**3GPP TSG- RAN WG4 Meeting #98bis *R4-2106391***

**Electronic Meeting, April – April 20th, 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:*** | Draft Big CR: Introduction of Rel-16 MR-DC EMR RRM performance requirements (TS 38.133) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Perf | | | | |  | ***Date:*** | | | 2021-04-16 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Introduction of accuracy requirements for MR-DC EMR idle mode measurements. Introduction of Test Cases for MR-DC EMR idle mode measurements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Changes inlcuded are:   1. R4-2103549: Accuracy requirements for MR-DC measurements for early measurement reporting (EMR) are introduced.  * removal of [] * correcting side condition for accuracy SSB Ês/Iot from -6 to -4 to align with LTE. * Correcting ‘Aboslute’ to ‘Absolute’ * In addition to R4-2103549 removal of a number of missing ‘[‘ and ‘]’s removed in table 10.1.7B.1.1-1, table 10.1.8B.1.1-1, table 10.1.9B.1.1-1 and table 10.1.10B.1.1-1.  1. R4-2102751: draftCR on accuracy requirements for EMR 38.133:    * Change the intra-frequency requriements to be appliable for serving cell only    * Update the reference section numbers for NR-LTE EMR accuracy so that they are referring to the correct requriements in LTE spec    * Some editorial correction and format change 2. R4-2103550: Test case for EMR with both PCell and target cell in FR1 has not been introduced.    * Introduce test case for EMR with both PCell and target cell in FR1 3. R4-2102261: Draft CR for Idle Mode measurements of inter-frequency CA candidate cells for early reporting:    * Introduction of test case for Idle Mode measurements of inter-frequency CA candidate cells for early reporting. 4. R4-2103551: draftCR to introduce TC4 for EMR:    * Based on discussions in email reflector, EMR TC4 for LTE – NR FR1 EMR needs to be defined 5. R4-2106992: draftCR to update EMR TC4:    * Update TC4 for EMR to include related test setup for the RSRP and RSRQ accuracy tests (section A.8.2.2). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Specification of feature is incomplete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | New sections: 10.1.2B, 10.1.3B, 10.1.4B, 10.1.5B, 10.1.7B, 10.1.8B, 10.1.9B, 10.1.10B, 10.2.4 and 10.2.5. Additionally, sections for for test cases are to be introduced (numbering not agreed) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Based on following endorsed Draft CRs from RAN4#98 e-meeting: R4-2103549, R4-2102751, R4-2103550, R4-2102261 and R4-2103551 | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Big draftCR R4-2017359 | | | | | | | | |

<Start of Change 1>

10.1.2 Intra-frequency RSRP accuracy requirements for FR1

10.1.2.1 Intra-frequency SS-RSRP accuracy requirements

10.1.2.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on the same frequency as that of the serving cell in FR1.

The accuracy requirements in Table 10.1.2.1.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each relevant SSB.

**Table 10.1.2.1.1-1: SS-RSRP Intra frequency 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 |
| ±4.5 | ±9 | ≥-6 | 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 |
| ±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 | -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. | | | | | | | |

10.1.2.1.2 Relative SS-RSRP Accuracy

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

The accuracy requirements in Table 10.1.2.1.2-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each relevant SSB.

**Table 10.1.2.1.2-1: SS-RSRP Intra frequency 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 |
| ±2 | ±3 | ≥-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 |
| ±3 | ±3 | ≥-6 | 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 SSB Ês/Iot is the minimum SSB 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. | | | | | | | |

10.1.2.2 Void

10.1.2B Intra-frequency RSRP accuracy requirements for FR1 for CA/DC Idle Mode Measurements

10.1.2B.1 Intra-frequency SS-RSRP accuracy requirements

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRP.

10.1.2B.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to the serving cell in FR1.

The accuracy requirements in Table 10.1.2B.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 intra-frequency measurements are fulfilled according to Annex B.1.2 for a corresponding Band for each relevant SSB.

**Table 10.1.2B.1.1-1: SS-RSRP Intra frequency 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 |
| ±6 | ±10.5 | ≥-4 | 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 |
| ±9.5 | ±12.5 | ≥-4 | 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 | -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. | | | | | | | |

10.1.3 Intra-frequency RSRP accuracy requirements for FR2

10.1.3.1 Intra-frequency SS-RSRP accuracy requirements

10.1.3.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on the same frequency as that of the serving cell in FR2.

The accuracy requirements in Table 10.1.3.1.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 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 10.1.3.1.1-1: SS-RSRP Intra frequency absolute accuracy in FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | | |
|  |  |  | **Minimum Io** | | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |  |
| ±6 | ±9 | ≥-6 | Same value as SSB\_RP in Table B.2.2-2, 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 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. | | | | | | |

10.1.3.1.2 Relative SS-RSRP Accuracy

The relative accuracy of SS-RSRP is defined as the SS-RSRP measured from one cell compared to the SS-RSRP measured from another cell on the same frequency, or between any two SS-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 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 10.1.3.1.2-1: SS-RSRP Intra frequency relative accuracy in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | |
|  |  |  | **Minimum Io** | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |
| ±6 | ±9 | ≥-6 | Same value as SSB\_RP in Table B.2.2-2, 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 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 parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of cells to which the requirement applies. | | | | | |

10.1.3B Intra-frequency RSRP accuracy requirements for FR2 for CA/DC Idle Mode Measurements

10.1.3B.1 Intra-frequency SS-RSRP accuracy requirements

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRP.

10.1.3B.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to the serving cell in FR2.

The accuracy requirements in Table 10.1.3B.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 intra-frequency measurements are fulfilled according to Annex B.1.2 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 10.1.3B.1.1-1: SS-RSRP Intra frequency absolute accuracy in FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | | |
|  |  |  | **Minimum Io** | | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |  |
| ±7.5 | ±10.5 | ≥-4 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±9.5 | ±12.5 |  | 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 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. | | | | | | |

<Start of Change 2>

10.1.4 Inter-frequency RSRP accuracy requirements for FR1

10.1.4.1 Inter-frequency SS-RSRP accuracy requirements

10.1.4.1.1 Absolute Accuracy of SS-RSRP in FR1

The requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on a frequency in FR1 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.4.1.1-1 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 measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

**Table 10.1.4.1.1-1: SS-RSRP Inter frequency Absolute accuracy in FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot Note 2** | **Io Note 1 range** | | | | |
|  |  |  | **NR operating band groups Note 3** | **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 |
| ±4.5 | ±9 | ≥-6 | 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 |
| ±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 | -70 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: Void  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

10.1.4.1.2 Relative Accuracy of SS-RSRP in FR1

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

The accuracy requirements in Table 10.1.4.1.2-1 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.

