**3GPP TSG-RAN WG4 Meeting #** **98-bis-e R4-2105777**

**Electronic Meeting, Apr.12 - 20, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | DraftCR | **rev** |  | **Current version:** | **16.6.0** |  |
|  |
| *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:***  | 38.133 draftCR on the CSI-RSRP accuracy requirements  |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_CSIRS\_L3meas-Perf  |  | ***Date:*** | 2021-4-16 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 canbe 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:*** | The Draft Big CR for the CSI-RS RRM performance requirements was endorsed in R4-2101291 in RAN4#98-e meeting, but leaving the value of the upper bound of timing offset open. This Draft CR is to update the value based on the discussion in RAN4#98bis-e.  |
|  |  |
| ***Summary of change:*** | The CSI-RSRP accuracy requirements are provided for intra-frequency and inter-frequency CSI-RS based measurements. The new change in this CR is tracked with “RAN4-98bis”. |
|  |  |
| ***Consequences if not approved:*** | The CSI-RSRP performance requirements are not complete. |
|  |  |
| ***Clauses affected:*** | Section 10.1.2.3, 10.1.3.3, 10.1.4.3, 10.1.5.3 |
|  |  |
|  | **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>

#### 10.1.2.3 Intra-frequency CSI-RSRP accuracy requirements

##### 10.1.2.3.1 Absolute CSI-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of CSI-RSRP in this clause apply to a cell where the CSI-RS resources to be measured have the same center frequency as the CSI-RS resources indicated for measurement in the serving cell in FR1.

The accuracy requirements in Table 10.1.2.3.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each associated SSB.

- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.8 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

 Table 10.1.2.3.1-1: CSI-RSRP Intra frequency absolute accuracy 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 |
| ±4.5 | ±9 | ≥-6 | 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 |
| 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 |
| ±8 | ±11 | ≥-6 | 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. |

##### 10.1.2.3.2 Relative CSI-RSRP Accuracy

The relative accuracy of CSI-RSRP is defined as the CSI-RSRP measured from one cell compared to the CSI-RSRP measured from another cell on the same center frequency, or between any two CSI-RSRP levels measured on the same cell in FR1.

The accuracy requirements in Table 10.1.2.3.2-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each associated SSB.

- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.8 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

Table 10.1.2.3.2-1: CSI-RSRP Intra frequency relative accuracy 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 |  |  |
| ±2 | ±3 | ≥-3 | 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 |
| 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 |
| ±3 | ±3 | ≥-6 | Note 3 | Note 3 | Note 3 | Note 3 | N/A | Note 3 |
| 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 cells to which the requirement applies.NOTE 3: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.NOTE 4: NR operating band groups in FR1 are as defined in clause 3.5.2. |

## <End of Change 1>

## <Start of Change 2>

#### 10.1.3.3 Intra-frequency CSI-RSRP accuracy requirements

##### 10.1.3.3.1 Absolute CSI-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of CSI-RSRP in this clause apply to a cell where the CSI-RS resources to be measured have the same center frequency as the CSI-RS resources indicated for measurement in the serving cell in FR2.

The accuracy requirements in Table 10.1.3.3.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each associated SSB(s).

- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.8 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

- 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 10.1.3.3.1-1: CSI-RSRP Intra frequency absolute accuracy in FR2

|  |  |
| --- | --- |
| Accuracy | Conditions |
| Normal condition | Extreme condition | CSI-RS Ês/Iot | Io Note 2 range |
| Minimum Io | Maximum Io |
| dB | dB | dB | dBm / SCSCSI-RS Note 1 | dBm/BWChannel | dBm/BWChannel |
| SCSCSI-RS = 60kHz | SCSCSI-RS = 120kHz |
| ±6 | ±9 | ≥-6 | Same value as CSI-RS\_RP in Table B.2.8-2, according to UE Power class, operating band and angle of arrival | N/A | -70 |
| ±8 | ±11 | N/A | -70 | -50 |
| Note 1: 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 2: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.Note 3: In the test cases, the CSI-RS 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. |

##### 10.1.3.3.2 Relative CSI-RSRP Accuracy

The relative accuracy of CSI-RSRP is defined as the CSI-RSRP measured from one cell compared to the CSI-RSRP measured from another cell on the same center frequency, or between any two CSI-RSRP levels measured on the same cell in FR2.

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

- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each associated SSB(s).

- Conditions for intra-frequency measurements are fulfilled according to Annex B.2.8 for a corresponding Band for each CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

- 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 10.1.3.3.2-1: CSI-RSRP Intra frequency relative accuracy in FR2

|  |  |
| --- | --- |
| Accuracy | Conditions |
| Normal condition | Extreme condition | CSI-RS Ês/Iot | Io Note 2 range |
| Minimum Io | Maximum Io |
| dB | dB | dB | dBm / SCS CSI-RS Note 1 | dBm/BWChannel |
| SCS CSI-RS = 60kHz | SCS CSI-RS = 120kHz |
| ±6 | ±9 | ≥-6 | Same value as CSI-RS\_RP in Table B.2.8-2, according to UE Power class, operating band and angle of arrival | -50 |
| Note 1: 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 2: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.Note 3: In the test cases, the CSI-RS 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 parameter CSI-RS Ês/Iot is the minimum CSI-RS Ês/Iot of the pair of cells to which the requirement applies. |

## <End of Change 2>

## <Start of Change 3>

#### 10.1.4.3 Inter-frequency CSI-RSRP accuracy requirements

##### 10.1.4.3.1 Absolute Accuracy of CSI-RSRP in FR1

The requirements for absolute accuracy of CSI-RSRP in this clause apply to a cell where the CSI-RS resources to be measured have the different center frequency as the CSI-RS resources indicated for measurement in the serving cell in FR1.

