**3GPP TSG- Meeting #112 *R4-2413966***

**Maastricht, Netherlands, 19th Aug. – 23rd Aug., 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **4705** | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | (NR\_Mob\_enh2-Perf) CR on performance maintenance for R18 mobility | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Change#1-2: The capability IE is not aligned with 38.306. 2. Change#3: The referenced clause number is not complete. As the maximum number of beams reported in each report supported by UE may be "1", relative accuracy requirements can not be checked in the test case. 3. Change#4: This test case was approved in big CR R4-2410400 but didn’t captured in 38.133. 4. Change#5-7: The capability IE is not aligned with 38.306. The title of A.6.3.4.4 is wrong. 5. Change#8-11: The referenced clause number is not complete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Change#1-2: Align the capability IE with 38.306. 2. Change#3: Correct the referenced clause number. Not to check relative accuracy requirements in A.6.7.17.1. 3. Change#4: Add the test cases approved in big CR R4-2410400 but not captured in 38.133. 4. Change#5-7: Align the capability IE with 38.306 5. Change#8-11: Correct the referenced clause number. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Test cases for R18 mobility are not accurate or complete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.3.4.2.3, A.6.3.5.1.3, A.6.7.17.1, (new)A.7.3.2.x, A.7.3.4.1.3, A.7.3.4.3.3, A.7.3.5.1.3, A.7.6.20.1.3, A.7.6.21.1.3, A.7.6.22.1.3, A.7.7.15 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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

##### A.6.3.4.2.3 Test Requirements

The UE shall start to transmit PRACH to Cell 2 in no later than DLTM from the beginning of time period T4.

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

NOTE: The cell switch delay can be expressed as DLTM (= Tcmd + TLTM-interrupt), where:

Tcmd = THARQ + 3ms and is specified in clause 6.3.1.2, TLTM-interrupt is defined in clause 6.3.1.3 as TLTM-RRC-processing + TLTM-processing + Tfirst-RS + TRS-proc + TLTM-IU,

- Tfirst-RS + TRS-proc= 0 ms for Test 1A and 1B, Tfirst-RS + TRS-proc= 22 ms for Test 2A and 2B,

- TLTM-IU\_= 20 ms.

- TLTM-RRC-processing =10ms if UE does not support *ltm-FastProcessingConfig-r18*, otherwise TLTM-RRC-processing = 0 ms

- TLTM-processing = 10 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 10 ms for FR1-to-FR1 cell switch in the capability

- TLTM-processing = 15 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 15 ms for FR1-to-FR1 cell switch in the capability

- TLTM-processing = 20 ms if the UE does not support *ltm-FastUE-Processing-r18* capability.

End of Change 1

Start of Change 2

##### A.6.3.5.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 3 in no later than DLTM from the beginning of time period T4.

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

NOTE: The cell switch delay can be expressed as DLTM (= Tcmd + TLTM-RRC-processing + TLTM-processing + Tfirst-RS + TRS-proc + TLTM-IU), where:

Tcmd = THARQ + 3ms and is specified in clause 6.3.1.2

- Tfirst-RS + TRS-proc= 0 ms for Test 1A and 1B, Tfirst-RS + TRS-proc= 22 ms for Test 2A and 2B

- TLTM-IU = 20 ms

- TLTM-RRC-processing = 10 ms if UE does not support *ltm-FastProcessingConfig-r18*, otherwise TLTM-RRC-processing =0ms

- TLTM-processing = 10 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 10 ms for FR1-to-FR1 cell switch in the capability

- TLTM-processing = 15 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 15 ms for FR1-to-FR1 cell switch in the capability

- TLTM-processing = 20 ms if the UE does not support *ltm-FastUE-Processing-r18* capability.

End of Change 2

Start of Change 3

#### A.6.7.17.1 Inter-frequency L1-RSRP accuracy requirements for neighbour cell in FR1

##### A.6.7.17.1.1 Test Purpose and Environment

The purpose of this test is to verify that the inter-frequency L1-RSRP measurement accuracy on neigbor cell is within the specified limits. This test will verify the requirements in clause 9.15.5 and clause 10.1.19E for inter-frequency L1-RSRP measurements based on SSB with the testing configurations for NR cells in Table A.6.7.17.1.1-1.

Table A.6.7.17.1.1-1: Applicable NR configurations for FR1 SSB based inte-frequency L1-RSRP test

|  |  |
| --- | --- |
| 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 in each supported band  Note 2: Target NR cell has the same SCS, BW and deplex mode as NR serving cell. | |

##### A.6.7.17.1.2 Test parameters

In this set of test cases 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 for the Cell 2 are given in Table A.6.7.17.1.2-1 below. The absolute accuracy of L1-RSRP measurements are tested by using the parameters in Table A.6.7.17.1.2-1.

