**3GPP TSG-RAN4 Meeting #94-e *R4-2002254***

**Online, 24th February – 6th March 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | 0546 | **rev** | **1** | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *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:*** | CR on CLI measurement accuracy requirements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_CLI\_RIM-Perf | | | | |  | ***Date:*** | | | 2019-12-26 |
|  |  | | | |  | |  | | |  |
| ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The exact CLI measurement accuracy requirements are TBD. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Update the TBDs to exact numbers in CLI measurement accuracy requirements.  Update the Io conditions for FR1 bands. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | CLI measurmenet accuracy requirements are complete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 10.1.22 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

<Start of Change 1>

10.1.22 CLI measurement accuracy requirements

10.1.22.1 SRS-RSRP

10.1.22.1.1 SRS-RSRP Accuracy

The SRS-RSRP measurement reported by the UE shall fulfil the accuracy requirements defined in Table 10.1.22.1.1-1 for FR1 and Table 10.1.22.1.1-2 for FR2, 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 SRS-RSRP measurements are fulfilled according to Annex B.2.z for a corresponding Band for each relevant SRS resource configured for measurement.

- The time difference between UE’s DL reference timing in the serving cell and SRS arrival time is no larger than Terror\_SRS\_RSRP, where

- Terror\_SRS\_RSRP = TC × NTA\_offset + 4.67us for FR1

- Terror\_SRS\_RSRP = TC × NTA\_offset + 3.67us for FR2

- NTA\_offset is defined in Table 7.1.2-2

- TC is 0.509ns

- The bandwidth of the SRS resource is 48 PRBs.

- One of the following conditions is met

- There is no other SRS resource with the same root sequence and on the same symbol and with same comb as the relevant SRS resource.

- If multiple SRS resources are on the same symbol and with same comb, the distance between cyclic shifts of any two resources is no less than 6 if transmissionComb = n4, and no less than 4 if transmissionComb = n2.

**Table 10.1.22.1.1-1: SRS-RSRP absolute accuracy in FR1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | | | | | **Conditions** | | | | | | |
| **Normal condition** | | | **Extreme condition** | | | **SRS Ês/Iot** | **Io Note 1 range** | | | | | |
| **NR operating band groups Note 2** | **Minimum Io** | | | | **Maximum Io** |
| **dB** | | | | | | **dB** |  | **dBm / SCSSRS** | | | **dBm/BW Channel** | **dBm/BW Channel** |
| **SCSSRS (kHz)** | | | **SCSSRS (kHz)** | | |
| **15** | **30** | **60** | **15** | **30** | **60** | **SCSSRS = 15 kHz** | **SCSSRS = 30 kHz** | **SCSSRS = 60 kHz** |
| ±[3] | ±[4] | ±[5.5] | ±[7.5] | ±[8.5] | ±[10] | ≥1 | NR\_TDD\_FR1\_A, | -120 | -117 | -114 | N/A | -70 |
| NR\_TDD\_FR1\_C | -119 | -116 | -113 | N/A | -70 |
| NR\_TDD\_FR1\_D | -118.5 | -115.5 | -112.5 | N/A | -70 |
| NR\_TDD\_FR1\_E | -118 | -115 | -112 | N/A | -70 |
| ±[6.5] | ±[7.5] | ±[9] | ±[9.5] | ±[10.5] | ±[12] | ≥1 | NR\_TDD\_FR1\_A,  NR\_TDD\_FR1\_C, NR\_TDD\_FR1\_D, NR\_TDD\_FR1\_E | 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. | | | | | | | | | | | | |



**Table 10.1.22.1.1-2: SRS-RSRP absolute accuracy in FR2**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | | | **Conditions** | | | | |
| **Normal condition** | | **Extreme condition** | | **SRS Ês/Iot** | **Io Note 1 range** | | | |
| **Minimum Io** | | | **Maximum Io** |
| **dB** | | | | **dB** | **dBm / SCSSRS Note 2** | | **dBm/BWChannel** | **dBm/BWChannel** |
| **SCSSRS (kHz)** | | **SCSSRS (kHz)** | | **SCSSRS = 60kHz** | **SCSSRS = 120kHz** |
| **60** | **120** | **60** | **120** |
| ±[6.5] | TBD | ±[9.5] | TBD | ≥1 | Same value as SRS\_RP in Table TBD, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±[9.5] | TBD | ±[11.5] | TBD | ≥1 | N/A | | -70 | -50 |
| NOTE 1: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.  NOTE 2: Values based on Refsens and EIS spherical coverage as defined in clauses 7.3.2 and 7.3.4 of TS 38.101-2 [19]. Applicable side condition selected depending on angle of arrival.  NOTE 3: In the test cases, the SSB Ês/Iot and related parameters may need to be adjusted to ensure Ês/Iot at UE baseband is above the value defined in this table. | | | | | | | | |

