**3GPP TSG-RAN4 Meeting #111 *R4-2409798***

Fukuoka, Japan, May 20th – 24th, 2024

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **4610** | **rev** | **1** | **Current version:** | **17.13.0** |  |
|  | | | | | | | | |
| *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:*** | (NR\_redcap-Perf) Formal CR to Rel-17 TS 38.133: on RedCap Perf maintenance | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | MediaTek inc. | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_redcap-Perf | | | | |  | ***Date:*** | | | 2024-05-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | There are various typo mistakes for the calculated delay needed for inter-frequency test cases. Also, some agreements from RAN4 RRM are not captured in the accuracy requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | **Changes from 1 to 5**:   * The calculation are:  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | TC ID |  | SMTC | DRX | GAP | PSS/SSS detection | Meas period | SSB index detection | total delay | Current TC req. | | 16.6.2.5  1RX |  | 20ms | no | 40ms | Table 9.3B.4-3:  600ms | Table 9.3B.5-3: 400ms | Table 9.3B.4-6: 240ms | **1240 ms** | **920ms** | | 16.6.2.6  2RX |  | 20ms | no | 40ms | Table 9.3B.4-1: 600ms | Table 9.3B.5-1: 320ms | Table 9.3B.4-4: 120ms | **1040 ms** | **920ms** | | 16.6.2.11  1RX | config 1/4 | 20ms | 40ms | 0 | Table 9.3B.7.1-3: 600ms | Table 9.3B.7.2-3: 320ms | Table 9.3B.7.1-5: 360ms | **1280 ms** | **1080ms** | | config 2/3 | 20ms | 40ms | 0 | Table 9.3B.7.1-3: 600ms | Table 9.3B.7.2-3: 320ms | 0 | **920ms** | **900ms** | | 16.6.2.12  2RX | config 1/4 | 20ms | 40ms | 0 | Table 9.3B.7.1-1: 600ms | Table 9.3B.7.2-1: 320ms | Table 9.3B.7.1-4: 200ms | **1120ms** | **1080ms** | | config 2/3 | 20ms | 40ms | 0 | Table 9.3B.7.1-1: 600ms | Table 9.3B.7.2-1: 320ms | 0 | **920ms** | **900ms** |   **Changes 6**:   * In May 2022, RAN4 RRM reached the following agreement [R4-2210592], as below. Yet, the agreements are not captured in the accuracy requirements.  |  | | --- | | Sub-topic 4-3 CBD including L1-RSRP measurements   * **CSI-RS based L1-RSRP measurements: absolute accuracy with measurement restriction in FR1**   + Relax by 3 dB when 1Rx is used compared with the legacy UE. * **CSI-RS based L1-RSRP measurements: relative accuracy with measurement restriction in FR1**   + Relax the relative L1-RSRP accuracy by 3dB | | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The inter-frequency test cases for RedCap will not be correct | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.16.6.2.5, A.16.6.2.6, A.16.6.2.8, A.16.6.2.11, A.16.6.2.12, 10.1A.14.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

<unimpacted clauses are removed>

##### A.16.6.2.5.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1240] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

<End of Change 1>

<Start of Change 2>

<unimpacted clauses are removed>

##### A.16.6.2.6.2 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1040] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

<End of Change 2>

<Start of Change 4>

<unimpacted clauses are removed>

##### A.16.6.2.11.2 Test Requirements

In test config 1, UE is required to report SSB time index. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1280] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test config 2 and 3, UE is not required to report SSB time index. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [920] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

<End of Change 4>

<Start of Change 5>

<unimpacted clauses are removed>

##### A.16.6.2.12.2 Test Requirements

In test config 1 and 4, UE is required to report SSB time index. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1120] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test config 2 and 3, UE is not required to report SSB time index. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [920] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

<End of Change 5>

<Start of Change 6>

<unimpacted clauses are removed>

#### 10.1A.14.2 CSI-RS based L1-RSRP accuracy requirements

##### 10.1A.14.2.1 Absolute Accuracy

The accuracy requirements in clause 10.1.19.2.2 shall apply when RedCap UE is capable of 2Rx. When UE is only required to support 1RX, the absolute accuracy requirements in Table 10.1A.14.2.1-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.2 for a corresponding Band for each relevant CSI-RS.

- The bandwidth of CSI-RS is 48 PRBs and the density is 3.

The performance with larger bandwidth of CSI-RS is equal to or better than the accuracy requirements in Table 10.1A.19.2.1-1.

Table 10.1A.14.2.1-1: CSI-RS based L1-RSRP absolute accuracy for 1Rx RedCap UE in FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | |
| Normal condition | Extreme condition | CSI-RS Ês/Iot | Io Note 1 range | | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSCSI-RS | | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -118 | -115 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 | N/A | -70 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | -114 | N/A | -70 |
| ±8.0 | ±12.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | -112 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 | N/A | -70 |
| ±11.5 | ±14.5 | ≥-3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B, NR\_TDD\_FR1\_C, NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D, NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E, NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G, NR\_FDD\_FR1\_H | N/A | N/A | N/A | -70 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | |

##### 10.1A.14.2.2 Relative Accuracy

The accuracy requirements in clause 10.1.19.2.2 shall apply when RedCap UE is capable of 2Rx. When UE is only required to support 1RX, the absolute accuracy requirements in Table 10.1A.14.2.2-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.2 for a corresponding Band for each relevant CSI-RS.

- The bandwidth of CSI-RS is 48 PRBs and the density is 3.

The performance with larger bandwidth of CSI-RS is equal to or better than the accuracy requirements in Table 10.1A.14.2.2-1.

Table 10.1A.14.2.2-1: CSI-RS based L1-RSRP relative accuracy for 1Rx RedCap UE in FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | |
| Normal condition | Extreme condition | CSI-RS Ês/Iot Note 2 | Io Note 1 range | | | | | |
|  |  |  | NR operating band groups Note 4 | Minimum Io | | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSCSI-RS | | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -118 | -115 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 | N/A | -50 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | -114 | N/A | -50 |
| ±6 | ±7 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | -112 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The parameter CSI-RS Ês/Iot is the minimum CSI-RS Ês/Iot of the pair of CSI-RS resources to which the requirement applies.  NOTE 3: Void  NOTE 4: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | |

<End of Change 6>