# A.13 NR Standalone Tests with NR SCell under CCA and All Other NR Cells in FR1

## A.13.1 Timing

## A.13.1.1 UE transmit timing

## A.13.1.2 Timing advance

## A.13.2 Signalling characteristics

### A.13.2.1 Interruption

#### A.13.2.1.1 NR interruptions during SCell operations with CCA on SCell

##### A.13.2.1.1.1 Test Purpose and Environment

The purpose of this test is to verify NR PCell interruptions during SCell operations on an NR SCC with CCA, This test will verify the interruption requirements for NR PCell in NR SA specified in TS 38.133 clause 8.2.2 and 8.3A. Supported test configurations are shown in table A.13.2.1.1.1-1.

The general test parameters and NR cell specific test parameters are given in Table A.13.2.1.1.1-2 and A.13.2.1.1.1-3 below. In the test there are two cells: Cell1 and Cell2. Cell1 and Cell2 are PCell and SCell. Cell 1 is on a licenced band and cell 2 is subject to CCA. The test consists of five time periods, with duration of T1, T2, T3, T4 and T5. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2. Throughout the test, the PCell are continuously scheduled in DL. The power of signals on cell 1 and 2 is not modified during the test.

Prior to T1, a connection is started with cell 1 as the PCell, and measurements of cell 2 are configured with gap pattern 0, such that cell 2 is reported. This ensures that cell 2 is known at the start of time period T1 and is not itself part of the tested requirement.

The point in time at which the RRC message implying Scell addition is received at the UE antenna connector, defines the start of time period T1. Measurement gap pattern 0 shall be stopped when the Scell is configured.

The point in time at which the MAC-CE message implying Scell activation is received at the UE antenna connector, defines the start of time period T2.

The point in time at which the MAC-CE message implying Scell deactivation is received at the UE antenna connector, defines the start of time period T3.

The point in time at which deactivation delay requirement in section 8.3A are satisfied defines the start of time period T4

The point in time at which the RRC message implying Scell release is received at the UE antenna connector, defines the start of time period T5.

Table A.13.2.1.1.1-1: Interruptions during measurements on deactivated NR SCC supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode;  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode;  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode;  With CCA: 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 | |

Table A.13.2.1.1.1-2: General test parameters for Interruptions during measurements on deactivated NR SCC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2 |  |
| Active PCell |  | Cell1 | PCell on NR RF channel number 1. |
| Configured dSCell |  | Cell2 | SCell on NR RF channel number 2 |
| CP length |  | Normal | Applicable to Cell1, Cell2 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| T1 | s | <10 |  |
| T2 | s | <10 |  |
| T3 | s | <10 |  |
| T4 | s | <10 |  |
| T5 | s | <10 |  |

Table A.13.2.1.1.1-3: NR cell specific test parameters for Interruptions during measurements on deactivated NR SCC

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell1 | | | | | Cell2 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 | T1 | T2 | T3 | T4 | T5 |
| TDD configuration | Config 1 |  | --- | | | | | TDDConf.1.1 CCA | | | | |
| Config 2 | TDDConf.1.1 | | | | |
| Config 3 | TDDConf.2.1 | | | | |
| BWchannel | Config 1,2 | MHz | 10: NRB,c = 52 | | | | | 40: NRB,c = 106 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| DL CCA model | Config 1,2,3 |  | --- | | | | | As specified in clause A.3.20.2.1 | | | | |
| DL CCA probability for semi-static channel accessNote6,8 | PCCA\_DL |  | --- | | | | | 0.9375 | | | | |
| DL CCA probability for dynamic channel accessNote7,8 | PCCA\_DL\_1 |  | --- | | | | | 0.75 | | | | |
| PCCA\_DL\_2 |  | --- | | | | | 0.75 | | | | |
| Initial BWP  Configuration | Config 1,2,3 |  | DLBWP.0.1 | | | | | DLBWP.0.1 | | | | |
| Dedicated DL BWP  Configuration | Config 1,2,3 |  | DLBWP.1.1 | | | | | DLBWP.1.1 | | | | |
| Initial UL BWP  Configuration | Config 1,2,3 |  | ULBWP.0.1 | | | | | ULBWP.0.1 | | | | |
| Dedicated UL BWP  Configuration | Config 1,2,3 |  | ULBWP.1.1 | | | | | ULBWP.1.1 | | | | |
| PDSCH reference meassurement channel | Config 1 |  | SR.1.1 FDD | | | | | --- | | | | |
| Config 2 | SR.1.1 TDD | | | | |
| Config 3 | SR.2.1 TDD | | | | |
| RMSI CORESET  Parameters | Config 1 |  | CR.1.1 FDD | | | | | --- | | | | |
| Config 2 | CR.1.1 TDD | | | | |
| Config 3 | CR.2.1 TDD | | | | |
| PDCCH CORESET  Parameters | Config 1 |  | CCR.1.1 FDD | | | | | --- | | | | |
| Config 2 |  | CCR.1.1 TDD | | | | |
| Config 3 |  | CCR.2.1 TDD | | | | |
| TRS configuration | Config 1 |  | TRS.1.1 FDD | | | | | --- | | | | |
| Config 2 |  | TRS.1.1 TDD | | | | |
| Config 3 |  | TRS.1.2 TDD | | | | |
| OCNG Pattern | |  | OP.1 | | | | | OP.1 | | | | |
| SSB configuration for semi-static channel accessNote6,8 | Config 1,2 |  | SSB.1 FR1 | | | | | SSB.1 CCA | | | | |
| Config 3 |  | SSB.2 FR1 | | | | |
| SSB configuration for dynamic channel accessNote7,8 | Config 1,2 |  | SSB.1 FR1 | | | | | SSB.2 CCA | | | | |
| Config 3 |  | SSB.2 FR1 | | | | |
| SMTC Configuration | Config 1,2,3 |  | SMTC.1 | | | | | SMTC.1 | | | | |
| DBT window configuration | Config 1,2,3 |  | --- | | | | | DBT.1 | | | | |
| TCI state | |  | TCI.State.0 | | | | | --- | | | | |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | | | | | 1x2 Low | | | | |
| 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 | | dB | 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) | |  |  | | | | |  | | | | |
| NocNote 2 | Config 1,2,3 | dBm/15 kHz | -104 | | | | | -104 | | | | |
| NocNote 2 | Config 1,2 | dBm/SCS | -104 | | | | | -101 | | | | |
| Config 3 | -101 | | | | |
| SS-RSRP Note 3 | Config 1,2,3 | dBm/15 kHz | -87 | | | | | -87 | | | | |
| Ês/Iot | | dB | 17 | | | | | 17 | | | | |
| Ês/Noc | | dB | 17 | | | | | 17 | | | | |
| 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. For Cell 2 with CCA model, OCNG is transmitted only in slots with downlink transmission bursts and is not transmitted during muted slots or during DBT windows.  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 modeled 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 themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 8: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | |

##### A.13.2.1.1.2 Test Requirements

The UE shall meet the interruption requirements for SCell addition on the victim Pcell in clause 8.2.1 during time T1

The UE shall meet the interruption requirements for SCell activation on the victim Pcell in clause 8.2.1during time T2. There shall be a single interruption with time window as specified in clause 8.3A.2

The UE shall meet the interruption requirements for SCell deactivation on the victim PCell in clause 8.2.1during time T3. There shall be a single interruption with time window as specified in clause 8.3A.3

The UE shall meet the interruption requirements for deactivated SCell measurements on the victim PCell in clause 8.2.1 during time T4. The interruptions shall be within the time window as specified in clause 8.3A.3

The UE shall meet the interruption requirements for SCell release on the victim PCell in clause 8.2.1during time T5.

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

### A.13.2.2 SCell activation and deactivation delay

#### A.13.2.2.1 SCell Activation and Deactivation of known SCell under CCA, 160 ms SCell measurement cycle

##### A.13.2.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation delays for SCell on NR-U SCC with CCA are within the requirements stated in clause 8.3A, when the SCell is known by the UE at the time of activation and the configured SCell measurement cycle is 160 ms.

The supported test configurations are shown in Table A.13.2.2.1.1-1.

The test parameters are given in Table A.13.2.2.1.1-2 and cell-specific parameters in Table A.13.2.2.1.1-3 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell: Cell 1 (PCell) on radio channel 1 (PCC) in NR FR1, and Cell2 (SCell) on radio channel 2 (SCC) in NR with CCA. Before the test starts the UE is connected to Cell 1, but is not aware of Cell 2, as the UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 2) becomes configured on radio channel 2. The UE now starts monitoring the SCC. At the end of T1, the test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a slot # denoted *m*, defines the start of time period T2. The UE shall be able to report a valid CSI in PCell for the activated SCell at latest in slot *m* + , as defined in clause 8.3A.2. The UE shall start reporting CSI in PCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot *m+* and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption shall fall within the time window specified in clause 8.3A.2. At the end of T2 the test equipment sends a MAC message for deactivation of the SCell.

The point in time at which the MAC message is received by at the UE antenna connector, in a slot # denoted *n*, defines the start of time period T3. The UE shall complete the activation at latest in slot . Any PCell interruption shall fall within the time window specified in clause 8.3A.3.

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the slots from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received, while taking into account CCA failures on SCC.