10.1.22.1.2 SRS-RSRP report mapping

The reporting range of SRS-RSRP is defined from -140 dBm to -44 dBm with 1 dB resolution. The mapping of measured quantity is defined in Table 10.1.22.1.2-1. The range in the signalling may be larger than the guaranteed accuracy range.

**Table 10.1.22.1.2-1: SRS-RSRP measurement report mapping**

|  |  |  |
| --- | --- | --- |
| **Reported value** | **Measured quantity value** | **Unit** |
| SRS-RSRP\_0 | SRS-RSRP<-140 | dBm |
| SRS-RSRP\_1 | -140≤ SRS-RSRP<-139 | dBm |
| SRS-RSRP\_2 | -139≤ SRS-RSRP<-138 | dBm |
| SRS-RSRP\_3 | -138≤ SRS-RSRP<-137 | dBm |
| SRS-RSRP\_4 | -137≤ SRS-RSRP<-136 | dBm |
| .. | .. | … |
| SRS-RSRP\_95 | -46≤ SRS-RSRP<-45 | dBm |
| SRS-RSRP\_96 | -45≤ SRS-RSRP<-44 | dBm |
| SRS-RSRP\_97 | -44≤ SRS-RSRP | dBm |
| SRS-RSRP\_98 | Infinity |  |
| Note: ‘Infinity’ means that UE cannot detect SRS due to too strong signal to measure. | | |

10.1.22.2 CLI-RSSI

10.1.22.2.1 CLI-RSSI Accuracy

The CLI-RSSI measurement reported by the UE shall fulfil the accuracy requirements defined in Table 10.1.22.2.1-1 for FR1 and Table 10.1.22.2.1-2 for FR2, provided that the following conditions are met.

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

**Table 10.1.22.2.1-1: CLI-RSSI absolute accuracy in FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | | |
| **Normal condition** | **Extreme condition** | **Io Note 1 range** | | | | | |
| **NR operating band groups Note 2** | **Minimum Io** | | | | **Maximum Io** |
| **dB** | **dB** |  | **dBm / SCSSRS** | | | **dBm/BWChannel** | **dBm/BWChannel** |
| **SCSSRS = 15 kHz** | **SCSSRS = 30 kHz** | **SCSSRS = 60 kHz** |
| ±[3.5] | ±[6.5] | NR\_TDD\_FR1\_A, | -120 | -117 | -114 | N/A | -70 |
| NR\_TDD\_FR1\_C | -119 | -116 | -113 | N/A | -70 |
| NR\_TDD\_FR1\_D | -118.5 | -115.5 | -112.5 | N/A | -70 |
| NR\_TDD\_FR1\_E | -118 | -115 | -112 | N/A | -70 |
| ±[5.5] | ±[8.5] | Note 3 | Note 3 | Note 3 | Note 3 | -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.  NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. | | | | | | | |

**Table 10.1.22.2.1-2: CLI-RSSI absolute accuracy in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | |
| **Normal condition** | **Extreme condition** | **Io Note 1 range** | | | |
| **Minimum Io** | | | **Maximum Io** |
| **dB** | **dB** | **dBm / SCSSRS Note 2** | | **dBm/BWChannel** | **dBm/BWChannel** |
| **SCSSRS = 60kHz** | **SCSSRS = 120kHz** |
| ±[5] | ±[8] | Same value as SRS\_RP in Table TBD, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±[7] | ±[10] | Note 4 | | -70 | -50 |
| NOTE 1: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.  NOTE 2: Values based on Refsens and EIS spherical coverage as defined in clauses 7.3.2 and 7.3.4 of TS 38.101-2 [19]. Applicable side condition selected depending on angle of arrival.  NOTE 3: In the test cases, the SSB Ês/Iot and related parameters may need to be adjusted to ensure Ês/Iot at UE baseband is above the value defined in this table.  NOTE 4: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement. | | | | | |

<End of Change 1>