**3GPP TSG- RAN4 Meeting #** **111 *R4-2408586***

**Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **-** | **rev** | **1** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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:*** | Correction on L1-RSRP accuracy requirements on neighbor cells | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_Mob\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-5-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Allign the discription of measurement accuracy for both intra-frequency and inter-frequency L1-RSRP on neighbor cells in FR1 and FR2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Allign the discription of measurement accuracy for both intra-frequency and inter-frequency L1-RSRP on neighbor cells in FR1 and FR2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | 10.1.19X, 10.1.19Y, 10.1.20X, 10.1.20Y | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS38.533 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

### 10.1.19X LTM Intra-frequency L1-RSRP accuracy requirements for FR1

#### 10.1.19X.1 SSB based intra-frequency L1-RSRP accuracy requirements

##### 10.1.19X.1.1 Absolute Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SSB based intra-frequency L1-RSRP in this clause apply to all SSBs of candidate neighbour cell(s) on the same frequency as that of the serving cell in FR1.

The accuracy requirements in Table 10.1.19X.1.1-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

Table 10.1.19X.1.1-1: SSB based L1-RSRP absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -70 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -70 |
| ±5.0 | ±9.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_N | -114.5 | -111.5 | N/A | -70 |
| ±8.5 | ±11.5 | ≥-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,  NR\_FDD\_FR1\_N | 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. | | | | | | | |

##### 10.1.19X.1.2 Relative Accuracy

The relative accuracy of SSB based L1-RSRP is defined as the L1-RSRP measured from one SSB compared to the largest measured value of L1-RSRP among all SSBs of the cell(s) on the same frequency in FR1.The accuracy requirements in Table 10.1.19X.1.2-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

Table 10.1.19X.1.2-1: SSB based L1-RSRP relative accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot Note 2 | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 4 | Minimum Io | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -118 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -50 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -50 |
| ±3 | ±4 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_N | -114.5 | -111.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of SSBs 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 1>

<Start of Change 2>

### 10.1.19y LTM Inter-frequency L1-RSRP accuracy requirements for FR1

#### 10.1.19y.1 SSB based Inter-frequency L1-RSRP accuracy requirements for FR1

##### 10.1.19y.1.1 Absolute Accuracy

The accuracy requirements in Table 10.1.19y.1.1-1 are valid under the following conditions:

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

- Conditions for inter-frequency L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

Table 10.1.19y.1.1-1: Inter-frequency L1-RSRP absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -70 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -70 |
| ±5.0 | ±9.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_N | -114.5 | -111.5 | N/A | -70 |
| ±8.5 | ±11.5 | ≥-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,  NR\_FDD\_FR1\_N | 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. | | | | | | | |

##### 10.1.19y.1.2 Relative Accuracy

The relative accuracy of SSB based L1-RSRP is defined as the L1-RSRP measured from one SSB from one cell on a frequency in FR1 compared to the largest measured value of L1-RSRP among all SSBs measured from another cell on another frequency in FR1.

The accuracy requirements in Table 10.1.19y.1.2-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

Table 10.1.19y.1.2-1: Inter-frequency L1-RSRP relative accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -70 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -70 |
| ±5.0 | ±9.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -70 |
|  |  |  | NR\_FDD\_FR1\_N | -114.5 | -111.5 | N/A | -70 |
| 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. | | | | | | | |

<End of Change 2>

<Start of Change 3>

### 10.1.20X LTM Intra-frequency L1-RSRP accuracy requirements for FR2

#### 10.1.20X.1 SSB based intra-frequency L1-RSRP accuracy requirements

##### 10.1.20X.1.1 Absolute Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SSB based intra-frequency L1-RSRP in this clause apply to all SSBs of candidate neighbour cells on the same frequency as that of the serving cell in FR2.

The accuracy requirements in Table 10.1.20X.1.1-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

- The measured signals are in the directions covered by the percentile EIS spherical coverage of the UE, defined in clause 7.3.4 of TS 38.101-2 [19].

Table 10.1.20X.1.1-1: SSB based L1-RSRP absolute accuracy in FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | |
|  |  |  | Minimum Io | | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 2 | | dBm/BWChannel | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |  |
| ±6.5 | ±9.5 | ≥-3 | Same value as SSB\_RP in Table B.2.4.1-2, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±8.5 | ±11.5 | ≥-3 | 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. | | | | | | |

##### 10.1.20X.1.2 Relative Accuracy

The relative accuracy of SSB based L1-RSRP is defined as the L1-RSRP measured from one SSB compared to the largest measured value of L1-RSRP among all SSBs of the cell(s) on the same frequency in FR2.

The accuracy requirements in Table 10.1.20X.1.2-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

- The measured signals are in the directions covered by the percentile EIS spherical coverage of the UE, defined in clause 7.3.4 of TS 38.101-2 [19].

Table 10.1.20X.1.2-1: SSB based L1-RSRP relative accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 3 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±6.5 | ±9.5 | ≥-3 | Same value as SSB\_RP in Table B.2.4.1-2, according to UE Power class, operating band and angle of arrival | | -50 |
| NOTE 1: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.  NOTE 2: The parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of SSBs to which the requirement applies.  NOTE 3: 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 4: 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. | | | | | |

<End of Change 3>

<Start of Change 4>

### 10.1.20Y LTM Inter-frequency L1-RSRP accuracy requirements for FR2

#### 10.1.20Y.1 SSB based L1-RSRP accuracy requirements

##### 10.1.20Y.1.1 Absolute Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SSB based L1-RSRP in this clause apply to all SSBs of candidate neighbour cell(s) on a frequency in FR2 that is on a different frequency than the serving cell.

The accuracy requirements in Table 10.1.20Y.1.1-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

- The measured signals are in the directions covered by the percentile EIS spherical coverage of the UE, defined in clause 7.3.4 of TS 38.101-2 [19].

Table 10.1.20Y.1.1-1: SSB based L1-RSRP absolute accuracy in FR2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | |
|  |  |  | Minimum Io | | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 2 | | dBm/BWChannel | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |  |
| ±6.5 | ±9.5 | ≥-3 | Same value as SSB\_RP in Table B.2.4.1-2, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±8.5 | ±11.5 | ≥-3 | 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. | | | | | | |

##### 10.1.20Y.1.2 Relative Accuracy

The relative accuracy of SSB based L1-RSRP is defined as the L1-RSRP measured from one SSB from one cell on a frequency in FR2 compared to the largest measured value of L1-RSRP among all SSBs measured from another cell on another frequency in FR2.

The accuracy requirements in Table 10.1.20Y.1.2-1 are valid under the following conditions:

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

- Conditions for L1-RSRP measurements are fulfilled according to Annex B.2.4.1 for a corresponding Band for each relevant SSB.

- The measured signals are in the directions covered by the percentile EIS spherical coverage of the UE, defined in clause 7.3.4 of TS 38.101-2 [19].

Table 10.1.20Y.1.2-1: SSB based L1-RSRP relative accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 3 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±6.5 | ±9.5 | ≥-3 | Same value as SSB\_RP in Table B.2.4.1-2, according to UE Power class, operating band and angle of arrival | | -50 |
| NOTE 1: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.  NOTE 2: The parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of SSBs to which the requirement applies.  NOTE 3: 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 4: 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. | | | | | |

<End of Change 4>