The test equipment verifies the deactivation time by counting the slots from the time when the SCell deactivation command is sent until CQI reporting for SCell is discontinued.

Table A.13.2.2.1.1-1: Supported test configurations for SCell Activation and Deactivation of known SCell under CCA, 160 ms SCell measurement cycle

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode;  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode;  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode;  With CCA: 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 | |

Table A.13.2.2.1.1-2: General test parameters for known SCell activation with SCell under CCA, 160 ms SCell measurement cycle

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1,2 | Two radio channels (1, 2) are used for this test |
| Active PCell |  | Cell 1 | Primary cell on NR RF channel number 1. |
| Configured deactivated SCell |  | Cell 2 | Configured deactivated secondary cell on NR RF channel number 2 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| CQI/PMI periodicity and offset configuration index |  | 0 | CQI reporting for SCell every fourth slot |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| Cell2 timing offset to cell1 | μs | 0 |  |
| Time alignment error between cell2 and cell1 | μs | ≤ TAE as specified in TS 38.104 [13] clause 6.5.3.1. | The value of time alignment error depends upon the type of carrier aggregation. |
| T1 | s | 7 | During this time the PCell shall be known and the SCell configured and detected. |
| T2 | s | 1 | During this time the UE shall activate the SCell. |
| T3 | s | 1 | During this time the UE shall deactivate the SCell. |
| THARQ | ms | k1NR slot length | k1 is a number of slots and is indicated by the PDSCH-to-HARQ-timing-indicator field in the DCI format, if present, or provided by *dl-DataToUL-ACK*, the value of k should be the minimum value defined in TS 38.213 [3] depends on UE’s capability |
| TCSI\_Reporting | ms |  | the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting (clause 5.2.2.5 in TS 38.214) and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2]  is the subcarrier spacing configuration for DL |

Table A.13.2.2.1.1-3: Cell specific test parameters for known FR1 SCell activation case with SCell under CCA, 160 ms SCell measurement cycle

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| Duplex mode | Config 1 |  | FDD | | | TDD | | |
| Config 2,3 | TDD | | |
| TDD configuration | Config 1 |  | --- | | | TDDConf.1.1 CCA | | |
| Config 2 | TDDConf.1.1 | | |
| Config 3 | TDDConf.2.1 | | |
| BWchannel | Config 1,2 | MHz | 10: NRB,c = 52 | | | 40: NRB,c = 106 | | |
| Config 3 | 40: NRB,c = 106 | | |
| DL CCA model | |  | --- | | | As specified in clause A.3.26.2.1 | | |
| DL CCA probability for semi-static channel accessNote5,7 | PCCA\_DL |  | --- | | | 0.9357 | | |
| DL CCA probability for dynamic channel accessNote6,7 | PCCA\_DL\_1 |  | --- | | | 0.75 | | |
| PCCA\_DL\_2 |  | --- | | | 0.75 | | |
| PCCA\_UL | |  |  | | | 1 | | |
| LCCA\_DL Note 8 | |  |  | | | 2 | | |
| WCCA\_DL Note 8 | | ms |  | | | Tactivation\_time\_withCCA | | |
| Initial downlink BWP configuration | |  | DLBWP.0.2 | | | DLBWP.0.2 | | |
| Initial uplink BWP configuration | |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| Dedicated downlink BWP configuration | |  | DLBWP.0.2 | | | DLBWP.0.2 | | |
| Dedicated uplink BWP configuration | |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| TCI state | |  | TCI.State.0 | | | TCI.State.0 | | |
| TRS Configuration | Config 1 |  | TRS.1.1 FDD | | | TRS.1.2 TDD | | |
| Config 2 | TRS.1.1 TDD | | |
| Config 3 | TRS.1.2 TDD | | |
| PDSCH Reference measurement channel | Config 1 |  | SR.1.1 FDD | | | SR.1.1 CCA | | |
| Config 2 | SR.1.1 TDD | | |
| Config 3 | SR.2.1 TDD | | |
| Dedicated CORESET parameters | Config 1 |  | CCR.1.1 FDD | | | CCR.1.3 CCA | | |
| Config 2 | CCR.1.1 TDD | | |
| Config 3 | CCR.2.1 TDD | | |
| RMSI CORESET parameters | Config 1 |  | CR.1.1 FDD | | | CR.1.1 CCA | | |
| Config 2 | CR.1.1 TDD | | |
| Config 3 | CR.2.1 TDD | | |
| OCNG Patterns Note1 | |  | OP.1 | | | OP.1 | | |
| SSB Configuration for semi-static channel accessNote5,7 | Config 1,2 |  | SSB.1 FR1 | | | SSB.1 CCA | | |
| Config 3 | SSB.2 FR1 | | |
| SSB Configuration for dynamic channel accessNote6,7 | Config 1,2 |  | SSB.1 FR1 | | | SSB.2 CCA | | |
| Config 3 | SSB.2 FR1 | | |
| SMTC configuration | |  | SMTC.1 | | | SMTC.1 | | |
| DBT window configuration | |  | --- | | | DBT.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 SSSNote1 | |
| EPRE ratio of OCNG to OCNG DMRSNote1 | |
| *Noc* Note2 | Config 1,2 | dBm/15kHz | -104 | | | -104 | | |
| Config 3 |
| *Noc* Note2 | Config 1,2 | dBm/SCS | -104 | | | -101 | | |
| Config 3 | -101 | | |
| *Ês/Iot* | | dB | 17 | | | 17 | | |
| *Ês/Noc* | | dB | 17 | | | 17 | | |
| SS-RSRP Note3 | Config 1,2 | dBm/SCS | -87 | | | -84 | | |
| Config 3 | -84 | | | -84 | | |
| IoNote3 | Config 1,2 |  | -58.96 | | | -52.87 | | |
| Config 3 |  | -52.87 | | | -52.87 | | |
| Propagation condition | | - | AWGN | | | | | |
| Note 1: OCNG shall be used such that resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. For Cell 2 with CCA model, OCNG is transmitted only in slots with downlink transmission bursts and is not transmitted during muted slots or during DBT windows.  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, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations.  Note 8: As specified in clause 8.3A for L1,max, L2,1,max, L2,2,max, L3,1,max, andL3,2,max | | | | | | | | |

##### A.13.2.2.1.2 Test Requirements

During T2, the UE shall send the first CSI report for SCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot *m+*1+

During T2, conditioned on that downlink CCA failures L1 and L2,2 experienced in the SCell fulfill L1 ≤ L1,max and L2,2 ≤ L2,2,max with L1,max = 2 and L2,2,max = 2, respectively, the UE shall send the first valid CSI report (non-zero CQI) for the SCell no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB + L1\*Trs + 5ms and TCSI\_reporting\_withCCA = TCSI\_reporting + L2,2\*TCSI-RS + TCSI\_ReportingDelay, as specified in clause 8.3A.2.

During T3, the UE shall stop sending CSI reports for SCell at latest in slot , as defined in clause 8.3A.3.

During T2, interruption on PCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB.

During T3, interruption on PCell shall not occur outside slot *n* +1+THARQ/NR\_slot\_length to slot *n*+1+(THARQ +3ms)/NR\_slot\_length.

The interruption on PCell shall not be more than specified for SA in clause 8.2.2.2.2.

The rate of correctly observed SCell activation delays and SCell deactivation delays shall for repeated tests be at least 90%.

#### A.13.2.2.2 SCell Activation and Deactivation of known SCell under CCA, 640 ms SCell measurement cycle

##### A.13.2.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation delays for SCell on NR-U SCC with CCA are within the requirements stated in clause 8.3A, when the SCell is known by the UE at the time of activation and the configured SCell measurement cycle is 640 ms.

The supported test configurations are same as in Table A.13.2.2.1.1-1 above.

The test parameters are same as in Table A.13.2.2.1.1-2 above, except for parameters listed below in Table A.13.2.2.2.1-1. The cell-specific parameters are same as in Table A.13.2.2.1.1-3 above.

The test execution is the same as described in clause A.13.2.2.1 above, except that downlink CCA failures L2,1 and L2,2 with limits L2,1 ≤ L2,1,max and L2,2 ≤ L2,2,max replace L1 as described in clause 8.3A.2 for activation of known SCell with a measurement cycle larger than 160 ms.

Table A.13.2.2.2.1-1: General test parameters for known SCell activation with SCell under CCA, 640 ms SCell measurement cycle

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |

##### A.13.2.2.2.2 Test Requirements

During T2, the UE shall send the first CSI report for SCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot *m+*1+

During T2, conditioned on that downlink CCA failures L2,1 and L2,2 experienced in the SCell fulfill L2,1 ≤ L2,1,max and L2,2 ≤ L2,2,max with L2,1,max = 2 and L2,2,max = 2, respectively, the UE shall send the first valid CSI report (non-zero CQI) for the SCell no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + L2,1\*TSMTC\_MAX + (1 +L2,2)\*Trs + 5ms and TCSI\_reporting\_withCCA = TCSI\_reporting + TCSI\_ReportingDelay, as specified in clause 8.3A.2.

During T3, the UE shall stop sending CSI reports for SCell at latest in slot , as defined in clause 8.3A.3.

During T2, interruption on PCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB.

