 UE | Same as clause 6.2.3F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.2B.4 Configured transmitted Power for category NB1 and NB2 | Same as clause 6.2.5F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.1 UE Minimum output power for category M1 | Same as clause 6.3.2EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.2 Transmit OFF power for category M1 | Same as clause 6.3.3EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.3.1 General ON/OFF time mask for category M1 | Same as clause 6.3.4EA.1 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.3.2.1 PRACH time mask for UE category M1 | Same as clause 6.3.4EA.2 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.3.2.2 SRS time mask for UE category M1 | Same as clause 6.3.4EA.2 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.4.1 Power Control Absolute power tolerance for UE category M1 | Same as clause 6.3.5EA.1 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 6.3A.4.2 Power Control Relative power tolerance for UE category M1 | Same as clause 6.3.5EA.2 in TS 36.521-1 [14] |  |
| 6.3A.4.3 Aggregate power control tolerance for UE category M1 | Same as clause 6.3.5EA.3 in TS 36.521-1 [14] |  |
| 6.3B.1 UE Minimum output power for category NB1 and NB2 | Same as clause 6.3.2F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.3B.2 Transmit OFF power for category NB1 and NB2 | Same as clause 6.3.3F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.3B.3.1 General ON/OFF time mask for category NB1 and NB2 | Same as clause 6.3.4F.1 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.3B.3.2 NPRACH time mask for category NB1 and NB2 | Same as clause 6.3.4F.2 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.3B.4.1 Power Control Absolute power tolerance for category NB1 and NB2 | Same as clause 6.3.5F.1 in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.3B.4.2 Power Control Relative power tolerance for category NB1 and NB2 | Same as clause 6.3.5F.2 in TS 36.521-1 [14] |  |
| 6.3B.4.3 Aggregate power control tolerance for category NB1 and NB2 | Same as clause 6.3.5F.3 in TS 36.521-1 [14] |  |
| 6.4A.2.1 Error Vector Magnitude (EVM) for category M1 | Same as clause 6.5.2.1EA.1 in TS 36.521-1 [14] |  |
| 6.4A.2.2 Carrier leakage for category M1 | Same as clause 6.5.2.2EA in TS 36.521-1 [14] |  |
| 6.4A.2.3 In-band emissions for non allocated RB for category M1 | Same as clause 6.5.2.3EA in TS 36.521-1 [14] |  |
| 6.4A.2.4 EVM equalizer spectrum flatness for category M1 | Same as clause 6.5.2.4EA in TS 36.521-1 [14] |  |
| 6.4B.2.1 Error Vector Magnitude (EVM) for Category NB1 and NB2 | Same as clause 6.5.2.1F.1 in TS 36.521-1 [14] |  |
| 6.4B.2.2 Carrier leakage for Category NB1 and NB2 | Same as clause 6.5.2.2F in TS 36.521-1 [14] |  |
| 6.4B.2.3 In-band emissions for Category NB1 and NB2 | Same as clause 6.5.2.3F in TS 36.521-1 [14] |  |
| 6.5A.2 Occupied bandwidth for category M1 | Same as clause 6.6.1EA in TS 36.521-1 [14] for FDD band with “channel bandwidth = 1.4MHz”. |  |
| 6.5A.3.2 Spectrum emission mask for category M1 | Same as clause 6.6.2.1EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.5A.3.4 Adjacent Channel Leakage Ratio for category M1 | Same as clause 6.6.2.3EA in TS 36.521-1 [14] |  |
| 6.5A.4.2 Transmitter Spurious emissions for category M1 | Same as clause 6.6.3EA.1 in TS 36.521-1 [14] for FDD band for spurious frequencies up to 12.75 GHz |  |
| 6.5A.4.3 Spurious emission band UE co-existence for category M1 | Same as clause 6.6.3EA.2 in TS 36.521-1 [14] for FDD band with “results > -60 dBm, f ≤ 3.0GHz” |  |
| 6.5A.4.4 Additional spurious emissions for category M1 | ± 2.0 dB, f ≤ 3.0GHz |  |
| 6.5B.2 Occupied bandwidth for category NB1 and NB2 | 200kHz: 2kHz |  |
| 6.5B.3.2 Spectrum emission mask for category NB1 and NB2 | Same as clause 6.6.2.1F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |
| 6.5B.3.4 Adjacent Channel Leakage Ratio for category NB1 and NB2 | Same as clause 6.6.2.3F in TS 36.521-1 [14] |  |
| 6.5B.4.2 Transmitter Spurious emissions for category NB1 and NB2 | Same as clause 6.6.3F.1 in TS 36.521-1[14] for f < 5th harmonic of the upper frequency edge of the UL operating band in GHz |  |
| 6.5B.4.3 Spurious emission band UE co-existence for category NB1 and NB2 | Same as clause 6.6.3F.2 in TS 36.521-1 [14] for FDD band with “results > -60 dBm, f ≤ 3.0GHz” |  |
| 6.5B.4.4 Additional spurious emissions for category NB1 and NB2 | ± 2.0 dB, f ≤ 3.0GHz |  |
| 6.6B Transmit intermodulation for category NB1 and NB2 | Same as clause 6.7F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz” |  |