- |SSB\_RP1dBm - SSB\_RP2dBm| ≤ 27 dB

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

**Table 10.1.4.1.2-1: SS-RSRP Inter frequency relative accuracy in FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot Note 2** | **Io Note 1 range** | | | | |
|  |  |  | **NR operating band groups Note 3** | **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 |
| ±4.5 | ±6 | ≥-6 | 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 |
| 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 cells to which the requirement applies.  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

10.1.4.2 Void

10.1.4B Inter-frequency RSRP accuracy requirements for FR1 for CA/DC Idle Mode Measurements

10.1.4B.1 Inter-frequency SS-RSRP accuracy requirements

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRP.

10.1.4B.1.1 Absolute Accuracy of SS-RSRP in FR1

The requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on a frequency in FR1 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.4B.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 measurements are fulfilled according to Annex B.1.3 for a corresponding Band for each relevant SSB.

**Table 10.1.4B.1.1-1: SS-RSRP Inter frequency Absolute accuracy in FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot Note 2** | **Io Note 1 range** | | | | |
|  |  |  | **NR operating band groups Note 3** | **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 |
| ±6 | ±10.5 | ≥-4 | 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 |
| ±9.5 | ±12.5 | ≥-4 | 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 | -70 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: Void  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

10.1.5 Inter-frequency RSRP accuracy requirements for FR2

10.1.5.1 Inter-frequency SS-RSRP accuracy requirements

10.1.5.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on a frequency in FR2 that is on a different frequency than the serving cell.

The accuracy requirements in Table 10.1.5.1.1-1 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 inter-frequency measurements are fulfilled according to Annex B.2.3 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 10.1.5.1.1-1: SS-RSRP Inter frequency absolute accuracy in FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | | |
|  |  |  | **Minimum Io** | | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |  |
| ±6 | ±9 | ≥-4 | Same value as SSB\_RP in Table B.2.3-2, 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 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. | | | | | | |

10.1.5.1.2 Relative SS-RSRP Accuracy

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

The accuracy requirements in Table 10.1.5.1.2-1 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 SSB.

- |SSB\_RP1dBm - SSB\_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 10.1.5.1.2-1: SS-RSRP Inter frequency relative accuracy in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | |
|  |  |  | **Minimum Io** | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |
| ±6 | ±9 | ≥-4 | Same value as SSB\_RP in Table B.2.3-2, 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 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 parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of cells to which the requirement applies. | | | | | |

10.1.5.2 Void

10.1.5B Inter-frequency RSRP accuracy requirements for FR2 for CA/DC Idle Mode Measurements

10.1.5B.1 Inter-frequency SS-RSRP accuracy requirements

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRP.

10.1.5B.1.1 Absolute SS-RSRP Accuracy

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRP in this clause apply to a cell on a frequency in FR2 that is on a different frequency than the serving cell.

The accuracy requirements in Table 10.1.5B.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 inter-frequency measurements are fulfilled according to Annex B.1.3 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 10.1.5B.1.1-1: SS-RSRP Inter frequency absolute accuracy in FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Accuracy** | | **Conditions** | | | | |
| **Normal condition** | **Extreme condition** | **SSB Ês/Iot** | **Io Note 2 range** | | | |
|  |  |  | **Minimum Io** | | | **Maximum Io** |
| **dB** | **dB** | **dB** | **dBm / SCSSSB Note 1** | | **dBm/BWChannel** | **dBm/BWChannel** |
|  |  |  | **SCSSSB = 120kHz** | **SCSSSB = 240kHz** |  |  |
| ±7.5 | ±10.5 | ≥-4 | Same value as SSB\_RP in Table B.2.3-2, according to UE Power class, operating band and angle of arrival | | N/A | -70 |
| ±9.5 | ±12.5 |  | 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 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. | | | | | | |

<Start of Change 3>

### 10.1.7 Intra-frequency RSRQ accuracy requirements for FR1

#### 10.1.7.1 Intra-frequency SS-RSRQ accuracy requirements in FR1

##### 10.1.7.1.1 Absolute SS-RSRQ Accuracy in FR1

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on the same frequency as that of the serving cell in FR1.

The accuracy requirements in Table 10.1.7.1.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 for a corresponding Band for each relevant SSB.

Table 10.1.7.1.1-1: SS-RSRQ Intra frequency absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 3 | 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 |
| ±2.5 | ±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 |
| ±3.5 | ±4 | ≥-6 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

### 10.1.7B Intra-frequency RSRQ accuracy requirements for FR1 for CA/DC Idle Mode Measurements

#### 10.1.7B.1 Intra-frequency SS-RSRQ accuracy requirements in FR1

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRQ.

##### 10.1.7B.1.1 Absolute SS-RSRQ Accuracy in FR1

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRQ in this clause apply to the serving cell in FR1.

The accuracy requirements in Table 10.1.7B.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 intra-frequency measurements are fulfilled according to Annex B.1.2 for a corresponding Band for each relevant SSB.

Table 10.1.7B.1.1-1: SS-RSRQ Intra frequency absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 3 | 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 |
| ±4 | ±5.5 | ≥-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 |
| ±5 | ±5.5 | ≥-4 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

### 10.1.8 Intra-frequency RSRQ accuracy requirements for FR2

#### 10.1.8.1 Intra-frequency SS-RSRQ accuracy requirements in FR2

##### 10.1.8.1.1 Absolute SS-RSRQ Accuracy in FR2

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on the same frequency as that of the serving cell in FR2.

The accuracy requirements in Table 10.1.8.1.1-1 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 intra-frequency measurements are fulfilled according to Annex B.2.2 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 10.1.8.1.1-1: SS-RSRQ Intra frequency absolute accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 2 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 1 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±2.5 | ±4 | ≥-3 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | -50 |
| ±3.5 | ±4 | ≥-6 |  | |  |
| 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 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. | | | | | |

### 10.1.8B Intra-frequency RSRQ accuracy requirements for FR2 for CA/DC Idle Mode Measurements

#### 10.1.8B.1 Intra-frequency SS-RSRQ accuracy requirements in FR2

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRQ.