During T3, interruption on PCell shall not occur outside slot *n* +1+THARQ/NR\_slot\_length to slot *n*+1+(THARQ +3ms)/NR\_slot\_length.

The interruption on PCell shall not be more than specified for SA in clause 8.2.2.2.2.

The rate of correctly observed SCell activation delays and SCell deactivation delays shall for repeated tests be at least 90%.

#### A.13.2.2.3 SCell Activation and Deactivation of unknown SCell under CCA

##### A.13.2.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that SCell activation and deactivation delays for SCell on NR-U SCC with CCA are within the requirements stated in clause 8.3A, when the SCell is unknown to the UE at the time of activation.

The supported test configurations are same as in Table A.13.2.2.1.1-1 above.

The test parameters are same as in Table A.13.2.2.1.1-2 above, except for parameters listed below in Table A.13.2.2.3.1-1. The cell-specific parameters are same as in Table A.13.2.2.1.1-3 above.

The test execution is the same as described in clause A.13.2.2.1 above, except that downlink CCA failures L3,1 and L3,2 with limits L3,1 ≤ L3,1,max and L3,2 ≤ L3,2,max replace L1 as described in clause 8.3A.2 for activation of unknown SCell.

Table A.13.2.2.3.1-1: General test parameters for unknown SCell activation with SCell under CCA

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| T1 | s | 0.1 | During this time period the PCell shall be known and the SCell configured, but not detected. |

##### A.13.2.2.3.2 Test Requirements

During T2, the UE shall send the first CSI report for SCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot *m+*1+

During T2, conditioned on that downlink CCA failures L3,1 and L3,2 experienced in the SCell fulfill L3,1 ≤ L3,1,max and L3,2 ≤ L3,2,max with L3,1,max = 2 and L3,2,max = 2, respectively, the UE shall send the first valid CSI report (non-zero CQI) for the SCell no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + (1 + L3,1)\*TSMTC\_MAX + (2 + L3,2)\*Trs + 5ms and TCSI\_reporting\_withCCA = TCSI\_reporting + TCSI\_ReportingDelay, as specified in clause 8.3A.2.

During T3, the UE shall stop sending CSI reports for SCell at latest in slot , as defined in clause 8.3A.3.

During T2, interruption on PCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB.

During T3, interruption on PCell shall not occur outside slot *n* +1+THARQ/NR\_slot\_length to slot *n*+1+(THARQ +3ms)/NR\_slot\_length.

The interruption on PCell shall not be more than specified for SA in clause 8.2.2.2.2.

The rate of correctly observed SCell activation delays and SCell deactivation delays shall for repeated tests be at least 90%.

### A.13.2.3 Void

## A.13.3 Measurement procedure

### A.13.3.1 Intra-frequency measurements

#### A.13.3.1.1 Event-triggered reporting tests on SCC without gaps under non-DRX

##### A.13.3.1.1.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.5.1 and 9.2A.5.2.

##### A.13.3.1.1.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). The test parameters for the three cells are given in Table A.13.3.1.1.2-1 and A.13.3.1.1.2-2 below. In the measurement control information, a measurement object is configured for the frequency of the SCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information of Cell 3.

FFS: The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

The test is conducted for SS-RSRP, SS-RSRQ, and SS-SINR:

- In the first test (Test 1), the UE is configured with SS-RSRP as Event A3 measurement quantity.

- In the second test (Test 2), the UE is configured with SS-RSRQ as Event A3 measurement quantity.

- In the third test (Test 3), the UE is configured with SS-SINR as Event A3 measurement quantity.

Table A.13.3.1.1.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.1.2-2: General test parameters for intra-frequency event triggered reporting without gaps

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | Comment |
| Test 1 | Test 2 | Test 3 |
| Active PCell |  | 1, 2, 3 | Cell 1 | | |  |
| Active SCell |  | 1, 2, 3 | Cell 2 | | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 3 | | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1  2: Cell 2 and Cell 3 | | |  |
| DL CCA model |  |  | As specified in clause A.3.20.2.1 | | |  |
| UL CCA model |  |  | As specified in clause A.3.20.2.2 | | |  |
| SSB configuration |  | 1 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | |  |
|  |  | 2 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | |  |
|  |  | 3 | Cell 1: SSB.2 FR1  Cell 2,3: TBD | | |  |
| SMTC configuration |  | 1 | Cell 1: SMTC.2  Cell 2,3: N/A | | |  |
|  |  | 2 | Cell 1: SMTC.1  Cell 2,3: N/A | | |  |
|  |  | 3 | Cell 1: SMTC.1  Cell 2,3: N/A | | |  |
| DBT window configuration |  | 1, 2, 3 | Cell 1: N/A  Cell 2,3: TBD | | |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 | | |  |
| Event A3 measurement quantity |  |  | SS-RSRP | SS-RSRQ | SS-SINR |  |
| CP length |  | 1, 2, 3 | Normal | | |  |
| Hysteresis | dB | 1, 2, 3 | 0 | | |  |
| Time To Trigger | s | 1, 2, 3 | 0 | | |  |
| Filter coefficient |  | 1, 2, 3 | 0 | | | L3 filtering is not used |
| DRX |  | 1, 2, 3 |  | | | OFF |
| Time offset between Cell 2 and Cell 3 |  | 1 | 3 ms | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | 2 | 3 ms | | | Synchronous cells |
|  |  | 3 | 3 ms | | | Synchronous cells |
| *deriveSSB-IndexFromCell* |  | 1 | *False* | | |  |
| 2 | *True* | | |  |
| 3 | *True* | | |  |
| T1 | s | 1, 2, 3 | TBD | | |  |
| T2 | s | 1, 2, 3 | TBD | | |  |

Table A.13.3.1.1.2-3: Cell-specific test parameters for intra-frequency event-triggered reporting without gaps

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| DL CCA probability PCCA\_DL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| TDD configuration |  | 1 | N/A | | TBD | | TBD | |
|  |  | 2 | TDDConf.1.1 | | TBD | | TBD | |
|  |  | 3 | TDDConf.2.1 | | TBD | | TBD | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CR.2.1 TDD | | TBD | | TBD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CCR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CCR.2.1 TDD | | TBD | | TBD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | TBD | | TBD | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | TRS.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | TRS.1.2 TDD | | TBD | | TBD | |
| IInitial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 2 | dBm/15 kHz | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 5 | dB | 1 | 4 | -1.46 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| Note 5 | dB | 1 | 4 | 4 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| SS-RSRP Note 3,5 | dBm/SCS kHz | 1 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 2 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 3 | -91 | -91 | TBD | TBD | -Infinity | TBD |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/9.36 MHz | 2 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | TBD | TBD | TBD | TBD |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | | | | | |

##### A.13.3.1.1.3 Test Requirements

The UE shall send one Event A3 triggered measurement report (SS-RSRP in Test 1, SS-RSRQ in Test 2, SS-SINR in Test 3), with a measurement reporting delay less than D1 ms from the beginning of time period T2.

*Editor’s note: D1=TBD.*

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

FFS: NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.1.2 Event-triggered reporting tests on SCC without gaps under DRX

##### A.13.3.1.2.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.5.1 and 9.2A.5.2.

##### A.13.3.1.2.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). The test parameters for the three cells are given in Table A.13.3.1.2.2-1 and A.13.3.1.2.2-2 below. In the measurement control information, a measurement object is configured for the frequency of the SCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information of Cell 3.

FFS: The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

The test is conducted for SS-RSRP, SS-RSRQ, and SS-SINR:

- In Test 1 and Test 2, the UE is configured with SS-RSRP as Event A3 measurement quantity.

- In Test 3 and Test 4, the UE is configured with SS-RSRQ as Event A3 measurement quantity.

- In Test 5 and Test 6, the UE is configured with SS-SINR as Event A3 measurement quantity.

Table A.13.3.1.2.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.2.2-2: General test parameters for intra-frequency event triggered reporting without gaps with DRX

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | | | | | | | Comment |
| Test 1 | | Test 2 | | Test 3 | | Test 4 | | Test 5 | Test 6 |  |
| Active PCell |  | 1, 2, 3 | Cell 1 | | | | | | | | | |  |
| Active SCell |  | 1, 2, 3 | Cell 2 | | | | | | | | | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 3 | | | | | | | | | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1  2: Cell 2 and Cell 3 | | | | | | | | | |  |
| DL CCA model |  |  | As specified in clause A.3.20.2.1 | | | | | | | | | |  |
| UL CCA model |  |  | As specified in clause A.3.20.2.2 | | | | | | | | | |  |
| SSB configuration |  | 1 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | | | | | | | | |  |
|  |  | 2 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | | | | | | | | |  |
|  |  | 3 | Cell 1: SSB.2 FR1  Cell 2,3: TBD | | | | | | | | | |  |
| SMTC configuration |  | 1 | Cell 1: SMTC.2  Cell 2,3: N/A | | | | | | | | | |  |
|  |  | 2 | Cell 1: SMTC.1  Cell 2,3: N/A | | | | | | | | | |  |
|  |  | 3 | Cell 1: SMTC.1  Cell 2,3: N/A | | | | | | | | | |  |
| DBT window configuration |  | 1, 2, 3 | Cell 1: N/A  Cell 2,3: TBD | | | | | | | | | |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 | | | | | | | | | |  |
| Event A3 measurement quantity |  |  | SS-RSRP | | | SS-RSRQ | | | | SS-SINR | | |  |
| CP length |  | 1, 2, 3 | Normal | | | | | | | | | |  |
| Hysteresis | dB | 1, 2, 3 | 0 | | | | | | | | | |  |
| Time To Trigger | s | 1, 2, 3 | 0 | | | | | | | | | |  |
| Filter coefficient |  | 1, 2, 3 | 0 | | | | | | | | | | L3 filtering is not used |
| DRX |  | 1, 2, 3 | DRX.1 | DRX.2 | | DRX.1 | | DRX.2 | | DRX.1 | | DRX.2 |  |
| Time offset between Cell 2 and Cell 3 |  | 1 | 3 ms | | | | | | | | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | 2 | 3 ms | | | | | | | | | | Synchronous cells |
|  |  | 3 | 3 ms | | | | | | | | | | Synchronous cells |
| *deriveSSB-IndexFromCell* |  | 1 | *False* | | | | | | | | | |  |
| 2 | *True* | | | | | | | | | |  |
| 3 | *True* | | | | | | | | | |  |
| T1 | s | 1, 2, 3 | TBD | | | | | | | | | |  |
| T2 | s | 1, 2, 3 | TBD | TBD | | TBD | | TBD | | TBD | | TBD |  |

