**3GPP TSG-RAN4 Meeting #99-e *R4-2110884***

**Electronic Meeting, May 19–27, 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **draft** | **rev** | **-** | **Current version:** | **16.7.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | draftCR to introduce accuracy requirements for RSTD measurement | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos-Perf | | | | |  | ***Date:*** | | | 2021-04-30 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | This draftCR is based on Big draftCR R4-2105751 endorsed at RAN4#98-bis-e. According to the work split in R4-2017158, this CR introduces RSTD measuremrent accuracy requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduces RSTD measuremrent accuracy requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There is no RSTD measuremrent accuracy requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 10.1.23 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 1>

10.1.23 RSTD Measurements

10.1.23.1 Introduction

The requirements in Clause 10.1.23 shall apply, provided the UE has received *nr-DL-TDOA-RequestLocationInformation* message from LMF via LPP [34] requesting the UE to report one or more DL RSTD measurements defined in TS 38.215 [4].

#### 10.1.23.2 Measurement Accuracy Requirements

The RSTD measurement reported by the UE shall fulfil the accuracy requirements defined in Table 10.1.23.2-1 for fading channel and Table 10.1.23.2-3 for AWGN channel for FR1, provided that the following conditions are met.

- Conditions defined in clause 7.3 of TS 38.101-1 [18] for reference sensitivity are fulfilled.

- Conditions for RSTD measurements are fulfilled according to Annex B.2.z for a corresponding Band for each relevant PRS resource configured for measurement.

The RSTD measurement reported by the UE shall fulfil the accuracy requirements defined in Table 10.1.23.2-2 for fading channel and Table 10.1.23.2-4 for AWGN channel for FR2, provided that the following conditions are met.

- Conditions defined in clause 7.3 of TS 38.101-2 [19] for reference sensitivity are fulfilled.

- Conditions for RSTD measurements are fulfilled according to Annex B.2.z for a corresponding Band for each relevant PRS resource configured for measurement.

Note: The requriements for fading channel in this clause are derived based on TDL-A (30 ns delay spread, 5Hz) and TDL-C (60 ns delay spread, 300 Hz) channel models.

**Table 10.1.23.2-1: RSTD absolute accuracy in FR1 for fading channel**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | **Conditions** | | | | | | |
| **PRS Ês/Iot** | **PRS SCS** | **PRS bandwidth**  **Note 1** | **PRS resource repetition ()**  **Note 2** | **Io Note 3 range** | | |
| **NR operating band groups Note 4** | **Minimum Io** | **Maximum Io** |
| **Tc Note 5** | **dB** | **kHz** | **RB** |  |  | **dBm/SCS** | **dBm/BWChannel** |
| TBD+ΔNote 7 | (PRS Ês/Iot)ref ≥-6dB  (PRS Ês/Iot)*i* ≥-13dB | 15 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -50 |
| NR\_FDD\_FR1\_B | -120.5 | -50 |
| NR\_TDD\_FR1\_C | -120 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -50 |
| NR\_FDD\_FR1\_F | -118.5 | -50 |
| NR\_FDD\_FR1\_G | -118 | -50 |
| NR\_FDD\_FR1\_H | -117.5 | -50 |
| TBD+Δ | ≥ [52] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | ≥ [104] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | 30 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -118 | -50 |
| NR\_FDD\_FR1\_B | -117.5 | -50 |
| NR\_TDD\_FR1\_C | -117 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -116.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -116 | -50 |
| NR\_FDD\_FR1\_F | -115.5 | -50 |
| NR\_FDD\_FR1\_G | -115 | -50 |
| NR\_FDD\_FR1\_H | -114.5 | -50 |
| TBD+Δ | ≥ [48] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | ≥ [132] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | 60 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -115 | -50 |
| NR\_FDD\_FR1\_B | -114.5 | -50 |
| NR\_TDD\_FR1\_C | -114 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -113.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -113 | -50 |
| NR\_FDD\_FR1\_F | -113.5 | -50 |
| NR\_FDD\_FR1\_G | -113 | -50 |
|  | NR\_FDD\_FR1\_H | -111.5 | -50 |
| TBD+Δ | ≥ [64] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| NOTE 1: Minimum PRS bandwidth, which is minimum of the PRS bandwidths of the reference resource and the measured neighbour resource i.  NOTE 2: Minimum number of PRS resource repetitions among the reference resource and the measured neighbour resource i. are configured by higher layer parameter *dl-PRS-ResourceRepetitionFactor, dl-PRS-NumSymbols and dl-PRS-CombSizeN*defined in TS 37.355 [34], respectively.  NOTE 3: Io is assumed to have constant EPRE across the bandwidth.  NOTE 4: NR operating band groups in FR1 are as defined in clause 3.5.2.  NOTE 5: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 6: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 7: Δ=TBD. | | | | | | | |