##### 10.1.8B.1.1 Absolute SS-RSRQ Accuracy in FR2

Unless otherwise specified, the requirements for absolute accuracy of SS-RSRQ in this clause apply to the serving cell in FR2.

The accuracy requirements in Table 10.1.8B.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 intra-frequency measurements are fulfilled according to Annex B.1.2 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 10.1.8B.1.1-1: SS-RSRQ Intra frequency absolute accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 2 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 1 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±4 | ±5.5 | ≥-3 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | -50 |
| ±5 | ±5.5 | ≥-4 |  | |  |
| 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 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. | | | | | |

<Start of Change 4>

### 10.1.9 Inter-frequency RSRQ accuracy requirements for FR1

#### 10.1.9.1 Inter-frequency SS-RSRQ accuracy requirements in FR1

##### 10.1.9.1.1 Absolute Accuracy of SS-RSRQ in FR1

The requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on a frequency in FR1 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.9.1.1-1 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 measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

Table 10.1.9.1.1-1: SS-RSRQ Inter frequency absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 3 | 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 |
| ±2.5 | ±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 |
| ±3.5 | ±4 | ≥-6 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

##### 10.1.9.1.2 Relative Accuracy of SS-RSRQ in FR1

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

The accuracy requirements in Table 10.1.9.1.2-1 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 inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

- |SSB\_RP1dBm - SSB\_RP2dBm| ≤ 27 dB

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

Table 10.1.9.1.2-1: SS-RSRQ Inter frequency relative accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  | Note 2 | 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 |
| ±4 | ±4 | ≥-6 | Note 3 | Note 3 | Note 3 | Note 3 | Note 3 |
| 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 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. | | | | | | | |

### 10.1.9B Inter-frequency RSRQ accuracy requirements for FR1 for CA/DC Idle Mode Measurements

#### 10.1.9B.1 Inter-frequency SS-RSRQ accuracy requirements in FR1

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRQ.

##### 10.1.9B.1.1 Absolute Accuracy of SS-RSRQ in FR1

The requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on a frequency in FR1 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.9B.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 measurements are fulfilled according to Annex B.1.3 for a corresponding Band for each relevant SSB.

Table 10.1.9B.1.1-1: SS-RSRQ Inter frequency absolute accuracy in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 3 | 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 |
| ±4 | ±5.5 | ≥-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 |
| ±5 | ±5.5 | ≥-4 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

### 10.1.10 Inter-frequency RSRQ accuracy requirements for FR2

10.1.10.1 Inter-frequency SS-RSRQ accuracy requirements in FR2

10.1.10.1.1 Absolute Accuracy of SS-RSRQ in FR2

The requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on a frequency in FR2 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.10.1.1-1 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 inter-frequency measurements are fulfilled according to Annex B.2.3 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 10.1.10.1.1-1: SS-RSRQ Inter frequency absolute accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 2 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 1 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±2.5 | ±4 | ≥-3 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | -50 |
| ±3.5 | ±4 | ≥-4 |  | |  |
| 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 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. | | | | | |

10.1.10.1.2 Relative Accuracy of SS-RSRQ in FR2

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

The accuracy requirements in Table 10.1.10.1.2-1 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 inter-frequency measurements are fulfilled according to Annex B.2.3 for a corresponding Band for each relevant SSB.

- |SSB\_RP1dBm - SSB\_RP2dBm| ≤ 27 dB

- | 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 10.1.10.1.2-1: SS-RSRQ Inter frequency relative accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 2 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 1 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±3 | ±4 | ≥-3 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | -50 |
| ±4 | ±4 | ≥-4 |  | |  |
| 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: The parameter SSB Ês/Iot is the minimum SSB Ês/Iot of the pair of cells to which the requirement applies.  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. | | | | | |

### 10.1.10B Inter-frequency RSRQ accuracy requirements for FR2 for CA/DC Idle Mode Measurements

10.1.10B.1 Inter-frequency SS-RSRQ accuracy requirements in FR2

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of SS-RSRQ.

10.1.10B.1.1 Absolute Accuracy of SS-RSRQ in FR2

The requirements for absolute accuracy of SS-RSRQ in this clause apply to a cell on a frequency in FR2 that has different carrier frequency from the serving cell.

The accuracy requirements in Table 10.1.10B.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 inter-frequency measurements are fulfilled according to Annex B.1.3 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 10.1.10B.1.1-1: SS-RSRQ Inter frequency absolute accuracy in FR2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | SSB Ês/Iot | Io Note 2 range | | |
|  |  |  | Minimum Io | | Maximum Io |
| dB | dB | dB | dBm / SCSSSB Note 1 | | dBm/BWChannel |
|  |  |  | SCSSSB = 120kHz | SCSSSB = 240kHz |  |
| ±4 | ±5.5 | ≥-3 | Same value as SSB\_RP in Table B.2.2-2, according to UE Power class, operating band and angle of arrival | | -50 |
| ±5 | ±5.5 | ≥-4 |  | |  |
| 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 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. | | | | | |

<Start of Change 5>

## 10.2 E-UTRAN measurements

### 10.2.1 Introduction

Accuracy requirements for measurements on E-UTRAN carrier frequencies are specified in clause 10.2 and apply for UE in SA or NR-DC or NE-DC operation mode, unless otherwise specified.

Unless otherwise specified, the requirements in clause 10.2 are applicable for a UE:

- in RRC\_CONNECTED state

- performing measurements with appropriate measurement gaps according to clause 9.1.2.

- that is synchronised to the cell that is measured.

The reported measurement result after layer 1 filtering shall be an estimate of the average value of the measured quantity over the measurement period. The reference point for the measurement result after layer 1 filtering is referred to as point B in the measurement model described in TS 36.300 [24].

The accuracy requirements of E-UTRA measurements in this clause are valid for the reported measurement result after layer 1 filtering. The accuracy requirements are verified from the measurement report at point D in the measurement model having the layer 3 filtering disabled.