Table A.13.3.1.2.2-3: Cell-specific test parameters for intra-frequency event-triggered reporting without gaps

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| DL CCA probability PCCA\_DL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| TDD configuration |  | 1 | N/A | | TBD | | TBD | |
|  |  | 2 | TDDConf.1.1 | | TBD | | TBD | |
|  |  | 3 | TDDConf.2.1 | | TBD | | TBD | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CR.2.1 TDD | | TBD | | TBD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CCR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CCR.2.1 TDD | | TBD | | TBD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | TBD | | TBD | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | TRS.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | TRS.1.2 TDD | | TBD | | TBD | |
| IInitial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 2 | dBm/15 kHz | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 5 | dB | 1 | 4 | -1.46 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| Note 5 | dB | 1 | 4 | 4 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| SS-RSRP Note 3,5 | dBm/SCS kHz | 1 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 2 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 3 | -91 | -91 | TBD | TBD | -Infinity | TBD |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/9.36 MHz | 2 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | TBD | TBD | TBD | TBD |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | | | | | |

##### A.13.3.1.2.3 Test Requirements

The UE shall send one Event A3 triggered measurement report (SS-RSRP in Test 1 and Test 2, SS-RSRQ in Test 3 and Test 4, SS-SINR in Test 5 and Test 6), with a measurement reporting delay less than D1 ms from the beginning of time period T2.

*Editor’s note: D1=TBD (D1 is different for different DRX configurations).*

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

FFS: NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.1.3 Event-triggered reporting tests on SCC with per-UE gaps under non-DRX

##### A.13.3.1.3.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.6.1 and 9.2A.6.2.

##### A.13.3.1.3.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). The test parameters for the three cells are given in Table A.13.3.1.3.2-1 and A.13.3.1.3.2-2 below. In the measurement control information, a measurement object is configured for the frequency of the SCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information of Cell 3.

FFS: The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

The test is conducted for SS-RSRP, SS-RSRQ, and SS-SINR:

- In the first test (Test 1), the UE is configured with SS-RSRP as Event A3 measurement quantity.

- In the second test (Test 2), the UE is configured with SS-RSRQ as Event A3 measurement quantity.

- In the third test (Test 3), the UE is configured with SS-SINR as Event A3 measurement quantity.

Table A.13.3.1.3.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.3.2-2: General test parameters for intra-frequency event triggered reporting with per-UE gaps

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | Comment |
| Test 1 | Test 2 | Test 3 |
| Active PCell |  | 1, 2, 3 | Cell 1 | | |  |
| Active SCell |  | 1, 2, 3 | Cell 2 | | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 3 | | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1  2: Cell 2 and Cell 3 | | |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE gaps | | |  |
| Measurement gap repitition periodicity | ms | 1, 2, 3 | 40 | | |  |
| Measurement gap length | ms | 1, 2, 3 | [6] | | |  |
| Measurement gap offset | ms | 1, 2, 3 | [39] | | |  |
| DL CCA model |  |  | As specified in clause A.3.20.2.1 | | |  |
| UL CCA model |  |  | As specified in clause A.3.20.2.2 | | |  |
| SSB configuration |  | 1 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | |  |
|  |  | 2 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | |  |
|  |  | 3 | Cell 1: SSB.2 FR1  Cell 2,3: TBD | | |  |
| SMTC configuration |  | 1 | Cell 1: SMTC.2  Cell 2,3: N/A | | |  |
|  |  | 2 | Cell 1: SMTC.1  Cell 2,3: N/A | | |  |
|  |  | 3 | Cell 1: SMTC.1  Cell 2,3: N/A | | |  |
| DBT window configuration |  | 1, 2, 3 | Cell 1: N/A  Cell 2,3: TBD | | |  |
| CSI-RS parameters in Cell 1 |  | 1 | CSI-RS.1.2 FDD resource #0 | | |  |
|  | 2 | CSI-RS.1.2 TDD resource #0 | | |  |
|  | 3 | CSI-RS.2.2 TDD resource #0 | | |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 | | |  |
| Event A3 measurement quantity |  |  | SS-RSRP | SS-RSRQ | SS-SINR |  |
| CP length |  | 1, 2, 3 | Normal | | |  |
| Hysteresis | dB | 1, 2, 3 | 0 | | |  |
| Time To Trigger | s | 1, 2, 3 | 0 | | |  |
| Filter coefficient |  | 1, 2, 3 | 0 | | | L3 filtering is not used |
| DRX |  | 1, 2, 3 |  | | | OFF |
| Time offset between Cell 2 and Cell 3 |  | 1 | 3 ms | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | 2 | 3 ms | | | Synchronous cells |
|  |  | 3 | 3 ms | | | Synchronous cells |
| *deriveSSB-IndexFromCell* |  | 1 | *False* | | |  |
| 2 | *True* | | |  |
| 3 | *True* | | |  |
| T1 | s | 1, 2, 3 | TBD | | |  |
| T2 | s | 1, 2, 3 | TBD | | |  |

Table A.13.3.1.3.2-3: Cell-specific test parameters for intra-frequency event-triggered reporting without gap

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| DL CCA probability PCCA\_DL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| TDD configuration |  | 1 | N/A | | TBD | | TBD | |
|  |  | 2 | TDDConf.1.1 | | TBD | | TBD | |
|  |  | 3 | TDDConf.2.1 | | TBD | | TBD | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CR.2.1 TDD | | TBD | | TBD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CCR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CCR.2.1 TDD | | TBD | | TBD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | TBD | | TBD | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | TRS.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | TRS.1.2 TDD | | TBD | | TBD | |
| IInitial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | DLBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 2 | dBm/15 kHz | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 5 | dB | 1 | 4 | -1.46 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| Note 5 | dB | 1 | 4 | 4 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| SS-RSRP Note 3,5 | dBm/SCS kHz | 1 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 2 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 3 | -91 | -91 | TBD | TBD | -Infinity | TBD |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/9.36 MHz | 2 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | TBD | TBD | TBD | TBD |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | | | | | |

##### A.13.3.1.3.3 Test Requirements

The UE shall send one Event A3 triggered measurement report (SS-RSRP in Test 1, SS-RSRQ in Test 2, SS-SINR in Test 3), with a measurement reporting delay less than D1 ms from the beginning of time period T2.

*Editor’s note: D1=TBD.*

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

FFS: NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.1.4 Event-triggered reporting tests on SCC with per-UE gaps under DRX

##### A.13.3.1.4.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.6.1 and 9.2A.6.2.

##### A.13.3.1.4.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). The test parameters for the three cells are given in Table A.13.3.1.4.2-1 and A.13.3.1.4.2-2 below. In the measurement control information, a measurement object is configured for the frequency of the SCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1 and T2, respectively. During time duration T1, the UE shall not have any timing information of Cell 3.

FFS: The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

The test is conducted for SS-RSRP, SS-RSRQ, and SS-SINR:

- In Test 1 and Test 2, the UE is configured with SS-RSRP as Event A3 measurement quantity.

- In Test 3 and Test 4, the UE is configured with SS-RSRQ as Event A3 measurement quantity.

- In Test 5 and Test 6, the UE is configured with SS-SINR as Event A3 measurement quantity.