Measurement gap pattern configuration defined in Table A.6.7.17.1.2-1 is provided. Before the test,

- UE is connected to Cell 1 (PCell) on RF channel 1 (PCC)

- UE is configured one SSB resource set with one SSB resource on Cell 2

- A measurement object is configured for the RF channel 2, and it is indicated to the UE to reprort periodica reporting with with SSB Index.

- UE is provided with *LTM-Candidate-r18* for Cell 2*.*

- UE is configured with SSB-based L1-RSRP measurements and periodic L1-RSRP measurement reports on candidate cell (Cell 2) in PUCCH format 2.

Table A.6.7.17.1.2-1: FR1 inter-frequency SSB based L1-RSRP test parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | | Test 2 | |
|  | |  |  | Cell1 | Cell 2 | Cell 1 | Cell 2 |
| SSB GSCN | | 1~3 |  | freq1 | freq2 | freq1 | freq2 |
| Duplex mode | | 1 |  | FDD | | FDD | |
|  | | 2 |  | TDD | | TDD | |
|  | | 3 |  | TDD | | TDD | |
| Gap Pattern Id | | 1~3 |  | 0 | | | |
| Measurement gap offset | | 1~3 |  | 39 | | | |
| TDD Configuration | | 1 |  | N/A | | N/A | |
|  | | 2 |  | TDDConf.1.1 | | TDDConf.1.1 | |
|  | | 3 |  | TDDConf.2.1 | | TDDConf.2.1 | |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
|  | | 2 |  | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
|  | | 3 |  | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | - | SR.1.1 FDD | - |
|  | | 2 |  | SR.1.1 TDD | - | SR.1.1 TDD | - |
|  | | 3 |  | SR.2.1 TDD | - | SR.2.1 TDD | - |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | - | CR.1.1 FDD | - |
|  | | 2 |  | CR.1.1 TDD | - | CR.1.1 TDD | - |
|  | | 3 |  | CR.2.1 TDD | - | CR.2.1 TDD | - |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | - | CCR.1.1 FDD | - |
|  | | 2 |  | CCR.1.1 TDD | - | CCR.1.1 TDD | - |
|  | | 3 |  | CCR.2.1 TDD | - | CCR.2.1 TDD | - |
| SSB configuration | | 1 |  | SSB.1 FR1 | | SSB.1 FR1 | |
|  | | 2 |  | SSB.1 FR1 | | SSB.1 FR1 | |
|  | | 3 |  | SSB.2 FR1 | | SSB.2 FR1 | |
| OCNG Patterns | | 1~3 |  | OP.1 | | OP.1 | |
| Initial BWP Configuration | | 1~3 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| TRS configuration | | 1 |  | TRS.1.1 FDD | - | TRS.1.1 FDD | - |
|  | | 2 |  | TRS.1.1 TDD | - | TRS.1.1 TDD | - |
|  | | 3 |  | TRS.1.2 TDD | - | TRS.1.2 TDD | - |
| Dedicated BWP configuration | | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | | DLBWP.1.1  ULBWP.1.1 | |
| SMTC configuration | | 1~3 |  | SMTC.1 | | SMTC.1 | |
| reportConfigType | | 1~3 |  | periodic | | periodic | |
| reportQuantity | | 1~3 |  | ssb-Index-RSRP | | ssb-Index-RSRP | |
| Number of reported RS | | 1~3 |  | 1 | | 1 | |
| L1-RSRP reporting period | | 1~3 |  | slot80 | | slot80 | |
| EPRE ratio of PSS to SSS | | 1~3 | dB | 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 DMRS | |  |  |  | |  | |
| EPRE ratio of OCNG DMRS to SSSNote 1 | |  |  |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |  |  |  | |  | |
| Note2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1~3 | dBm/15kHz | -94.65 | | ( for Channel 2 +8dB) | -117 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -116.5 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -116 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -115.5 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -115 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -114.5 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -114 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -113.5 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -110.5 |
| Note2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1,2 | dBm/SSB SCS | -94.65 | | ( for Channel 2 +8dB) | -117 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -116.5 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -116 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -115.5 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -115 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -114.5 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -114 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -113.5 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -110.5 |
|  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 3 |  | -91.65 | | ( for Channel 2 +8dB) | -114 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -113.5 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -114 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -112.5 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -112 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -111.5 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -111 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -110.5 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -107.5 |
|  | | 1~3 | dB | 10 | 10 | 13 | -3 |
| SSB RSRP Note3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1,2 | dBm/SSB SCS | -84.65 | | (RSRP for Cell 2 +24dB) | -120 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -119.5 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -119 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -118.5 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -118 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -117.5 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -117 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -116.5 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -113.5 |
|  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 3 |  | -81.65 | | (RSRP for Cell 2 +24dB) | -117 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -116.5 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -116 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -115.5 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -115 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -114.5 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -114 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -113.5 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -110.5 |
| Io Note3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1,2 | dBm/9.36 MHz | -56.28 | | (Io for Channel 2 +19.75dB) | -87.28 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -86.78 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -86.28 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -85.78 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -85.28 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -84.78 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -84.28 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -83.78 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -80.78 |
|  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 3 | dBm/38.16 MHz | -50.19 | | (Io for Channel 2 +19.75dB) | -81.19 |
|  | NR\_FDD\_FR1\_B |  |  |  | | -80.69 |
|  | NR\_TDD\_FR1\_C |  |  |  | | -80.19 |
|  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | | -79.69 |
|  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | | -79.19 |
|  | NR\_FDD\_FR1\_F |  |  |  | | -78.69 |
|  | NR\_FDD\_FR1\_G |  |  |  | | -78.19 |
|  | NR\_FDD\_FR1\_H |  |  |  | | -77.69 |
|  | NR\_FDD\_FR1\_N |  |  |  | | -74.69 |
|  | | 1~3 | dB | 10 | 10 | 13 | -3 |
| Propagation condition | | 1~3 |  | AWGN | | AWGN | |
| Antenna configuration | | 1~3 |  | 1x2 | | 1x2 | |
| 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 and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | | |

##### A.6.7.17.1.3 Test Requirements

The inter-frequency L1-RSRP measurement accuracy for SSB resource reported by UE in L1-RSRP report (SSB#0 of Cell 2) shall fulfil the requirements in clauses 10.1.19E.

End of Change 3

Start of Change 4

A.7.3.2.x LTM PDCCH-order Random Access

A.7.3.2.x.1 PDCCH-order RACH on neighbor cell in FR2 when RACH BW is within active BWP

A.7.3.2.x.1.1 Test Purpose and Environment

This test is to verify the requirement for the NR FR2-NR FR2 PDCCH-ordered RACH to an intra-frequency candidate cell in FR2 for LTM. The interruption requirements specified in clause 8.2.2.2.20. This test is for UE supporting PDCCH-ordered RACH to an intra-frequency candidate cell, whose SSB is within active BWPs of the UE.

A.7.3.2.x.1.2 Test Parameters

Two cells are deployed in the test, which are FR2 PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell. Test configurations are given in table A.7.3.2.x.1.2-1. Both PDCCH order RACH delay and transmit timing requirement are tested by using the parameters in table A.7.3.2.x.1.2-2, and A.7.3.2.x.1.2-3.

There are two tests in the test case, test 1 and test 2:

* In test 1, joint TCI state configuration as defined in Table A.7.3.2.x.1.2-2 is provided for UE that supports *ltm-BeamIndicationJointTCI-r18*.
* In test 2, separate TCI state configuration as defined in Table A.7.3.2.x.1.2-2 for test 2 is provided for UE that supports *ltm-BeamIndicationSeparateTCI-r18* and does not support *ltm-BeamIndicationJointTCI-r18*.

If a UE supports *ltm-BeamIndicationSeparateTCI-r18* and does not support *ltm-BeamIndicationJointTCI-r18*, it is only required to pass test 2. Otherwise, it is only required to pass test 1.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. No gap patterns are configured in the test case.

Prior to the start of the time duration T1,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC).

- UE is provided with *LTM-Candidate-r18* for Cell 2*.*

- A measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

- UE is configured with SSB-based L1-RSRP measurements and periodic L1-RSRP measurement reports on candidate cell (Cell 2) in PUCCH format 2.

- The UE has performed L3 measurement and SSB based L1-RSRP measurement on Cell 2.

T1 starts from UE transmitting a valid L1 report on Cell 2. After receiving the first L1 report on Cell 2 during T1, the network sends TCI state activation MAC CE to active TCI state of Cell 2 in no later than 100ms.

* In test 1, CandidateTCI-State#1 is activated.
* In test 2, CandidateTCI-State#1 and CandidateTCI-UL-State#1 are activated.
* For UE incapable of early TCI state activation, network shall not send TCI state activation MAC CE to active TCI state of Cell 2.

The start of T2 is the instant when PDCCH order to trigger PRACH transmission on Cell 2 is sent to the UE.