If the UE needs measurement gaps to perform the inter-RAT NR ─ E-UTRAN FDD and NR ─ E-UTRAN TDD measurements, the relevant measurement procedure and measurement gap patterns stated in clause 9.1.2 shall apply.

### 10.2.2 E-UTRAN RSRP measurements

NOTE: This measurement is for handover between NR and E-UTRAN.

The measurement period of E-UTRA RSRP in RRC\_CONNECTED state is specified in clause 9.4.2 and 9.4.3.

The accuracy requirements of E-UTRA RSRP measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RSRP Accuracy Requirements in clause 9.1.3 of TS 36.133 [15].

The reporting range and mapping specified for RSRP measurements in clause 9.1.4 of TS 36.133 [15] shall apply.

### 10.2.3 E-UTRAN RSRQ measurements

NOTE: This measurement is for handover between NR and E-UTRAN.

The measurement period of E-UTRA RSRQ in RRC\_CONNECTED state is specified in clause 9.4.2 and 9.4.3.

The accuracy requirements of E-UTRA RSRQ measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RSRQ Accuracy Requirements in clause 9.1.6 of TS 36.133 [15].

The requirements for accuracy of E-UTRA RSRQ measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RSRQ Accuracy Requirements in clause 9.1.6 of TS 36.133 [15].

The reporting range and mapping specified for RSRQ measurements in clause 9.1.7 of TS 36.133 [15] shall apply.

### 10.2.4 E-UTRAN RSRP measurements for CA/DC Idle Mode Measurements

NOTE: This measurement is for CA/DC Idle Mode measurements between NR and E-UTRAN.

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of E-UTRA RSRP.

The measurement period of E-UTRA RSRP in RRC\_IDLE and RRC INACTIVE states are specified in clause 4.4.2.

The accuracy requirements of E-UTRA RSRP measurements in RRC\_IDLE and RRC INACTIVE states and the corresponding side conditions shall be as the inter-frequency RSRP Accuracy Requirements in clause 9.1.3B.2 of TS 36.133 [15].

The reporting range and mapping specified for RSRP measurements in clause 9.1.4 of TS 36.133 [15] shall apply.

### 10.2.5 E-UTRAN RSRQ measurements for CA/DC Idle Mode Measurements

NOTE: This measurement is for CA/DC Idle Mode measurements between NR and E-UTRAN.

The requirements in this clause are applicable for a UE:

- in state RRC\_IDLE or RRC INACTIVE

- that is synchronised to the cell that is measured.

The requirements are for absolute accuracy of E-UTRA RSRQ.

The measurement period of E-UTRA RSRQ in RRC\_IDLE and RRC INACTIVE states are specified in clause 4.4.2.

The accuracy requirements of E-UTRA RSRQ measurements in RRC\_IDLE and RRC INACTIVE states and the corresponding side conditions shall be as the inter-frequency RSRQ Accuracy Requirements in clause 9.1.6B.2 of TS 36.133 [15].

The reporting range and mapping specified for RSRQ measurements in clause 9.1.7 of TS 36.133 [15] shall apply.

<Start of Change 6>

A.6.6.x Idle Mode CA/DC Measurements

A.6.6.X.1 SA Idle mode CA/DC measurement for FR1

A.6.6.X.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting after the UE has entered Idle mode. This test will partly verify the Idle mode CA/DC measurements requirements in clause 4.4.

In this test, there are two cells: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.6.6.X.1.1-1, A.6.6.X.1.1-2, A.6.6.X.1.1-3 and A.6.6.X.1.1-4.

The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. Druing T1, the UE is connected to cell 1 only and shall not have any timing information of cell 2. UE is configured with early measurement reporting with channel 2. Beam level reporting for early measurements is not configured. The connection is released at the end of T1. T2 starts when the connection is released. During the time periods T2 UE is in Idle mode. At T3 the UE is paged for connection setup and requested by the network to send idle mode measurements.

**Table A.6.6.X.1.1-1: supported test configuration**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

**Table A.6.6.X.1.1-2: General test parameters for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2. |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 2 | SSB.1 FR1 | As specified in clause A.3.10.1 |
|  |  | Config 3 | SSB.2 FR1 | As specified in clause A.3.10.1 |
| Hysteresis | dB | Config 1,2,3 | 0 |  |
| PRACH configuration index |  | Config 1,2,3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| CP length |  | Config 1,2,3 | Normal |  |
| TimeToTrigger | s | Config 1,2,3 | 0 |  |
| Filter coefficient |  | Config 1,2,3 | 0 | L3 filtering is not used |
| DRX in connected mode |  | Config 1,2,3 | OFF | DRX is not used |
| DRX in idle mode | s | Config 1,2,3 | [0.32] | The value shall be used for all cells in the test. |
| T331 | s |  | 300 |  |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 10 |  |
| T2 | s | Config 1,2,3 | [11.52] |  |
| T3 | s | Config 1,2,3 | 10 |  |

**Table A.6.6.X.1.1-3: Cell specific test parameters for connected mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test configuration** | **Cell 1** | | | **Cell 2** | | | | |
|  | |  |  | **T1** | **T2** | **T3** | **T1** | **T2** | | **T3** | |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | 2 | | | | |
| Duplex mode | |  | Config 1 | FDD | | | | | | | |
|  | |  | Config 2,3 | TDD | | | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | | | |
|  | |  | Config 2 | TDDConf.1.1 | | | | | | | |
|  | |  | Config 3 | TDDConf.2.1 | | | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | | | | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | | NA | | | | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | | NA | | | | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | | NA | | | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | | | | |
|  | |  | Config 2 | TRS.1.1 TDD | | | NA | | | | |
|  | |  | Config 3 | TRS.1.2 TDD | | | NA | | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | OP.1 | | | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | SR.1.1 FDD | | | | |
|  | |  | Config 2 | SR.1.1 TDD | | | SR.1.1 TDD | | | | |
|  | |  | Config 3 | SR2.1 TDD | | | SR2.1 TDD | | | | |
| CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | CR.1.1 FDD | | | | |
|  | |  | Config 2 | CR.1.1 TDD | | | CR.1.1 TDD | | | | |
|  | |  | Config 3 | CR2.1 TDD | | | CR2.1 TDD | | | | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | | | | |
|  | |  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | | | | |
|  | |  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | | | | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | | SMTC.5 | | | | |
|  | |  | Config 2, 3 | SMTC.1 | | | SMTC.4 | | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | | | |
|  | |  | Config 3 | 30 | | | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  | | |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  | | |  | | | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  | | |  | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  |  | | |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | |  | | | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | |  | | | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | |  | | | | |
| Note2 | | dBm/15kHz |  | -98 | | | -98 | | | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | | -98 | | | | |
|  | |  | Config 3 | -95 | | | -95 | | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -91 | -91 | -91 | -infinity | | -98 | | -98 |
|  | |  | Config 3 | -88 | -88 | -88 | -infinity | | -95 | | -95 |
|  | | dB | Config 1,2,3,4,5,6 | 7 | 7 | 7 | - infinity | | 0 | | 0 |
|  | | dB | Config 1,2,3 | 7 | 7 | 7 | infinity | | 0 | | 0 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -62.26 | -62.26 | -62.26 | -70.5 | | -67.04 | | -67.04 |
|  | | dBm/38.16MHz | Config 3 | -56.15 | -56.15 | -56.15 | -63.94 | | -60.93 | | -60.93 |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | | AWGN | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | | | |

**Table A.6.6.X.1.1-4: Cell specific test parameters for idle mode for SA Idle mode CA/DC measurement for FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | | **Cell 2** | | |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| NR RF Channel Number |  | 1,2,3 | 1 | | | 2 | | |
| TDD configuration |  | 1 | N/A | | | N/A | | |
|  |  | 2 | TDDConf.1.1 | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.2.1 | | | TDDConf.2.1 | | |
| PDSCH RMC |  | 1 | SR.1.1 FDD | | | SR.1.1 FDD | | |
| configuration |  | 2 | SR.1.1 TDD | | | SR.1.1 TDD | | |
|  |  | 3 | SR.2.1 TDD | | | SR.2.1 TDD | | |
| RMSI CORESET |  | 1 | CR.1.1 FDD | | | CR.1.1 FDD | | |
| RMC configuration |  | 2 | CR.1.1 TDD | | | CR.1.1 TDD | | |
|  |  | 3 | CR.2.1 TDD | | | CR.2.1 TDD | | |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| RMC configuration |  | 2 | CCR.1.1 TDD | | | CCR.1.1 TDD | | |
|  |  | 3 | CCR.2.1 TDD | | | CCR.2.1 TDD | | |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2, 3 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | | | -140 | | |
|  |  | 3 | -137 | | | -137 | | |
| Pcompensation | dB | 1, 2, 3 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | | | SS-RSRP | | |
|  | dB | 1 | [14] | [14] | [14] | -infinity | [12] | [12] |
|  |  | 2 |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |
| Note2 | dBm/SCS | 1 | [-98] | | | | | |
|  |  | 2 | [-98] | | | | | |
|  |  | 3 | [-95] | | | | | |
| Note2 | dBm/15 kHz | 1 | [-98] | | | | | |
|  |  | 2 |
|  |  | 3 |
|  | dB | 1 | [7] | [7] | [7] | -infinity | [0] | [0] |
|  |  | 2 |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | [-91] | [-91] | [-91] | -infinity | [-98] | [-98] |
|  |  | 2 | [-91] | [-91] | [-91] | -infinity | [-98] | [-98] |
|  |  | 3 | [-88] | [-88] | [-88] | -infinity | [-95] | [-95] |
| Io | dBm/9.36 MHz | 1 | [-62.26] | [-62.26] | [-62.26] | [-70.5] | [-67.04] | [-67.04] |
|  | dBm/9.36 MHz | 2 | [-62.26] | [-62.26] | [-62.26] | [-70.5] | [-67.04] | [-67.04] |
|  | dBm/38.16 MHz | 3 | [-56.15] | [-56.15] | [-56.15] | [-63.94] | [-60.93] | [-60.93] |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | Not sent | | | Not sent | | |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | | |

A.6.6.X.1.2 Test Requirements

The UE behaviour during time durations T2 and T3 shall be as follows:

During the time period T2 the UE is in Idle mode and the signal level of cell 2 is changed. The UE shall not perform reselection. The UE shall perform Idle Mode CA measurement according to Section 4.4.

At the start of T3 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report for cell 2. The UE shall send early measurement report to the PCell.

After receiving the requested early measurement report, the test equipment verifies the accuracy of measurement reported for Cell 2 meets the requirements in Section 10.X and test ends.

The rate of correct events observed during repeated tests shall be at least 90%.

<Start of Change 7>

A.x.x.x Idle Mode measurements of inter-frequency CA candidate cells for early reporting

A.x.x.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly retains the detected cell status for the idle mode CA measurement when UE transitions from RRC Connected mode to Idle mode when the UE has entered Idle mode, and that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting. This test will partly verify the Idle mode CA measurements in clause 4.4. In the test, connected mode DRX configuration is not configured in either PCell or PSCell. UE is configured to report beam level measurements if UE support beam level measurement reporting.

The supported test configurations are given in Table A.x.x.x.1-1. The test parameters are given in Tables A.x.x.x.1-2, A.x.x.x.1-3, A.x.x.x.1-4 and A.x.x.x.1-5 below. In the test there are two cells, cell 1, which is the PCell in connected, and serving cell in idle mode, on radio channel 1 in FR1, and cell 2, which is the PSCell in connected, and measured inter-freuency cell idle mode, on radio channel 2 in FR2.

The test consists of 5 successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. During T1 cell 2, the PSCell, shall be configured.

Time duration T2 starts when UE has transmitted random access preamble on the PSCell. After T2, the UE is configured with idle mode CA measurements on PSCell carrier. The connection is released [X]ms after the UE has sent random access preamble on the PSCell.

T3 starts when the connection is released. During the time periods T3 and T4 UE is in Idle mode. The UE is configured to perform inter-frequency measurements in idle mode on the PSCell carrier. During T3, [TBD] ms after T3, the signal level of the inter-frequency carrier configured for idle mode measurements is changed at which time T4 starts. T5 starts [TBD]ms after T4, when the UE is paged for connection setup and requested by the network to send idle mode measurements.