Table A.13.3.1.4.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.4.2-2: General test parameters for intra-frequency event triggered reporting without gap with DRX

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | | | | | | | Comment |
| Test 1 | | Test 2 | | Test 3 | | Test 4 | | Test 5 | Test 6 |  |
| Active PCell |  | 1, 2, 3 | Cell 1 | | | | | | | | | |  |
| Active SCell |  | 1, 2, 3 | Cell 2 | | | | | | | | | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 3 | | | | | | | | | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1  2: Cell 2 and Cell 3 | | | | | | | | | |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE gaps | | | | | | | | | |  |
| Measurement gap repitition periodicity | ms | 1, 2, 3 | 40 | | | | | | | | | |  |
| Measurement gap length | ms | 1, 2, 3 | [6] | | | | | | | | | |  |
| Measurement gap offset | ms | 1, 2, 3 | [39] | | | | | | | | | |  |
| DL CCA model |  |  | As specified in clause A.3.20.2.1 | | | | | | | | | |  |
| UL CCA model |  |  | As specified in clause A.3.20.2.2 | | | | | | | | | |  |
| SSB configuration |  | 1 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | | | | | | | | |  |
|  |  | 2 | Cell 1: SSB.1 FR1  Cell 2,3: TBD | | | | | | | | | |  |
|  |  | 3 | Cell 1: SSB.2 FR1  Cell 2,3: TBD | | | | | | | | | |  |
| SMTC configuration |  | 1 | Cell 1: SMTC.2  Cell 2,3: N/A | | | | | | | | | |  |
|  |  | 2 | Cell 1: SMTC.1  Cell 2,3: N/A | | | | | | | | | |  |
|  |  | 3 | Cell 1: SMTC.1  Cell 2,3: N/A | | | | | | | | | |  |
| DBT window configuration |  | 1, 2, 3 | Cell 1: N/A  Cell 2,3: TBD | | | | | | | | | |  |
| CSI-RS parameters in Cell 1 |  | 1 | CSI-RS.1.2 FDD resource #0 | | | | | | | | | |  |
|  | 2 | CSI-RS.1.2 TDD resource #0 | | | | | | | | | |  |
|  | 3 | CSI-RS.2.2 TDD resource #0 | | | | | | | | | |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 | | | | | | | | | |  |
| Event A3 measurement quantity |  |  | SS-RSRP | | | SS-RSRQ | | | | SS-SINR | | |  |
| CP length |  | 1, 2, 3 | Normal | | | | | | | | | |  |
| Hysteresis | dB | 1, 2, 3 | 0 | | | | | | | | | |  |
| Time To Trigger | s | 1, 2, 3 | 0 | | | | | | | | | |  |
| Filter coefficient |  | 1, 2, 3 | 0 | | | | | | | | | | L3 filtering is not used |
| DRX |  | 1, 2, 3 | DRX.1 | DRX.2 | | DRX.1 | | DRX.2 | | DRX.1 | | DRX.2 |  |
| Time offset between Cell 2 and Cell 3 |  | 1 | 3 ms | | | | | | | | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | 2 | 3 ms | | | | | | | | | | Synchronous cells |
|  |  | 3 | 3 ms | | | | | | | | | | Synchronous cells |
| *deriveSSB-IndexFromCell* |  | 1 | *False* | | | | | | | | | |  |
| 2 | *True* | | | | | | | | | |  |
| 3 | *True* | | | | | | | | | |  |
| T1 | s | 1, 2, 3 | TBD | | | | | | | | | |  |
| T2 | s | 1, 2, 3 | TBD | TBD | | TBD | | TBD | | TBD | | TBD |  |

Table A.13.3.1.4.2-3: Cell-specific test parameters for intra-frequency event-triggered reporting without gap

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| DL CCA probability PCCA\_DL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | | TBD | TBD | TBD | TBD |
| TDD configuration |  | 1 | N/A | | TBD | | TBD | |
|  |  | 2 | TDDConf.1.1 | | TBD | | TBD | |
|  |  | 3 | TDDConf.2.1 | | TBD | | TBD | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CR.2.1 TDD | | TBD | | TBD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | CCR.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | CCR.2.1 TDD | | TBD | | TBD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | TBD | | TBD | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | TBD | | TBD | |
|  |  | 2 | TRS.1.1 TDD | | TBD | | TBD | |
|  |  | 3 | TRS.1.2 TDD | | TBD | | TBD | |
| IInitial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | DLBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 2 | dBm/15 kHz | 1 | -98 | | TBD | | TBD | |
|  |  | 2 | -98 | | TBD | | TBD | |
|  |  | 3 | -95 | | TBD | | TBD | |
| Note 5 | dB | 1 | 4 | -1.46 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| Note 5 | dB | 1 | 4 | 4 | TBD | TBD | -Infinity | TBD |
|  |  | 2 |  |  | TBD | TBD | -Infinity | TBD |
|  |  | 3 |  |  | TBD | TBD | -Infinity | TBD |
| SS-RSRP Note 3,5 | dBm/SCS kHz | 1 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 2 | -94 | -94 | TBD | TBD | -Infinity | TBD |
|  |  | 3 | -91 | -91 | TBD | TBD | -Infinity | TBD |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/9.36 MHz | 2 | -64.60 | -62.25 | TBD | TBD | TBD | TBD |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | TBD | TBD | TBD | TBD |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | |
| NOTE 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | | | | | |

##### A.13.3.1.4.3 Test Requirements

The UE shall send one Event A3 triggered measurement report (SS-RSRP in Test 1 and Test 2, SS-RSRQ in Test 3 and Test 4, SS-SINR in Test 5 and Test 6), with a measurement reporting delay less than D1 ms from the beginning of time period T2.

*Editor’s note: D1=TBD (D1 is different for different DRX configurations).*

The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

FFS: NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.1.5 RSSI measurement reporting on SCC

##### A.13.3.1.5.1 Test purpose and environment

The purpose of this test is to verify that the UE correctly reports RSSI measurements. This test will partly verify the intra-frequency RSSI measurement reporting requirements in Section 9.2A.7.1.

##### A.13.3.1.5.2 Test parameters

In the test, the UE is configured to perform intra-frequency RSSI measurements on a carrier frequency under CCA.

Supported test configurations are shown in Table A.13.3.1.5.2-1. There are two cells in the test: Cell 1 is PCell on a licensed FR1 band, and Cell 2 is SCell operating on a carrier frequency under CCA. Prior to the start of the time duration T1, the UE is connected to Cell 1 and Cell 2.

Table A.13.3.1.5.2-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.5.2-2: General test parameters.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Configurations | Unit | Test 1 | |
| Cell 1 | Cell 2 |
| RF Channel Number |  |  | 1 | 2 |
| BWchannel |  | MHz | 40 | 40 |
| DL CCA model |  |  | N/A | PCCA\_DL=1.0 |
| UL CCA model |  |  | N/A | PCCA\_UL=1.0 |
| Measurement bandwidth |  |  | Same as channel access bandwidth | |
| Channel access bandwidth |  |  | TBD | |
| PDSCH Reference measurement channel defined in TBD |  |  | TBD | TBD |
| PDCCH/PCFICH/PHICH Reference measurement channel defined in TBD |  |  | TBD | TBD |
| OCNG Patterns defined in TBD |  |  | TBD | TBD |
| Other general configuration parameters: TBD |  |  | TBD | TBD |
| in slots not corresponding to RSSI measurement time configuration (RMTC) |  | dBm/SCS | TBD | TBD |
| in slots corresponding to RSSI measurement time configuration (RMTC) |  | dBm/SCS | TBD | TBD |
| in slots not corresponding to RSSI measurement time configuration (RMTC) |  | dB | TBD | TBD |
| in slots corresponding to RSSI measurement time configuration (RMTC) |  | dB | TBD | TBD |
| SS-RSRP in slots not corresponding to RSSI measurement time configuration (RMTC) |  | dBm/SCS | TBD | TBD |
| SS-RSRP in slots corresponding to RSSI measurement time configuration (RMTC) |  |  | TBD | TBD |
| Io within measurement bandwidth in slots corresponding to RSSI measurement time configuration (RMTC) |  | dBm/BW | TBD | TBD |
| Io within measurement bandwidth in slots not corresponding to RSSI measurement time configuration (RMTC) |  | dBm/BW | TBD | TBD |
| Propagation condition |  | - | AWGN | |

#### A.13.3.1.6 Channel occupancy measurement reporting on SCC

##### A.13.3.1.6.1 Test purpose and environment

The purpose of this test is to verify that the UE correctly reports channel occupancy measurements. This test will partly verify the intra-frequency channel occupancy measurement reporting requirements in Section 9.2A.7.2.

##### A.13.3.1.6.2 Test parameters

In the test, the UE is configured to perform intra-frequency channel occupancy measurements on a carrier frequency under CCA.

Supported test configurations are shown in Table A.13.3.1.6.2-1. There are two cells in the test: Cell 1 is PCell on a licensed FR1 band, and Cell 2 is SCell operating on a carrier frequency under CCA. Prior to the start of the time duration T1, the UE is connected to Cell 1 and Cell 2.

Table A.13.3.1.6.2-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.1.6.2-2: General test parameters.

Editor’s note: Table is TBD

### A.13.3.2 Inter-frequency measurements

#### A.13.3.2.1 RSSI measurement reporting

##### A.13.3.2.1.1 Test purpose and environment

The purpose of this test is to verify that the UE correctly reports RSSI measurements. This test will partly verify the inter-frequency RSSI measurement reporting requirements in Section 9.3A.8.

##### A.13.3.2.1.2 Test parameters

In the test, the UE is configured to perform inter-frequency RSSI measurements on a carrier frequency under CCA.

Supported test configurations are shown in Table A.13.3.2.1.2-1. There are two cells in the test: Cell 1 is PCell on a licensed FR1 band, and Cell 2 is SCell operating on a carrier frequency under CCA. Prior to the start of the time duration T1, the UE is connected to Cell 1 and Cell 2. The RSSI measurement is performed on an inter-frequency under CCA.