**Table 10.1.23.2-2: RSTD absolute accuracy in FR2 for fading channel**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | **Conditions** | | | | | |
| **PRS Ês/Iot** | **PRS SCS** | **PRS bandwidth**  **Note 1** | **PRS resource repetition**  **() Note 2** | **Io Note 3 range** | |
| **Minimum Io** | **Maximum Io** |
| **Tc Note 4** | **dB** | **kHz** | **RB** |  | **dBm/SCS** | **dBm/BWChannel** |
| TBD+ΔNote 6 | (PRS Ês/Iot)ref ≥-6dB  (PRS Ês/Iot)*i* ≥-13dB | 60 | ≥ [24] | ≥ [4] | Same value as PRS\_RP in Table B.2.z-2, according to UE Power class, operating band and angle of arrival | -50 |
| TBD+Δ | ≥ [64] | ≥ [1] | Note 5 | Note 5 |
|  | ≥ [132] | ≥ [1] | Note 5 | Note 5 |
| TBD+Δ | 120 | ≥ [32] | ≥ [4] | Same value as PRS\_RP in Table B.2.z-2, according to UE Power class, operating band and angle of arrival | -50 |
|  | ≥ [64] | ≥ [1] | Note 5 | Note 5 |
| TBD+Δ | ≥ [128] | ≥ [1] | Note 5 | Note 5 |
| NOTE 1: Minimum PRS bandwidth, which is minimum of the PRS bandwidths of the reference resource and the measured neighbour resource i.  NOTE 2: Minimum number of PRS resource repetitions among the reference resource and the measured neighbour resource i. are configured by higher layer parameter *dl-PRS-ResourceRepetitionFactor, dl-PRS-NumSymbols and dl-PRS-CombSizeN*defined in TS 37.355 [34], respectively.  NOTE 3: Io is assumed to have constant EPRE across the bandwidth.  NOTE 4: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 5: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 6: Δ=TBD. | | | | | | |