**Table A.x.x.x.x-1: Supported test configurations for Idle Mode measurements of inter-frequency CA candidate cells for early reporting**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | FR1 FDD SSB SCS 15kHz BW 10MHz – FR2 TDD SSB SCS 240kHz BW 100MHz |
| 2 | FR1 TDD SSB SCS 15kHz BW 10MHz – FR2 TDD SSB SCS 240kHz BW 100MHz |
| 3 | FR1 TDD SSB SCS 30kHz BW 40MHz – FR2 TDD SSB SCS 240kHz BW 100MHz |
| Note 1: The UE is only required to be tested in one of the supported test configurations | |

**Table A.x.x.x.x.1-2: General test parameters for Idle Mode measurements of inter-frequency CA candidate cells for early reporting**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| RF Channel Number |  | 1, 2 | Two radio channels are used for this test |
| Active PCell |  | Cell 1 | PCell on RF channel number 1 in FR1 |
| PSCell |  | Cell 2 | PSCell on RF channel number 2 in FR2 |
| DRX |  | OFF | For both PCell and PSCell once configured |
| PRACH configuration in Cell 2 |  | FR2 PRACH configuration 2 | PRACH configuration as specified in Clause A.3.8.3.2. |
| CSI reporting periodicity and offset configuration for Cell 2 | ms | 2 |  |
| T1 | s | [TBD] | During this time the PCell is known and PSCell is configured. |
| T2 | s | [TBD] | During this time the UE is configured to perform inter-frequency measurements in idle mode on the PSCell carrier. |
| T5 | s | [TBD] | UE is paged and connection is setup. Network requests measurement report from the UE. |

**Table A.x.x.x.x.x-3: NR Cell specific test parameters for Idle Mode measurements of inter-frequency CA candidate cells for early reporting**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Cell 1** | **Cell2** | | |
| **T1** | **T2** | **T5** |
| AoA setup |  | 1,2,3 | N/A | Setup 2a according to clause A.3.15.2.1 | | |
| Assumption for UE beams Note 5 |  |  | N/A | Rough | | |
| Frequency Range |  | 1,2,3 | FR1 | FR2 | | |
| Duplex mode |  | 1 | FDD | TDD | | |
| 2,3 | TDD |
| TDD configuration |  | 1 | – | TDDConf.3.1 | | |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | MHz | 1,2 | 10: NRB,c = 52 | 100: NRB,c = 66 | | |
| 3 | 40: NRB,c = 106 |
| Initial Downlink BWP configuration |  | 1,2,3 | DLBWP.0.1 | DLBWP.0.1 | | |
| Initial Uplink BWP configuration |  | 1,2,3 | ULBWP.0.1 | ULBWP.0.1 | | |
| Dedicated Downlink BWP configuration |  | 1,2,3 | DLBWP.1.1 | DLBWP.1.1 | | |
| Dedicated Uplink BWP configuration |  | 1,2,3 | ULBWP.1.1 | ULBWP.1.1 | | |
| PDSCH Reference Measurement Channel |  | 1 | SR.1.1 FDD | SR.3.1 TDD | | |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| TRS configuration |  | 1,2,3 | – | TRS.2.1 TDD | | |
| TCI state |  | 1,2,3 | – | TCI.State.0 | | |
| RMSI CORESET parameters |  | 1 | CR.1.1 FDD | CR.3.1 TDD | | |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET parameters |  | 1 | CCR.1.1 FDD | CCR.3.1 TDD | | |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| OCNG PatternsNote1 |  | 1,2,3 | OP.1 | OP.1 | | |
| SSB configuration |  | 1,2 | SSB.1 FR1 | SSB.2 FR2 | | |
| 3 | SSB.2 FR1 |
| SMTC configuration |  | 1,2,3 | SMTC.2 | SMTC.1 | | |
| Correlation Matrix and Antenna config |  | 1,2,3 | 1x2 Low | 1x2 Low | | |
| EPRE ratio of PSS to SSS | dB | 1,2,3 | 0 | 0 | | |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH |
| EPRE ratio of OCNG DMRS to SSS |
| EPRE ratio of OCNG to OCNG DMRS |
| Noc Note2 | dBm/ 15kHz | 1,2,3 | [-98] | [-98] | | |
| Noc Note2 | dBm/SCS | 1,2 | [-98] | [-89] | | |
| 3 | [-95] |
| Ês/Iot | dB | 1,2,3 | [5] | [5] | | |
| Ês/Noc | dB | 1,2,3 | [5] | [5] | | |
| SS-RSRPNote3,4 | dBm/SCS | 1,2 | [-93] | [-84] | | |
| 3 | [-90] |
| IoNote3,4 | dBm/ 9.36 MHz | 1,2 | [-63.85] | – | | |
| dBm/ 38.16 MHz | 3 | [-57.76] | – | | |
| dBm/ 95.04 MHz | 1,2,3 | – | [-53.82] | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Propagation Condition |  | 1,2,3 | AWGN | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated, and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone.  Note 5: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation. | | | | |

**Table A.x.x.x.x.x-4: General test parameters for Idle Mode measurements of inter-frequency CA candidate cells for early reporting**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| Serving cell |  | 1, 2, 3 | Cell1 | The UE camps on cell 1 which is the former PCell. |
| Neighbour cell |  | 1, 2, 3 | Cell2 | The UE shall perform inter-frequency measurements on cell 2 which is the former PSCell. |
| RF Channel Number |  | 1, 2, 3 | 1, 2 |  |
| Time offset between cells |  | 1, 2, 3 | 3 μs | Synchronous cells |
| Access Barring Information | - | 1, 2, 3 | Not Sent | No additional delays in random access procedure. |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | Serving cell |
| 3 | SSB.2 FR1 | Serving cell |
| 1, 2, 3 | SSB.2 FR2 | Neighbour cell |
| SMTC configuration Serving cell |  | 1, 2, 3 | SMTC.2 |  |
| SMTC configuration Neighbour cell |  | 1, 2, 3 | SMTC.1 |  |
| DRX cycle length | s | 1, 2, 3 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index |  | 1, 2, 3 | 190 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell |  | 1, 2, 3 | Not configured |  |
| T3 | s | 1, 2, 3 | [TBD] | T3 needs to be defined so that cell measurement time is taken into account. |
| T4 | s | 1, 2, 3 | [TBD] | T4 needs to be defined so that cell measurement time is taken into account. |