Table A.13.3.2.1.2-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.2.1.2-2: General test parameters.

Editor’s note: Table TBD

#### A.13.3.2.2 Channel occupancy measurement reporting

##### A.13.3.2.2.1 Test purpose and environment

The purpose of this test is to verify that the UE correctly reports channel occupancy measurements. This test will partly verify the inter-frequency channel occupancy measurement reporting requirements in Section 9.3A.13.

##### A.13.3.2.2.2 Test parameters

In the test, the UE is configured to perform inter-frequency channel occupancy measurements on a carrier frequency under CCA.

Supported test configurations are shown in Table A.13.3.2.2.2-1. There are two cells in the test: Cell 1 is PCell on a licensed FR1 band, and Cell 2 is SCell operating on a carrier frequency under CCA. Prior to the start of the time duration T1, the UE is connected to Cell 1 and Cell 2. The channel occupancy measurement is performed on an inter-frequency under CCA.

Table A.13.3.2.2.2-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.3.2.2.2-2: General test parameters.

Editor’s note: Table is TBD

#### A.13.3.2.3 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is not used

##### A.13.3.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements for NR cell with CCA in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.3.1-1, A.13.3.2.3.1-2 and A.13.3.2.3.1-3.

In test 1, measurement gap pattern configuration # 0 as defined in Table A.13.3.2.3.1-2 is provided for UE that does not support per-FR gap. In test 2, measurement gap pattern configuration #4 as defined in Table A.13.3.2.3.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.13.3.2.3.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: NR 30 kHz 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 | |

Table A.13.3.2.3.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| 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 |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.7 | 1.7 |  |

Table A.13.3.2.3.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 12 | | 12 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 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 | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | 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.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

##### A.13.3.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is not required to report SSB time index.

Tidentify\_inter\_cca\_without\_index = (TPSS/SSS\_sync\_inter\_cca + T SSB\_measurement\_period\_inter\_cca) ms, where

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.2.4 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is used

##### A.13.3.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.4.1-1, A.13.3.2.4.1-2 and A.13.3.2.4.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.13.3.2.4.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.13.3.2.4.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: NR 30 kHz 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 | |

Table A.13.3.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| 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 |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3μs | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 2.5 | 17 | 2.5 | 17 |  |

Table A.13.3.2.4.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 5 | | 5 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 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 | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | 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.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

Table A.13.3.2.4.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.13.3.2.4.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.13.3.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

Tidentify\_inter\_cca\_without\_index = (TPSS/SSS\_sync\_inter\_cca + T SSB\_measurement\_period\_inter\_cca) ms, where

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.2.5 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is not used

##### A.13.3.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.5.1-1, A.13.3.2.5.1-2 and A.13.3.2.5.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.5.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.13.3.2.5.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.13.3.2.5.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: NR 30 kHz 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 | |

Table A.13.3.2.5.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| 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 |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 2 | 2 |  |

Table A.13.3.2.5.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 5 | | 5 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 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 | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | 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.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration | | | | | | | | | | |

##### A.13.3.2.5.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

Tidentify\_inter\_cca\_with\_index = (TPSS/SSS\_sync\_inter\_cca + T SSB\_measurement\_period\_inter\_cca + TSSB\_time\_index\_inter\_cca) ms, where

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.2.6 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is used

##### A.13.3.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.6.1-1, A.13.3.2.6.1-2 and A.13.3.2.6.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.6.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.13.3.2.6.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.13.3.2.6.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: NR 30 kHz 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 | |

Table A.13.3.2.6.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| 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 |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3μs | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 3 | 20 | 3 | 20 |  |

Table A.13.3.2.6.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 2 | | 2 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 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 | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | 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.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

Table A.13.3.2.6.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.13.3.2.6.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.13.3.2.6.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

Tidentify\_inter\_cca\_with\_index = (TPSS/SSS\_sync\_inter\_cca + T SSB\_measurement\_period\_inter\_cca + TSSB\_time\_index\_inter\_cca) ms, where

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.13.3.3 L1-RSRP measurements for beam reporting

#### A.13.3.3.1 SSB based L1-RSRP measurement when DRX is not used

##### A.13.3.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5A.4.1, with the testing configurations for NR cells in Table A.13.3.3.1.1-1.

Table A.13.3.3.1.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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 | |

##### A.13.3.3.1.2 Test parameters

There are two cells in the tests, FR1 PCell (Cell 1) and FR1 SCell (Cell 2). Cell 2 operates on a carrier frequency with CCA and transmits SSBs in DBT window according to DL CCA model. The test parameters and applicability for Cell 1 and Cell 2 are given in Table A.13.3.3.1.2-1 and Table A.13.3.3.1.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the SSBs and report periodically. The UE transmits the reporting according to UL CCA model. The test consists of two successive time periods, with time duration of T1 and T2 respectively. The test has higher layer parameter *timeRestrictionForChannelMeasurements* configured*.*

The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

Table A.13.3.3.1.2-1: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Value |  |
|  |  |  | Cell 1 | Cell 2 |
| Active PCell/SCell Configuration |  |  | PCell | SCell |
| RF Channel Number |  |  | 1 | 2 |
| DL CCA model | 1~3 |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | 1~3 |  | N/A | As specified in A.3.20.2.2 |
| Duplex mode | 1 |  | FDD | TDD |
|  | 2 |  | TDD |  |
|  | 3 |  | TDD |  |
| TDD Configuration | 1 |  | N/A | TDDConf.1.1 CCA |
|  | 2 |  | TDDConf.1.1 |  |
|  | 3 |  | TDDConf.2.1 |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 | 40: NRB,c = 106 |
|  | 2 |  | 10: NRB,c = 52 |  |
|  | 3 |  | 40: NRB,c = 106 |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD | SR.1.1 CCA |
|  | 2 |  | SR.1.1 TDD |  |
|  | 3 |  | SR.2.1 TDD |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD | CR.1.1 CCA |
|  | 2 |  | CR.1.1 TDD |  |
|  | 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD | CCR.1.1 CCA |
|  | 2 |  | CCR.1.1 TDD |  |
|  | 3 |  | CCR.2.1 TDD |  |
| SSB configuration | 1 |  | SSB.3 FR1 | SSB.3 CCA for semi-static channel access |
|  | 2 |  | SSB.3 FR1 | SSB.4 CCA for dynamic channel access |
|  | 3 |  | SSB.4 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 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 | N/A |
| DBT Window Configuration | 1~3 |  | N/A | DBT.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD | TRS.1.2 TDD |
|  | 2 |  | TRS.1.1 TDD |  |
|  | 3 |  | TRS.1.2 TDD |  |
| DRX configuration | 1~3 |  | Off | Off |
| reportConfigType | 1~3 |  | periodic | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 | 80 |
| T1 | 1~3 | s | 5 | 5 |
| T2 | 1~3 | s | 1 | 1 |
| 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 |  |  |  |  |
| Propagation condition | 1~3 |  | AWGN | AWGN |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window. | | | | |

Table A.13.3.3.1.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| DL CCA Probability PCCA\_DL Note 4,6 | 1,2,3 |  | [0.9375] | [0.9375] | [0.9375] | [0.9375] |
| DL CCA Probability PCCA\_DL Note 4.7 | 1,2,3 |  | [0.75]/[0.75] | [0.75]/[0.75] | [0.75]/[0.75] | [0.75]/[0.75] |
| UL CCA probability PCCA\_UL | 1,2,3 |  | [1.0] | [1.0] | [1.0] | [1.0] |
| Note2 | 1,2,3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2,3 | dBm/SSB SCS | -91.65 | | | |
|  | 1,2,3 | dB | 0 | 0 | -Infinity | 3 |
| SSB RSRP Note3 | 1,2,3 | dBm/SSB SCS | -91.65 | -91.65 | -Infinity | -88.65 |
| Io Note3 | 1,2,3 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.84 |
|  | 1,2,3 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  Note 5: The signal levels apply for SSS Res when the discovery burst is transmitted during DBT windows.  Note 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2. | | | | | | |

##### A.13.3.3.1.3 Test Requirements

The UE shall send L1-RSRP report every 80 slots. No later than 640 ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement in clause 10.1.19.1.1 and relative accuracy requirement in clause 10.1.19.1.2. The rate of correct events observed during repeated tests shall be at least 90%.

The UE shall send L1-RSRP report of both SSB0 and SSB1 in Cell 2.

NOTE: The actual overall delays measured in the test may be up to 2xTTI DCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.13.3.3.2 SSB based L1-RSRP measurement when DRX is used

##### A.13.3.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5A.4.1, with the testing configurations for NR cells in Table A.13.3.3.1.1-1.