**Table A.7.3.2.x.1.2-1: PDCCH order RACH on Neighbor cell in FR1 test configurations**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | Source cell: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode  Target cell: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

**Table A.7.3.2.x..2.2-2: General test parameters for PDCCH order RACH in FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | | **Comment** |
| **Test 1** | **Test 2** |
| Initial conditions | Active cell |  | Cell 1 | |  |
|  | Neighbouring cell |  | Cell 2 | | Cell 2 is the candidate cell |
| Final condition | Active cell |  | Cell 1 | | After transmitting PRACH on Cell 2, UE shall be back to Cell 1. |
| A3-Offset | | dB | 0 | |  |
| Hysteresis | | dB | 0 | |  |
| Time To Trigger | | s | 0 | |  |
| Filter coefficient | |  | 0 | | L3 filtering is not used |
| DRX | |  | OFF | | DRX is not used |
|  | |  |  | |  |
| Time offset between cells | |  | 0.3 μs | | RTD between cells is less than CP |
| deriveSSB-IndexFromCell | |  | Enabled | |  |
| EarlyUL-SyncConfig | frequencyInfoUL |  | NR RF Channel Number 1 | | Same as Cell 1 |
| PRACH configuration |  | FR2 PRACH configuration 5 | | RACH bandwidth is within active UL BWP of Cell 1 |
| bwp-GenericParameters |  | ULBWP.0.1 | |
| n-TimingAdvanceOffset | Tc | N/A | |  |
| LTM-CSI-ReportConfig | L1-RSRP reporting period | slot | 320 | | Periodic L1-RSRP reporting configured |
| nrOfReportedCells |  | n1 | | Report candidate cell’s (Cell 2) L1-RSRP measurement results. |
| nrOfReportedRS-PerCell |  | n1 | |
|  | spCellInclusion |  | N/A | |
| ltm-DL-OrJointTCI-StateToAddModList | CandidateTCI-State#1 |  | DLorJoint TCI.State.0 | DLorJoint TCI.State.2 | As specified in clause A.3.16B.  Configured for early TCI state activation. |
| ltm-UL-TCI-StatesToAddModList | CandidateTCI-UL-State#1 |  | N/A | UL TCI.State.0 | As specified in clause A.3.16B.  Configured for early TCI state activation. |
| ltm-ConfigComplete | |  | True | | Candidate cell’s configuration is complete configuration |
| T1 | | s | 0.3 | |  |
| T2 | | s | ≤0.5 | |  |

**Table A.7.3.2.x..2.2-3: Cell specific test parameters for PDCCH order RACH test case in FR2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | | **Cell 2** | |
|  | | |  | **T1** | **T2** | **T1** | **T2** |
| Assumption for UE beamsNote 6 | | |  | Rough | | Rough | |
| AoA setup | | |  | Setup 1 as defined in A.3.15 | | | |
| NR RF Channel Number | | |  | **1** | | **1** | |
| Duplex mode | | |  | TDD | | | |
| TDD configuration | | |  | TDDConf.3.1 | | | |
| BWchannel | | | MHz | 100: NRB,c = 66 | | | |
| BWP BW | | | MHz | 100: NRB,c = 66 | | | |
| Data RBs allocated | | |  | 66 | | | |
| DRx Cycle | | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | | |  | SR3.1 TDD | | | |
| RMSI CORESET Reference Channel | | |  | CR3.1 TDD | | | |
| Control Channel RMC | | |  | CCR.3.1 TDD | | | |
| OCNG Patterns | | |  | O P. 1 | | | |
| SMTC Configuration | | |  | SMTC pattern 1 | | | |
| SSB Configuration | | |  | SSB.3 FR2 | | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | 120 | | | |
| PUCCH/PUSCH subcarrier spacing | | | kHz | 120 | | | |
| PRACH configuration | | |  | FR2 PRACH configuration 6 | | | |
| TRS configuration | | |  | TRS.2.1 TDD | | | |
| PDSCH/PDCCH TCI state | | |  | TCI.State.2 | | | |
| BWP configuraiton | | Initial DL BWP |  | DLBWP.0.1 | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | |
| EPRE ratio of PSS to SSS | | | dB | 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 | -104.7 | | -104.7 | |
| Note2 |  | | dBm/SCS | -95.7 | | -95.7 | |
|  | | | dB | -1.8 | | 0 | |
|  | | | dB | 6 | | 7 | |
| SSB\_RP | | | dBm/SCS | -89.7 | | -88.7 | |
| IoNote3 | | | dBm/  95.04MHz | -56.7 | | -56.7 | |
| Propagation condition | | | - | 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | | |

A.7.3.2.x.1.3 Test Requirements

The UE shall transmit the PRACH to Cell 2 in the first available PRACH occasion after + 0.25ms + from the beginning of time period T2. After transmitting PRACH on Cell 2, UE shall be back to Cell 1.

NOTE: The PDCCH order RACH delay can be expressed as: , where:

- is a time duration of symbols corresponding to a PUSCH preparation time for UE processing capability 1 assuming corresponds to the smallest SCS configuration between the SCS configuration of the PDCCH order and the SCS configuration of the corresponding PRACH transmission and is specified in Table 6.4-1 in 38.214 [26].