**Table A.x.x.x.x.x-5: Cell specific test parameters for Idle Mode measurements of inter-frequency CA candidate cells for early reporting**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
| **T3** | **T4** | **T3** | **T4** |
| FDD configuration |  | 1 | N/A | | TDDConf.3.1 | |
| TDD configuration | 2 | TDDConf.1.1 | |
| TDD configuration | 3 | TDDConf.2.1 | |
| PDSCH RMC configuration | FDD | 1 | SR.1.1 FDD | | SR.3.1 TDD | |
| TDD | 2 | SR.1.1 TDD | |
| TDD | 3 | SR.2.1 TDD | |
| RMSI CORESET parameters | FDD | 1 | CR.1.1 FDD | | CR.3.1 TDD | |
| TDD | 2 | CR.1.1 TDD | |
| TDD | 3 | CR.2.1 TDD | |
| RMSI CORESET RMC configuration | FDD | 1 | CCR.1.1 FDD | | CCR.3.1 TDD | |
| TDD | 2 | CCR.1.1 TDD | |
| TDD | 3 | CCR.2.1 TDD | |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | | ULBWP.0.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | 1 | [-140] | | [-140] | |
|  |  | 2 | [-137] | | [-137] | |
| 3 | [] | | [] | |
| Pcompensation | dB | 1, 2, 3 | 0 | | 0 | |
| Qhysts | dB | 1, 2, 3 | 0 | | 0 | |
| Qoffsets, n | dB | 1, 2, 3 | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | | SS-RSRP | |
| AoA setup |  | 1, 2, 3 | N/A | | Setup 1 defined in A.3.15.3 | |
| Beam assumptionNote 4 |  | 1, 2, 3 | Rough | | Rough | |
|  | dB | 1, 2 | [8] | [8] | [-3] | [8] |
|  |  | 3 |  |
| Note2 | dBm/SCS | 1, 2 | [-93] | | [-93] | |
|  |  | 3 | [-90] | | [-90] | |
| Note2 | dBm/15 kHz | 1, 2 | [-102] | | [-102] | |
|  |  | 3 |
|  | dB | 1, 2 | [8] | [8] | [-3] | [8] |
|  |  | 3 |
| SS-RSRP Note3 | dBm/SCS | 1, 2 | [-85] | | [-96] | [-85] |
|  |  | 3 | [-82] | | [-93] | [-82] |
| Io | dBm/95.04 MHz | 1, 2 | [-55.37] | | [-62.25] | [-55.37] |
|  |  | 3 | [-52.37] | | [-59.25] | [-52.37] |
| Treselection | s | 1, 2, 3 | 0 | | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | Not sent | | Not sent | |
| Threshx, high | dB | 1, 2, 3 | [48] | | [48] | |
| Threshserving, low | dB | 1, 2, 3 | [44] | | [44] | |
| Threshx, low | dB | 1, 2, 3 | [50] | | [50] | |
| Propagation Condition |  | 1, 2, 3 | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated, and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | |

A.x.x.x.2 Test Requirements

The UE behaviour during time durations T2, T3, T4 and T5 shall be as follows:

During time durations T1 the UE shall start transmitting preamble on PSCell. During T2 the UE perform intra-frequency measurements on PCell and PSCell.

During the time-period T3 the connection is released, and UE enters idle mode. During the time period T3 and T4 the UE is in Idle mode and at T4 the signal level of cell 2 is changed. The UE shall not perform reselection. The UE shall perform Idle Mode CA measurement according to Section 4.4.

At the start of T5 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report. The UE shall send early measurement report to the PCell.

After receiving the requested early measurement report, the test equipment verifies that the accuracy of measurement reported for serving Cell 1 and Cell 2 meets the requirements in Section 10.1.2B and Section 10.1.5B, respectively and test ends.

The rate of correct events observed during repeated tests shall be at least 90%.

<Start of Change 8>

A.8.2.2 E-UTRA – NR Inter-RAT Early Measruement Reporting

A.8.2.2.1 E-UTRA – NR Early Measruement Reporting for NR in FR1

A.8.2.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the E-UTRAN to NR inter-RAT Idle mode DC measurement requirements specified in clause 4.9.2.4 in TS 36.133 [15]. This test is also to verify the accuracy requirement for the E-UTRAN to NR inter-RAT Idle mode DC measurement requirements specified in clause 9.11.1A and 9.11.2A in TS 36.133 [15]. Supported test configurations are shown in Table A.8.2.2.1.1-1.

**Table A.8.2.2.1.1-1: Supported test configurations**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

The test scenario comprises of 1 E-UTRA cell (Cell 1) and 1 NR cell (Cell 2). The the test parameters and applicability for the E-UTRAN cell are defined in Table A.8.2.2.1.1-4. The general test parameters and the cell specific test parameters for the NR cell are speficied in Table A.8.2.2.1.1-2 and Table A.8.2.2.1.1-3, respectively.

The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Prior to the start of the time duration T1, the UE shall be connected to Cell 1. During T1, Cell 2 shall be powered off. At the end of T1, the RRC connection to Cell 1 is released and UE is configured Idle mode DC measurement on the carrier frequency of Cell 2. Time duration T2 starts when the RRC connection is released, and during the T2 UE is in Idle mode. Cell 2 shall be powered on from the beginning of T2. At beginning of T3 the UE is paged for connection setup and requested by the network to send idle mode measurements.