Table A.13.3.3.2.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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 | |

##### A.13.3.3.2.2 Test parameters

There are two cells in the tests, FR1 Pcell (Cell 1) and FR1 Scell (Cell 2). Cell 2 operates on a carrier frequency with CCA and transmits SSBs in DBT window according to DL CCA model. The test parameters and applicability for Cell 1 and Cell 2 are given in Table A.13.3.3.2.2-1 and Table A.13.3.3.2.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the SSBs and report periodically. The UE transmits the reporting according to UL CCA model. The test consists of two successive time periods, with time duration of T1 and T2 respectively. The test has higher layer parameter *timeRestrictionForChannelMeasurements* configured*.*

The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

Table A.13.3.3.2.2-1: General test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Value |  |
|  |  |  | Cell 1 | Cell 2 |
| Active Pcell/Scell Configuration |  |  | Pcell | Scell |
| RF Channel Number |  |  | 1 | 2 |
| DL CCA model | 1~3 |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | 1~3 |  | N/A | As specified in A.3.20.2.2 |
| Duplex mode | 1 |  | FDD | TDD |
|  | 2 |  | TDD |  |
|  | 3 |  | TDD |  |
| TDD Configuration | 1 |  | N/A | TDDConf.1.1 CCA |
|  | 2 |  | TDDConf.1.1 |  |
|  | 3 |  | TDDConf.2.1 |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 | 40: NRB,c = 106 |
|  | 2 |  | 10: NRB,c = 52 |  |
|  | 3 |  | 40: NRB,c = 106 |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD | SR.1.1 CCA |
|  | 2 |  | SR.1.1 TDD |  |
|  | 3 |  | SR.2.1 TDD |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD | CR.1.1 CCA |
|  | 2 |  | CR.1.1 TDD |  |
|  | 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD | CCR.1.1 CCA |
|  | 2 |  | CCR.1.1 TDD |  |
|  | 3 |  | CCR.2.1 TDD |  |
| SSB configuration | 1 |  | SSB.3 FR1 | SSB.3 CCA for semi-static channel access |
|  | 2 |  | SSB.3 FR1 | SSB.4 CCA for dynamic channel access |
|  | 3 |  | SSB.4 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 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 | N/A |
| DBT Window Configuration | 1~3 |  | N/A | DBT.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD | TRS.1.2 TDD |
|  | 2 |  | TRS.1.1 TDD |  |
|  | 3 |  | TRS.1.2 TDD |  |
| DRX configuration | 1~3 |  | DRX.3 | DRX.3 |
| reportConfigType | 1~3 |  | periodic | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 | 80 |
| T1 | 1~3 | s | 5 | 5 |
| T2 | 1~3 | s | 1 | 1 |
| 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 |  |  |  |  |
| Propagation condition | 1~3 |  | AWGN | AWGN |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window. | | | | |

Table A.13.3.3.2.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| DL CCA Probability PCCA\_DL Note 4,6 | 1,2,3 |  | [0.9375] | [0.9375] | [0.9375] | [0.9375] |
| DL CCA Probability PCCA\_DL Note 4.7 | 1,2,3 |  | [0.75]/[0.75] | [0.75]/[0.75] | [0.75]/[0.75] | [0.75]/[0.75] |
| UL CCA probability PCCA\_UL | 1,2,3 |  | [1.0] | [1.0] | [1.0] | [1.0] |
| Note2 | 1,2,3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2,3 | dBm/SSB SCS | -91.65 | | | |
|  | 1,2,3 | dB | 0 | 0 | -Infinity | 3 |
| SSB RSRP Note3 | 1,2,3 | dBm/SSB SCS | -91.65 | -91.65 | -Infinity | -88.65 |
| Io Note3 | 1,2,3 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.84 |
|  | 1,2,3 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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: DL and UL CCA probabilities apply for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.  Note 5: The signal levels apply for SSS Res when the discovery burst is transmitted during DBT windows.  Note 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2. | | | | | | |

##### A.13.3.3.2.3 Test Requirements

The UE shall send L1-RSRP report every 80 slots. No later than 640 ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement in clause 10.1.19.1.1 and relative accuracy requirement in clause 10.1.19.1.2. The rate of correct events observed during repeated tests shall be at least 90%.

The UE shall send L1-RSRP report of both SSB0 and SSB1 in Cell 2.

NOTE: The actual overall delays measured in the test may be up to 2xTTI DCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.13.4 Measurement performance

### A.13.4.1 SS-RSRP

#### A.13.4.1.1 Intra-frequency measurement accuracy on a carrier frequency with CCA

##### A.13.4.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy on the carrier frequency with CCA is within the specified limits. This test will verify the requirements in clauses 10.1.36.1.1 and 10.1.36.1.2 for intra-frequency measurements under CCA.

##### A.13.4.1.1.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). Supported test configurations are shown in table A.13.4.1.1.2-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in A.13.4.1.1.2-2.

Table A.13.4.1.1.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 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 for each supported band | |

Table A.13.4.1.1.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | | Unit | Test 1 | | | Test 2 | | | | | | Test 3 | | | | | |
|  | | | | | |  | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 | | | | Cell 2 | | | Cell 3 | | |
| Cell ID | | | | | |  | 489 | 0 | | 489 | | 0 | | | | 489 | | 0 | | | |
| SSB ARFCN | | | | | |  | freq1 | | | freq1 | | | | | | freq1 | | | | | |
| DL CCA model | | | | | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | | | | |
| UL CCA model | | | | | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | | | | |
| PCCA\_DL for dynamic channel access Note 7,9 | | | | | |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | | | | | | | | | | |
| PCCA\_DL for semi-static channel access Note 8,9 | | | | | |  | PCCA\_DL=0.9375 | | | | | | | | | | | | | | |
| PCCA\_UL | | | | | |  | 1 | | | | | | | | | | | | | | |
| TDD configuration | | | | Config 1,2,3 | |  | TDDConf.1.1 CCA | | | | | | | | | | | | | | |
| BWchannel | | | | Config 1,2,3 | | MHz | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| BWP BW | | | | Config 1,2,3 | |  | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| CCA model | | | | Config 1,2,3 | |  | TBD | | | | | | | | | | | | | | |
| Downlink initial BWP configuration | | | | | |  | DLBWP.0.1 | | | | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | | | | |  | DLBWP.1.1 | | | | | | | | | | | | | | |
| Uplink initial BWP configuration | | | | | |  | ULBWP.0.1 | | | | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | | | | |  | ULBWP.1.1 | | | | | | | | | | | | | | |
| TRS configuration | | | | | Config 1,2,3 |  | TRS.1.2 TDD | | NA | | TRS.1.2 TDD | | | NA | TRS.1.2 TDD | | | | | | NA |
| DRX Cycle | | | | | | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | | Config 1,2,3 | |  | SR.1.1 CCA | | - | SR.1.1 CCA | | - | | | | SR.1.1 CCA | | | | | - |
| RMSI CORESET Reference Channel | | | | Config 1,2,3 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| Control channel RMC | | | | Config 1,2,3 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| SSB configuration for semi-static channel access | | | | Config 1,2,3 | |  | SSB.1 CCA | | SSB.1 CCA | SSB.1 CCA | | SSB.1 CCA | | | | SSB.1 CCA | | | | | SSB.1 CCA |
| SSB configuration for dynamic channel access | | | | Config 1,2,3 | |  | SSB.2 CCA | | SSB.2 CCA | SSB.2 CCA | | SSB.2 CCA | | | | SSB.2 CCA | | | | | SSB.2 CCA |
| DBT window configuration | | | | Config 1,2,3 | |  | DBT.1 | | DBT.1 | DBT.1 | | DBT.1 | | | | DBT.1 | | | | | DBT.1 |
| Time offset with Cell 1 | | Config 1,2,3 | | | | μs | - | | 3 | - | | 3 | | | | - | | | | 3 | |
| SMTC configuration | | Config 1,2,3 | | | |  | SMTC.1 | | | | | | | | | | | | | | |
| OCNG Patterns | | | | | |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1,2,3 | | kHz | 30 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | | | dB | 0 | | 0 | 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 | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| Note2 | Config 1,2,3 | | | | NR\_CCA\_FR1\_I |  | Not applicableNote 5 | | | -94 | | | | | | | -110 | | | | |
| NR\_CCA\_FR1\_J | -109.5 | | | | |
| Note2 | Config 1,2,3 | NR\_CCA\_FR1\_I | | | | dBm/SCS | Not applicableNote 5 | | | -91 | | | | | | | -107.0 | | | | |
| NR\_CCA\_FR1\_J | | | | -106.5 | | | | |
| Note6 | | | | | | dB | 2.46 | | -5.97 | 2.46 | | | -5.97 | | | | -2.01 | | | | -3.54 |
| Note6 | | | | | | dB | 6 | | 1 | 6 | | | 1 | | | | 1 | | | | 0 |
| SS-RSRPNote3,6 | Config 1,2,3 | | NR\_TDD\_FR1\_I | | | dBm/SCS | Not applicableNote 5 | | Not applicableNote 5 | -85 | | | -90 | | | | -106.00 | | | | -107.00 |
|  | | | -105.50 | | | | -106.50 |
| IoNote3 | Config 1,2,3 | | | NR\_CCA\_FR1\_I | | dBm/  38.16MHz | Not applicableNote 5- | | | -51.99 | | | | | | | -70.82 | | | | |
| NR\_CCA\_FR1\_J | | -70.32 | | | | |
| Propagation condition | | | | | | - | AWGN | | | | | | | | | | | | | | |
| Antenna configuration | | | | | |  | 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: 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.  NOTE 5: Subtest 1 is not used when testing with 30kHz SSB SCS.  NOTE 6: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 9: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | | | | | | | | | | | |

##### A.13.4.1.1.3 Test Requirements

The SS-RSRP measurement accuracy for cell 2 and cell 3 shall fulfil absolute requirement in clause 10.1.36.1.1 and relative requirement in clause 10.1.36.1.2.