- = 0, = 0, = 0

- = 0.25ms

- , where is first SSB occasion, after 1slot from the end of the slot of the PDCCH, and = 2 ms, which is the time for SSB processing.

During T2, interruption on Cell 1 UL shall not happen outside the overlapped slot to transmit PRACH and symbols from the last or first symbol of PRACH occasion as defined in clause 8.1 in 38.213 [3], where N=4. During T2, interruption on Cell 1 DL shall not occur outside the overlapped slot to transmit PRACH.

The test equipment will verify that the timing of PRACH transmission on Cell 2 is within (NTA + NTA\_offset) ×Tc ± Te of the first detected path of DL SSB of Cell 2.

a. The NTA\_offset value (in Tc units) is 13792.

b. The Te values depend on the DL and UL SCS for which the test is being run and are given in Table 7.1.2-1.

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

A.7.3.2.x.2 PDCCH-order RACH on inter-frequency neighbor cell in FR2

A.7.3.2.x.2.1 Test Purpose and Environment

This test is to verify the requirement for PDCCH-order RACH on neighbour cell in FR2 when RACH bandwidth is outside any configured UL BWP specified in clause 8.1 in 38.213 [3], UE transmit timing in clause 7.1 and interruption in clause for UE supporting [RACH-based early TA acquisition], [RF/BB preparation time for PDCCH-order RACH] and [Interruption due to RF retuning for PDCCH- ordered RACH].

A.7.3.2.x.2.2 Test Parameters

In this test, there are two cells: NR Cell 1 as PCell in FR2 on NR RF channel 1 and NR Cell 2 as neighbour cell in FR2 on NR RF channel 2. Test configurations are given in table A.7.3.2.x.2.2-1. Both PDCCH order RACH delay, transmit timing requirement and the interruption requirements are tested by using the parameters in table A.7.3.2.x.2.2-2, and A.7.3.2.x.2.2-3.

The test consists of two successive time periods, with time durations of T1 and T2 respectively.

Prior to the start of the time duration T1,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC).

- UE is provided with *LTM-Candidate-r18* for Cell 2*.*

- A measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A4 is used.

- UE is configured with SSB-based L1-RSRP measurements and periodic L1-RSRP measurement reports on candidate cell (Cell 2) in PUCCH format 2.

- The UE has reported L3 measurement results and performed SSB based L1-RSRP measurement on Cell 2.

T1 starts from UE transmitting a valid L1 report on Cell 2. After T1, test equipment sends PDCCH order to trigger RACH transmission. The start of T2 is the instant when PDCCH order to trigger PRACH transmission on Cell 2 is received.

**Table A.7.3.2.x.2.2-1: PDCCH order RACH on inter-frequency neighbor cell in FR2 test configurations**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | Source cell: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode  Candidate cell: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

**Table A.7.3.2.x.2.2-2: General test parameters for PDCCH order RACH in FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 | Cell 2 is the candidate cell |
| Final condition | Active cell |  | Cell 1 | After transmitting PRACH on Cell 2, UE shall be back to Cell 1. |
| *a4-Threshold* | | dBm | -110 | Cell 2 |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | ms | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| includeBeamMeasurements | |  | True |  |
| Gap Pattern Id | |  | 13 | As specified in Table 9.1.2-1. |
| Measurement gap offset | |  | 39 |  |
| DRX | |  | OFF | DRX is not used |
| Time offset between cells | |  | 0.3 μs |  |
| deriveSSB-IndexFromCell | |  | Enabled |  |
| EarlyUL-SyncConfig | frequencyInfoUL |  | NR RF Channel Number 2 | Cell 2 |
| PRACH configuration |  | FR2 PRACH configuration 5 |  |
| bwp-GenericParameters |  | ULBWP.0.1 |
| n-TimingAdvanceOffset | Tc | N/A |  |
| LTM-CSI-ReportConfig | L1-RSRP reporting period | slot | 320 | Periodic L1-RSRP reporting configured |
| nrOfReportedCells |  | n1 | Report candidate cell’s (Cell 2) L1-RSRP measurement results. |
| nrOfReportedRS-PerCell |  | n1 |
|  | spCellInclusion |  | N/A |
| ltm-ConfigComplete | |  | True | Candidate cell’s configuration is complete configuration |
| T1 | | s | 0.3 |  |
| T2 | | s | ≤0.5 |  |