## F.1.3 Measurement of receiver

Table F.1.3-1: Maximum Test System Uncertainty for receiver tests

|  |  |  |
| --- | --- | --- |
| Subclause | Maximum Test System Uncertainty1 | Derivation of Test System Uncertainty |
| 7.3B Reference sensitivity power level for UE category NB1 and NB2 | Same as clause 7.3F.1 in TS 36.521-1 [14] |  |
| 7.4A Maximum input level for category M1 | Same as clause 7.4EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 7.4B Maximum input level for category NB1 and NB2 | Same as clause 7.4F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 7.5A Adjacent Channel Selectivity for category M1 | Same as clause 7.5EA in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 7.5B Adjacent Channel Selectivity for category NB1 and NB2 | Same as clause 7.5F in TS 36.521-1 [14] for FDD band with “f ≤ 3.0GHz”. |  |
| 7.6A.2 In-band blocking for category M1 | Same as clause 7.6.1EA in TS 36.521-1 [14]. |  |
| 7.6B.2 In-band blocking for category NB1 and NB2 | Same as clause 7.6.1F in TS 36.521-1 [14]. |  |
| Note 1: 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. | | |

## F.1.4 Measurement of performance requirements

Table F.1.4-1: Maximum Test System Uncertainty for Performance Requirements

|  |  |  |
| --- | --- | --- |
| Subclause | Maximum Test System Uncertainty1 | Derivation of Test System Uncertainty |
| 8.2.1.1.1 PDSCH in standalone mode for UE category M1 under NTN fading conditions | ± 0.8 dB | Overall system uncertainty for fading conditions comprises three quantities:  1. Signal-to-noise ratio uncertainty  2. Fading profile power uncertainty  3. Effect of AWGN flatness and signal flatness  Items 1, 2 and 3 are assumed to be uncorrelated so can be root sum squared:  AWGN flatness and signal flatness has x 0.25 effect on the required SNR, so use sensitivity factor of x 0.25 for the uncertainty contribution.  Test System uncertainty = SQRT (Signal-to-noise ratio uncertainty 2 + Fading profile power uncertainty 2 + (0.25 x AWGN flatness and signal flatness) 2)  Signal-to-noise ratio uncertainty ±0.3 dB  Fading profile power uncertainty ±0.5 dB for single Tx  AWGN flatness and signal flatness ±2.0 dB |
| 8.3.1.1.1 Demodulation of NPDSCH (Cell-Specific Reference Symbols) in standalone mode for category NB1 and NB2 under NTN fading conditions | Same as clause 8.12.1.1.2 in TS 36.521-1 [14]. |  |
| 8.3.1.1.2 Demodulation of NPDSCH (Cell-Specific Reference Symbols) in standalone mode for category NB1 and NB2 | Same as clause 8.12.1.1.2 in TS 36.521-1 [14]. |  |
| 8.3.1.1.3 Demodulation of NPDSCH (Cell-Specific Reference Symbols) in standalone for NB2 | Same as clause 8.12.1.1.3 in TS 36.521-1 [14]. |  |
| 8.3.1.2.1 Demodulation of NPDCCH single-antenna performance for category NB1 and NB2 | Same as clause 8.12.2.1.1 in TS 36.521-1 [14]. |  |
| Note 1: 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. | | |

<< END OF CHANGES >>