The accuracy requirements in Table 10.1.4.3.1-1 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 measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.9 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

Table 10.1.4.3.1-1: CSI-RSRP Inter frequency Absolute accuracy 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 |
| ±4.5 | ±9 | ≥-6 | 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 |
| ±8 | ±11 | ≥-6 | 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. |

##### 10.1.4.3.2 Relative Accuracy of CS-RSRP in FR1

The relative accuracy of CSI-RSRP in inter frequency case is defined as the CSI-RSRP measured from one cell on a frequency in FR1compared to the CSI-RSRP measured from another cell on a different frequency in FR1.

The accuracy requirements in Table 10.1.4.3.2-1 are valid under the following conditions:

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

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.9 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

- |CSI\_RP1dBm - CSI\_RP2dBm| ≤ 27 dB

- | Channel 1\_Io ‑Channel 2\_Io | ≤ 20 dB

Table 10.1.4.3.2-1: CSI-RSRP Inter frequency relative accuracy 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 |
| ±4.5 | ±6 | ≥-6 | 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: VoidNOTE 4: NR operating band groups in FR1 are as defined in clause 3.5.2. |

## <End of Change 3>

## <Start of Change 4>

#### 10.1.5.3 Inter-frequency CSI-RSRP accuracy requirements

##### 10.1.5.3.1 Absolute CSI-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of CSI-RSRP in this clause apply to a cell on a frequency in FR2 where the CSI-RS resources to be measured have the different center frequency as the CSI-RS resources indicated for measurement in the serving cell.

The accuracy requirements in Table 10.1.5.3.1-1 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 inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant associated SSB.

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.9 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

- 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 10.1.5.3.1-1: CSI-RSRP Inter frequency absolute accuracy in FR2**

|  |  |
| --- | --- |
| Accuracy | Conditions |
| Normal condition | Extreme condition | CSI-RS Ês/Iot | Io Note 2 range |
|  |  |  | Minimum Io | Maximum Io |
| dB | dB | dB | dBm / SCSCSI-RS Note 1 | dBm/BWChannel | dBm/BWChannel |
|  |  |  | SCSCSI-RS = 60kHz | SCSCSI-RS = 120kHz |  |  |
| ±6 | ±9 | ≥-4 | Same value as CSI\_RP in Table B.2.9-2, according to UE Power class, operating band and angle of arrival | N/A | -70 |
| ±8 | ±11 |  | N/A | -70 | -50 |
| Note 1: 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 2: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.Note 3: In the test cases, the CSI-RS 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. |

##### 10.1.5.3.2 Relative CSI-RSRP Accuracy

The relative accuracy of CSI-RSRP in inter frequency case is defined as the CSI-RSRP measured from one cell on a frequency in FR2 compared to the CSI-RSRP measured from another cell on another frequency in FR2.

The accuracy requirements in Table 10.1.5.3.2-1 are valid under the following conditions:

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

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant associated SSB.

- Conditions for inter-frequency measurements are fulfilled according to Annex B.2.9 for a corresponding Band for each relevant CSI-RS to be measured.

- The bandwidth of CSI-RS resource is 48PRB when density is 3.

- The timing offset between the reference measurement timing and the target CSI-RS in one layer is no larger than CP.

- |CSI\_RP1dBm - CSI\_RP2dBm| ≤ 27dB

- | Channel 1\_Io ‑Channel 2\_Io | ≤ 20 dB

- 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 10.1.5.3.2-1: CSI-RSRP Inter frequency relative accuracy in FR2

|  |  |
| --- | --- |
| Accuracy | Conditions |
| Normal condition | Extreme condition | CSI-RS Ês/Iot | Io Note 2 range |
|  |  |  | Minimum Io | Maximum Io |
| dB | dB | dB | dBm / SCSCSI-RS Note 1 | dBm/BWChannel |
|  |  |  | SCSCSI-RS = 60kHz | SCSCSI-RS = 120kHz |  |
| ±6 | ±9 | ≥-4 | Same value as CSI\_RP in Table B.2.9-2, according to UE Power class, operating band and angle of arrival | -50 |
| Note 1: 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 2: Io specified at the Reference point, and assumed to have constant EPRE across the bandwidth.Note 3: In the test cases, the CSI-RS 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 parameter CSI-RS Ês/Iot is the minimum CSI-RS Ês/Iot of the pair of cells to which the requirement applies. |

## <End of Change 4>