**Table A.7.3.2.x.2.2-3: Cell specific test parameters for PDCCH order RACH test case**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | |
|  | |  |  | **T1** | **T2** | **T1** | **T2** |
| AoA setup | |  | Config 1 | Setup 1 as specified in clause A.3.15 | | | |
| Beam AssumptionNote 7 | |  | Config 1 | Rough | | Rough | |
| NR RF Channel Number | |  | Config 1 | 1 | | 2 | |
| Duplex mode | |  | Config 1 | TDD | | TDD | |
| TDD configuration | |  | Config 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | | MHz | Config 1 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated | |  | Config 1 | 66 | | 66 | |
| BWP BW | | MHz | Config 1 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| BWP configuration | Initial DL BWP |  | Config 1 | DLBWP.0.1 | | N/A | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | N/A | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | N/A | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | N/A | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.3.1 TDD | | N/A | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.3.1 TDD | | N/A | |
| Control Channel RMC | |  | Config 1 | CCR.3.1 TDD | | N/A | |
| SMTC configuration | |  | Config 1 | SMTC.1 | | SMTC.1 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1 | 120 | | 120 | |
| PUCCH/PUSCH subcarrier spacing | | kHz | Config 1 | 120 | | 120 | |
| TRS configuration | |  | Config 1 | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDSCH/PDCCH TCI state | |  | Config 1 | TCI.State.2 | | N/A | |
| EPRE ratio of PSS to SSS | |  |  |  | |  | |
| 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 | |  | Config 1 | 0 | | 0 | |
| 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) | |  |  |  | |  | |
| Note 3 | | dB | Config 1 | 5 | 5 | 5 | 5 |
| Note2 | | dBm/15 kHz | Config 1 | -104.7 | -104.7 | -104.7 | -104.7 |
| Note2 | | dBm/SCS | Config 1 | -95.7 | -95.7 | -95.7 | -95.7 |
| SSB\_RP Note 3 | | dBm/SCS Note5 | Config 1 | -90.7 | -90.7 | -90.7 | -90.7 |
| IoNote3 | | dBm/95.04 MHz Note5 | Config 1 | -60.5 | -60.5 | -60.5 | -60.5 |
| Propagation Condition | |  | Config 1 | 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: SSB\_RP, Es/Iot and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | | |

A.7.3.2.x.2.3 Test Requirements

The UE shall transmit the PRACH to Cell 2 in the first available PRACH occasion after + 0.25ms + + from the beginning of time period T2. After transmitting PRACH on Cell 2, UE shall be back to Cell 1.

NOTE: The PDCCH order RACH delay can be expressed as: , where:

- is a time duration of symbols corresponding to a PUSCH preparation time for UE processing capability 1 assuming corresponds to the smallest SCS configuration between the SCS configuration of the PDCCH order and the SCS configuration of the corresponding PRACH transmission and is specified in Table 6.4-1 in 38.214 [26].

- = 0, = 0

- is reported in [UE capability of RF/BB preparation time for PDCCH-order RACH]

- = 0.25ms

- , where is the time to first SSB occasion overlapped with MGL after 2ms and 1 slot from the end of the slot that UE receives PDCCH-order, and = 2 ms, which is the time for SSB processing.

During T2, interruption on Cell 1 shall not happen outside ceil (Y/NR Slot length) +1 slots before and after PRACH transmission and the same slot of PRACH, where Y as reported in [UE capability xx],

The test equipment will verify that the timing of PRACH transmission on Cell 2 is within (NTA + NTA\_offset) ×Tc ± Te of the first detected path of DL SSB of Cell 2.

a. The NTA\_offset value (in Tc units) is 13792.

b. The Te values depend on the DL and UL SCS for which the test is being run and are given in Table 7.1.2-1.

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

End of Change 4

Start of Change 5

##### A.7.3.4.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 in no later than DLTM from the beginning of time period T4.

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

NOTE: The cell switch delay can be expressed as DLTM (= Tcmd + TLTM-interrupt), where:

Tcmd = THARQ + 3 ms and is specified in clause 6.3.1.2,

TLTM-interrupt = TLTM-RRC-processing + TLTM-processing + Tfirst-RS + TRS-proc + TLTM-IU ms, as stated in section 6.3.1.3

- Tfirst-RS + TRS-proc= 0 ms for Test 1A and 1B, Tfirst-RS + TRS-proc= 22 ms for Test 2A and 2B

- TLTM-IU = 20 ms

- TLTM-RRC-processing = 10 ms if UE does not support *ltm-FastProcessingConfig-r18*, otherwise TLTM-RRC-processing =0ms

- TLTM-processing = 10 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 10 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 15 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 15 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 20 ms if the UE does not support *ltm-FastUE-Processing-r18* capability.

End of Change 5

Start of Change 6

##### A.7.3.4.3.3 Test Requirements

The UE shall start to transmit PUSCH to Cell 2 in no later than DLTM from the beginning of time period T4.