**Table 10.1.23.2-3: RSTD absolute accuracy in FR1 for AWGN channel**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | **Conditions** | | | | | | |
| **PRS Ês/Iot** | **PRS SCS** | **PRS bandwidth**  **Note 1** | **PRS resource repetition ()**  **Note 2** | **Io Note 3 range** | | |
| **NR operating band groups Note 4** | **Minimum Io** | **Maximum Io** |
| **Tc Note 5** | **dB** | **kHz** | **RB** |  |  | **dBm/SCS** | **dBm/BWChannel** |
| TBD+ΔNote 7 | (PRS Ês/Iot)ref ≥-6dB  (PRS Ês/Iot)*i* ≥-13dB | 15 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -50 |
| NR\_FDD\_FR1\_B | -120.5 | -50 |
| NR\_TDD\_FR1\_C | -120 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -50 |
| NR\_FDD\_FR1\_F | -118.5 | -50 |
| NR\_FDD\_FR1\_G | -118 | -50 |
| NR\_FDD\_FR1\_H | -117.5 | -50 |
| TBD+Δ | ≥ [52] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | ≥ [104] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | 30 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -118 | -50 |
| NR\_FDD\_FR1\_B | -117.5 | -50 |
| NR\_TDD\_FR1\_C | -117 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -116.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -116 | -50 |
| NR\_FDD\_FR1\_F | -115.5 | -50 |
| NR\_FDD\_FR1\_G | -115 | -50 |
| NR\_FDD\_FR1\_H | -114.5 | -50 |
| TBD+Δ | ≥ [48] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | ≥ [132] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| TBD+Δ | 60 | ≥ [24] | ≥ [4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -115 | -50 |
| NR\_FDD\_FR1\_B | -114.5 | -50 |
| NR\_TDD\_FR1\_C | -114 | -50 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -113.5 | -50 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -113 | -50 |
| NR\_FDD\_FR1\_F | -113.5 | -50 |
| NR\_FDD\_FR1\_G | -113 | -50 |
| NR\_FDD\_FR1\_H | -111.5 | -50 |
| TBD+Δ | ≥ [64] | ≥ [1] | Note 6 | Note 6 | Note 6 |
| NOTE 1: Minimum PRS bandwidth, which is minimum of the PRS bandwidths of the reference resource and the measured neighbour resource i.  NOTE 2: Minimum number of PRS resource repetitions among the reference resource and the measured neighbour resource i. are configured by higher layer parameter *dl-PRS-ResourceRepetitionFactor, dl-PRS-NumSymbols and dl-PRS-CombSizeN*defined in TS 37.355 [34], respectively.  NOTE 3: Io is assumed to have constant EPRE across the bandwidth.  NOTE 4: NR operating band groups in FR1 are as defined in clause 3.5.2.  NOTE 5: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 6: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 7: Δ=TBD. | | | | | | | |

**Table 10.1.23.2-4: RSTD absolute accuracy in FR2 for AWGN channel**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | **Conditions** | | | | | |
| **PRS Ês/Iot** | **PRS SCS** | **PRS bandwidth**  **Note 1** | **PRS resource repetition**  **() Note 2** | **Io Note 3 range** | |
| **Minimum Io** | **Maximum Io** |
| **Tc Note 4** | **dB** | **kHz** | **RB** |  | **dBm/SCS** | **dBm/BWChannel** |
| TBD+ΔNote 6 | (PRS Ês/Iot)ref ≥-6dB  (PRS Ês/Iot)*i* ≥-13dB | 60 | ≥ [24] | ≥ [1] | Same value as PRS\_RP in Table B.2.z-2, according to UE Power class, operating band and angle of arrival | -50 |
| TBD+Δ | ≥ [64] | ≥ [1] | Note 5 | Note 5 |
| TBD+Δ | ≥ [132] | ≥ [1] | Note 5 | Note 5 |
| TBD+Δ | 120 | ≥ [32] | ≥ [1] | Same value as PRS\_RP in Table B.2.z-2, according to UE Power class, operating band and angle of arrival | -50 |
| TBD+Δ | ≥ [64] | ≥ [1] | Note 5 | Note 5 |
| TBD+Δ | ≥ [128] | ≥ [1] | Note 5 | Note 5 |
| NOTE 1: Minimum PRS bandwidth, which is minimum of the PRS bandwidths of the reference resource and the measured neighbour resource i.  NOTE 2: Minimum number of PRS resource repetitions among the reference resource and the measured neighbour resource i. are configured by higher layer parameter *dl-PRS-ResourceRepetitionFactor, dl-PRS-NumSymbols and dl-PRS-CombSizeN*defined in TS 37.355 [34], respectively.  NOTE 3: Io is assumed to have constant EPRE across the bandwidth.  NOTE 4: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 5: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 6: Δ=TBD. | | | | | | |

<End of Change 1>