**Table A.8.2.2.1.1-2: General test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test** | **Value** | **Comment** |
|  |  | **configuration** |  |  |
| Active cell |  | 1, 2, 3, 4, 5, 6 | E-UTRAN Cell 1 |  |
| Neighbour cell |  | 1, 2, 3, 4, 5, 6 | NR Cell 2 |  |
| RF Channel Number |  | 1, 2, 3, 4, 5, 6 | 1: Cell 1  2: Cell 2 |  |
| DRX cycle length | s | 1, 2, 3, 4, 5, 6 | 1.28 |  |
| Time offset between Cell 1 and Cell 2 |  | 1, 2, 3, 4, 5, 6 | 3 μs |  |
| T1 | s | 1, 2, 3, 4, 5, 6 | 0.5 |  |
| T2 | s | 1, 2, 3, 4, 5, 6 | 71 |  |
| T3 | s | 1, 2, 3, 4, 5, 6 | 2 |  |
| T331 | s | 1, 2, 3, 4, 5, 6 | 300 |  |

**Table A.8.2.2.1.1-3: Cell specific test parameters for NR cell 2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 2** | | |
|  |  |  | **T1** | **T2** | **T3** |
| TDD configuration |  | 1, 4 | N/A | | |
|  |  | 2, 5 | TDDConf.1.1 | | |
|  |  | 3, 6 | TDDConf.2.1 | | |
| PDSCH Reference measurement channel |  | 1, 4 | SR.1.1 FDD | | |
|  |  | 2, 5 | SR.1.1 TDD | | |
|  |  | 3, 6 | SR.2.1 TDD | | |
| RMSI CORESET Reference Channel |  | 1, 4 | CR.1.1 FDD | | |
|  |  | 2, 5 | CR.1.1 TDD | | |
|  |  | 3, 6 | CR.2.1 TDD | | |
| RMC CORESET Reference Channel |  | 1, 4 | CCR.1.1 FDD | | |
|  |  | 2, 5 | CCR.1.1 TDD | | |
|  |  | 3, 6 | CCR.2.1 TDD | | |
| OCNG Patterns |  | 1, 2, 3, 4, 5, 6 | OP.1 | | |
| SMTC configuration |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | | |
| SSB configuration |  | 1, 4 | SSB.1 FR1 | | |
|  |  | 2, 5 | SSB.1 FR1 | | |
|  |  | 3, 6 | SSB.2 FR1 | | |
| Initial DL BWP configuration |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | | |
|  | dB | 1, 4 | -infinity | 4 | 4 |
|  |  | 2, 5 |  |  |  |
|  |  | 3, 6 |  |  |  |
| Note2 | dBm/SCS | 1, 4 | -98 | | |
|  |  | 2, 5 | -98 | | |
|  |  | 3, 6 | -95 | | |
| Note2 | dBm/15 kHz | 1, 4 | -98 | | |
|  |  | 2, 5 |  | | |
|  |  | 3, 6 |  | | |
|  | dB | 1, 4 | -infinity | -4 | -4 |
|  |  | 2, 5 |  |  |  |
|  |  | 3, 6 |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1, 4 | -infinity | -102 | -102 |
|  |  | 2, 5 | -infinity | -102 | -102 |
|  |  | 3, 6 | -infinity | -99 | -99 |
| SS-RSRQ Note3 | dB | 1, 4 | -infinity | -16.25 | -16.25 |
| 2, 5 | -infinity | -16.25 | -16.25 |
| 3, 6 | -infinity | -16.25 | -16.25 |
| Io | dBm/9.36 MHz | 1, 4 | -70.05 | -68.60 | -68.60 |
|  | dBm/9.36 MHz | 2, 5 | -70.05 | -68.60 | -68.60 |
|  | dBm/38.16 MHz | 3, 6 | -63.96 | -62.50 | -62.50 |
| Propagation Condition |  | 1, 2, 3, 4, 5, 6 | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | |

**Table A.8.2.2.1.1-4: Cell specific test parameters for E-UTRA cell 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | |
|  |  | **T1** | **T2** | **T3** |
| E-UTRA RF Channel number |  | 1 | | |
| BWchannel | MHz | 10 | | |
| OCNG Patterns defined in TS 36.133 [15] clause A.3.2 |  | OP.2 TDD for test configuration 1, 2, 3;  OP.2 FDD for test configuration 4, 5, 6 | | |
| PBCH\_RA | dB | 0 | | |
| PBCH\_RB | dB |  | | |
| PSS\_RA | dB |  | | |
| SSS\_RA | dB |  | | |
| PCFICH\_RB | dB |  | | |
| PHICH\_RA | dB |  | | |
| PHICH\_RB | dB |  | | |
| PDCCH\_RA | dB |  | | |
| PDCCH\_RB | dB |  | | |
| PDSCH\_RA | dB |  | | |
| PDSCH\_RB | dB |  | | |
| OCNG\_RANote 1 | dB |  | | |
| OCNG\_RBNote 1 | dB |  | | |
| Qrxlevmin | dBm | -140 | | |
| Note 2 | dBm/15 kHz | -98 | | |
| RSRP Note 3 | dBm/15 KHz | -84 | -84 | -84 |
| RSRQ Note 3 | dB | -10.96 | -10.96 | -10.96 |
|  | dB | 14 | 14 | 14 |
|  | dB | 14 | 14 | 14 |
| TreselectionEUTRAN | S | 0 | | |
| SnonintrasearchP | dB | 50 | | |
| Threshx, highP | dB | 48 | | |
| Threshserving, lowP | dB | 44 | | |
| Threshx, lowP | dB | 50 | | |
| beamMeasConfigIdle |  | True | | |
| Propagation Condition |  | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

A.8.2.2.1.2 Test Requirements

At the beginning of the time-period T2 the connection is released, and UE enters idle mode. During the time period T2 the UE is in Idle mode and Cell 2 is active. The UE shall not perform reselection. The UE shall perform Idle Mode DC measurement according to clause 4.9.2.4 in TS 36.133 [15]. UE shall be able to detect, acqure the SSB index and measure the SS-RSRP and SS-RSRQ from Cell 2 for Idle mode DC measurement during T2.

NOTE: The Idle mode DC measurement period for the test setup can be expressed as: Thigher\_priority\_search + TSSB\_index,NR + Tevaluate, NR.

Where:

Thigher\_priority\_search See clause 4.2.2 in TS 36.133 [15]

TSSB\_index,NR See Table 4.9.2.4-1 in clause 4.9.2.4 in TS 36.133 [15]

Tevaluate, NR See Table 4.2.2.5.6-1 in clause 4.2.2.5.6 in TS 36.133 [15]

This gives a total of 70.24 s, allow 71 s for the T2.

At the start of T3 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report. The UE shall send early measurement report to the PCell.

After receiving the requested early measurement report, the test equipment verifies the accuracy of measurement reported for serving Cell 1 and Cell 2 meets the requirements in Section 9.1.2B in TS 36.133 [15] and Section 9.1.3B, respectively and test ends.

The rate of correct events observed during repeated tests shall be at least 90%.

<End of Changes>