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

NOTE: The cell switch delay can be expressed as DLTM (= Tcmd + TLTM-interrupt), where:

Tcmd = THARQ + 3 ms and is specified in clause 6.3.1.2, TLTM-interrupt is defined in clause 6.3.1.3 as TLTM-RRC-processing + TLTM-processing + Tfirst-RS + TRS-proc + TLTM-IU,

- Tfirst-RS + TRS-proc= 0 ms for Test 1A and 1B, Tfirst-RS + TRS-proc= 22 ms for Test 2A and 2B,

- TLTM-IU = 20 ms.

- TLTM-RRC-processing = 10 ms if UE does not support *ltm-FastProcessingConfig-r18*, otherwise TLTM-RRC-processing =0ms

- TLTM-processing = 10 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 10 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 15 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 15 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 20 ms if the UE does not support *ltm-FastUE-Processing-r18* capability.

End of Change 6

Start of Change 7

##### A.7.3.5.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 3 in no later than DLTM from the beginning of time period T4.

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

NOTE: The cell switch delay can be expressed as DLTM (= Tcmd + TLTM-interrupt), where:

Tcmd = THARQ + 3 ms and is specified in clause 6.3.1.2, TLTM-interrupt is defined in clause 8.20.3 as TLTM-interrupt = TLTM-RRC-processing + TLTM-processing + Tfirst-RS + TRS-proc + TLTM-IU ms.

- Tfirst-RS + TRS-proc= 0 ms for Test 1A and 1B, Tfirst-RS + TRS-proc= 22 ms for Test 2A and 2B

- TLTM-IU=20ms,

- TLTM-RRC-processing = 10 ms if UE does not support *ltm-FastProcessingConfig-r18*, otherwise TLTM-RRC-processing =0ms

- TLTM-processing = 10 ms if the UE supports *ltm-FastUE-Processing-r18* capability and UE reports 10 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 15 ms if the UE supports *ltm-FastUE-Processing-r18*] capability and UE reports 15 ms for FR2-to-FR2 cell switch in the capability

- TLTM-processing = 20 ms if the UE does not support *ltm-FastUE-Processing-r18* capability.

End of Change 7

Start of Change 8

##### A.7.6.20.1.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots in T2. The UE shall start to report a larger L1-RSRP value of Cell 2 in no later than 960 ms plus 320 slots from the beginning of time period T2, UE shall send L1-RSRP report including the valid results for Cell 2 while meeting the accuracy requirements defined in clause 10.1.20A. The reported L1-RSRP value shall include the Rx antenna gain in the range of -10 to +20 dB.

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

End of Change 8

Start of Change 9

##### A.7.6.21.1.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots in T2. The UE shall start to report a larger L1-RSRP value of Cell 2 in no later than 1280 ms plus 320 slots from the beginning of time period T2. UE shall send L1-RSRP report including the valid results for Cell 2 while meeting the accuracy requirements defined in clause 10.1.20B.

The reported L1-RSRP value shall include the Rx antenna gain in the range of -10 to +20 dB.

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

End of Change 9

Start of Change 10

##### A.7.6.22.1.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots in T2. No later than 960 ms plus 320 slots from the beginning of time period T2, UE shall send L1-RSRP report including the valid results for Cell 2 while meeting the accuracy requirements defined in clause 10.1.20B.

The reported L1-RSRP value shall include the Rx antenna gain in the range of -10 to +20 dB.

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

End of Change 10

Start of Change 11

### A.7.7.15 LTM L1-RSRP measurement

#### A.7.7.15.1 SSB based inter-frequency L1-RSRP measurement

##### A.7.7.15.1.1 Test Purpose and Environment

The purpose of this test is to verify that the L1-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clause10.1.20B.1.1] for inter-frequency L1-RSRP measurements based on SSB with the testing configurations for NR cells in Table A.7.7.15.1.1-1.

Prior to the start of the test,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC).

- UE is provided with *LTM-Candidate-r18* for Cell 2*.*

- A measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A4 is used.

- UE is configured with SSB-based L1-RSRP measurements and periodic L1-RSRP measurement reports on candidate cell (Cell 2) in PUCCH format 2.

- The UE has reported L3 measurement results and performed SSB based L1-RSRP measurement on Cell 2.

Table A.7.7.15.1.1-1: Applicable NR configurations for FR2 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

##### A.7.7.15.1.2 Test parameters

In this set of test cases there are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on a different frequency than the PCell. The test parameters for the Cell 1 and Cell 2 are given in Table A.7.7.15.1.2-1 and Table A.7.7.15.1.2-2 below. The absolute accuracy of inter-frequency L1-RSRP measurements are tested by using the parameters in Table A.7.7.15.1.2-1 and Table A.7.7.15.1.2-2. The inter-frequency L1-RSRP measurements are supported by a measurement gap.

Before the test, UE is configured L1-RSRP measurement on SSB0 of Cell 2.

Table A.7.7.15.1.2-1: FR2 SSB based inter-frequency L1-RSRP general test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| SSB ARFCN | 1~2 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1~2 |  | 100:  NRB,c = 66 | | 100:  NRB,c = 66 | |
| Data RBs allocated | 1~2 |  | 66 | | 66 | |
| Gap pattern ID | 1~2 |  | 13 | | 13 | |
| Measurement gap offset | 1~2 |  | 39 | | 39 | |
| Duplex mode | 1~2 |  | TDD | | TDD | |
| TDD configuration | 1~2 |  | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH Reference measurement channel | 1 |  | SR.3. 2 TDD | - | SR.3. 2 TDD | - |
| 2 | SR.3.3 TDD | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| 2 | CR.3.2 TDD | CR.3.2 TDD |
| Control Channel RMC | 1 |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| 2 | CCR.3.7 TDD | CCR.3.7 TDD |
| SSB configuration | 1 |  | SSB.3 FR2 | | SSB.3 FR2 | |
|  | 2 |  | SSB.4 FR2 | | SSB.4 FR2 | |
| PDSCH/PDCCH subcarrier spacing | 1~2 | kHz | 120 | | 120 | |
| OCNG Patterns | 1~2 |  | OP.1 | | OP.1 | |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.3  ULBWP.1.3 | | DLBWP.1.3  ULBWP.1.3 | |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 | | TCI.State.2 | |
| SMTC configuration | 1~2 |  | SMTC.1 | | SMTC.1 | |
| LTM reportConfigType | 1~2 |  | periodic | - | periodic | - |
| ltm-ResourcesForChannelMeasurement | 1~2 |  | SSB0 of Cell 2 | - | SSB0 of Cell 2 | - |
| LTM L1-RSRP reporting period | 1~2 |  | slot320 | - | slot320 | - |
| nrOfReportedCells | 1~2 |  | 1 | - | 1 | - |
| nrOfReportedRS-PerCell | 1~2 |  | 1 | - | 1 | - |
| spCellInclusion | 1~2 |  | N/A | - | N/A | |
| Time offset between Cell 2 and Cell 1 | 1~2 | μs | 3 | | 3 | |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 | 0 | 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 DMRS |  |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |  |
| Propagation condition | 1~2 | - | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration | 1~2 | - | 1x2 | 1x2 | 1x2 | 1x2 |
| 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. | | | | | | |

Table A.7.7.15.1.2-2: FR2 SSB based inter-frequency L1-RSRP OTA related test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration | 1~2 |  | Setup 1 according to A.3.15.1 | | Setup 1 according to A.3.15.1 | |
| Assumption for UE beamsNote 4 | 1~2 |  | Rough | | Rough | |
| Note1 | 1 | dBm/15kHzNote4 | -100 | | n.a. | |
| 2 |
| Note1 | 1 | dBm/SCSNote4 | -91 | | n.a. | |
| 2 | -88 | | n.a. | |
|  | 1~2 | dB | 10 | -2 | n.a. | |
| Note2 | 1~2 | dB | 10 | -2 | n.a. | |
| SSB\_RPNote2 | 1 | dBm/SCS | -81 | -93 | As in Table B.2.4-2 | |
| 2 | -78 | -90 | As in Table B.2.4-2 | |
| IoNote2 | 1 | dBm/95.04 MHz Note3 | -51.57 | -59.86 | SSB\_RP+28.98 | |
| 2 | -51.57 | -59.86 | SSB\_RP+28.98 | |
| Note 1: Where used, 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 2: SSB\_RP, Es/Iot, Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  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.7.7.15.1.3 Test Requirements

The L1-RSRP measurement accuracy for Cell 2 shall fulfil the absolute requirements in clause 10.1.20B.1.1.

Test 1:

Absolute accuracy of SSB0 in Cell 2. The UE is deemed to meet the requirement if the reported L1-RSRP is in the range shown in Table A.7.7.15.1.3-1.

Test 2:

Absolute accuracy of SSB0 in Cell 2. The UE is deemed to meet the requirement if the reported L1-RSRP is in the range shown in Table A.7.7.15.1.3-1.

Table A.7.7.15.1.3-1: L1-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3 |
| SSB0 | SSB\_RP0 -δ + Gmin ≤ Reported RSRP(dBm) ≤ SSB\_RP0 +δ + Gmax |
| Note 1: SSB\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the SSB n under consideration  Note 2: δ is the RSRP absolute accuracy requirement from Table 10.1.20.1.1-1, selected according to the Io used in the test  Note 3: Gmin and Gmax are the minimum and maximum UE gain values from Table B.2.1.5.1-1, selected according to the UE power class | |

End of Change 11