### A.13.4.2 SS-RSRQ

#### A.13.4.2.1 Intra-frequency measurement accuracy on SCC

##### A.13.4.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.29.1.1.

##### A.13.4.2.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.13.4.2.1.2-1. The absolute accuracy of SS-RSRQ intra-frequency measurement is tested by using the parameters in Table A.13.4.2.1.2-2 and Table A.13.4.2.1.2-3. In all test cases, Cell 1 is the PCell, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1, 2, and 3.

Table A.13.4.2.1.2-1: SS-RSRQ Intra frequency SS-RSRQ supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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 | |

Table A.13.4.2.1.2-2: SS-RSRQ Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | Test 2 | | | Test 3 | | |
|  | | | |  | Cell 2 | Cell 3 | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 |
| SSB ARFCN | | | |  | freq2 | freq2 | freq2 | freq2 | | freq2 | | freq2 |
| DL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.1 | | | | | | | |
| UL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.2 | | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | 1.0 | - | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | 0.9375 | - | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | 0.75 | - | 0.75 | | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | 0.75 | - | 0.75 | | - | |
| Duplex mode | | | Config 1, 2, 3 |  | TDD | | | | | | | |
| TDD configuration | | | Config 1, 2, 3 |  | TDDConf.1.1 CCA | | | | | | | |
| BWchannel | | | Config 1, 2, 3 | MHz | 40: NRB,c = 106 | | | | | | | |
| Gap Pattern ID | | |  |  | 0 | | | | | | | |
| BWP configuration | | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | |
|  | | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | |
|  | | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | |
|  | | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | |
| PDSCH Reference measurement channel | | | Config 1, 2, 3 |  | SR1.1 CCA |  | SR1.1 CCA |  | | SR1.1 CCA | |  |
| RMSI CORESET Reference Channel | | | Config 1, 2, 3 |  | CR.1.1 CCA |  | CR.1.1 CCA |  | | CR.1.1 CCA | |  |
| Control Channel RMC | | | Config 1, 2, 3 |  | CCR.1.1 CCA |  | CCR.1.1 CCA |  | | CCR.1.1 CCA | |  |
| TRS Configuration | | | Config 1, 2, 3 |  | TRS.1.2 TDD |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | |  |
| OCNG Patterns | | | |  | OP. 1 | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | |
| Time offset with Cell 1 | | | Config 1, 2, 3 | μs | 3 | 3 | 3 | 3 | 3 | | 3 | |
| DBT Window configuration | | | Config 1, 2, 3 |  | DBT.1 | | | | | | | |
| SSB configuration | | | Config 1, 2, 3 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | |
| SMTC configuration | | | Config 1, 2, 3 |  | SMTC.1 | | | | | | | |
| CSI-RS for tracking | | | Config 1, 2, 3 |  | TRS.1.2 TDD | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2, 3 | kHz | 30 kHz | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | 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 | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  |  |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -91 | | - | | | -110 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | | | -109.5 | | |
| Note2 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I |  | -88 | | - | | | -107 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | | | -106.5 | | |
|  | | | | dB | -1.76 | | -4.7 | | | -5.46 | | -5.46 |
|  | | | | dB | 3 | 3 | -2.9 | -2.9 | | -4 | | -4 |
| SS-RSRPNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I |  | -85 | -85 | - | - | | -111 | | -111 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  |  |  | | -110.5 | | -110.5 |
| SS-RSRQ Note3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | -14.77 | -16.76 | -16.76 | | -17.34 | | -17.34 |
|  | | | NR\_CCA\_FR1\_J |  |  |  |  |  | |  | |  |
| IoNote3 | | Config 1, 2, 3 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -50 | | - | | | -73.4 | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | |  | | | -72.9 | | |
| Propagation condition | | | | - | AWGN | AWGN | AWGN | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | 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.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | |

Table A.13.4.2.1.2-3: SS-RSRQ Intra frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | **Cell 1** | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | |  |  | freq1 |  |
| 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 | | | Config 1 | MHz |  | 10: NRB,c = 52 |  |
|  | | | Config 2 |  |  | 10: NRB,c = 52 |  |
|  | | | Config 3 |  |  | 40: NRB,c = 106 |  |
| Gap Pattern ID | | |  |  |  | 0 |  |
| BWP configuration | | | Initial DL BWP |  |  | DLBWP.0.1 |  |
|  | | | Dedicated DL BWP |  |  | DLBWP.1.1 |  |
|  | | | Initial UL BWP |  |  | ULBWP.0.1 |  |
|  | | | Dedicated UL BWP |  |  | ULBWP.1.1 |  |
| DRX Cycle | | | | ms |  | Not Applicable |  |
| PDSCH Reference measurement channel | | | Config 1 |  |  | SR.1.1 FDD |  |
|  | | | Config 2 |  |  | SR.1.1 TDD |  |
|  | | | Config 3 |  |  | SR2.1 TDD |  |
| RMSI CORESET Reference Channel | | | Config 1 |  |  | CR.1.1 FDD |  |
|  | | | Config 2 |  |  | CR.1.1 TDD |  |
|  | | | Config 3 |  |  | CR.2.1 TDD |  |
| Control Channel RMC | | | Config 1 |  |  | CCR.1.1 FDD |  |
|  | | | Config 2 |  |  | CCR.1.1 TDD |  |
|  | | | Config 3 |  |  | CCR.2.1 TDD |  |
| TRS Configuration | | | Config 1 |  |  | TRS.1.1 FDD |  |
|  | | | Config 2 |  |  | TRS.1.1 TDD |  |
|  | | | Config 3 |  |  | TRS.1.2 TDD |  |
| OCNG Patterns | | | |  |  | OP. 1 |  |
| SS-RSSI-Measurement | | | |  |  | Not Applicable |  |
| SMTC configuration | | | Config 1 |  |  | SMTC.2 |  |
|  | | | Config 2,3 |  |  | SMTC.1 |  |
| SSB configuration | | | Config 1,2 |  |  | SSB.1 FR1 |  |
|  | | | Config 3 |  |  | SSB.2 FR1 |  |
| CSI-RS for tracking | | | Config 1 |  |  | TRS.1.1 FDD |  |
| Config 2 |  | TRS.1.1 TDD |  |
| Config 3 |  | TRS.1.2 TDD |  |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz |  | 15 kHz |  |
|  | | | Config 3 |  |  | 30 kHz |  |
| EPRE ratio of PSS to SSS | | | | dB |  | 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) | | | |  |  |  |  |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/15kHz | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | 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 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -91 | - | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | 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 |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | 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 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -88 | - | -111 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -110.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -110 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -109.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -109 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -108.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -108 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -107.5 |
|  | | | | dB | -1.76 | -4.7 | -5.46 |
|  | | | | dB | 3 | -2.9 | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -82 | -103.9 | -118 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -117.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -117 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -116.5 |
|  |  | | NR\_FDD\_FR1\_E,  NR\_TDD\_FR1\_E |  |  |  | -116 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -115.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -115 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -114.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -85 | - | -115 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -114.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -114 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -113.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -111.5 |
| SS-RSRQ Note3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dB | -14.77 | -16.76 | -17.34 |
|  | | | 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 |  |  |  |  |
| IoNote3 | | Config 1,2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -50 | -70 | -83.5 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -83 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -82.5 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -82 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -81.5 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -81 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -80.5 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -80 |
|  | | Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -50 | - | -77.4 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -76.9 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -76.4 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -75.9 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -75.4 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -74.9 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -74.4 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -73.9 |
| Propagation condition | | | | - | AWGN | AWGN | AWGN |
| Antenna configuration | | | |  | 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.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: 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.13.4.2.1.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.29.1.1.

### A.13.4.3 SS-SINR

#### A.13.4.3.1 Intra-frequency measurement accuracy on SCC

##### A.13.4.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.1.

##### A.13.4.3.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.13.4.3.1.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.13.4.3.1.2-2 and Table A.13.4.3.1.2-3. In all test cases, Cell 1 is the PCell, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 1, 2, and 3.

Table A.13.4.3.1.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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 | |

A.13.4.3.1.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 2 | | Cell 3 | Cell 2 | | | Cell 3 |
| SSB ARFCN | | | |  | freq2 | | freq2 | freq2 | | | freq2 |
| DL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | | 0.75 | - | |
| Duplex mode | | | Config 1, 2, 3 |  | TDD | | | | | | |
| TDD configuration | | | Config 1, 2, 3 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS configuration | | | Config 1, 2, 3 |  | TRS.1.2 TDD | |  | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1, 2, 3 |  | SR.1.1 CCA | |  | SR.1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1, 2, 3 |  | CR.1.1 CCA | |  | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1, 2, 3 |  | CCR.1.1 CCA | |  | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| DBT Window configuration | | | Config 1, 2, 3 |  | DBT.1 | | | | | | |
| Time offset with Cell 1 | | | Config 1, 2, 3 | s | 3 (for Cell 2) | | 3 | | 3 (for Cell 2) | | 3 |
| SSB configuration | | | Config 1, 2, 3 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1, 2, 3 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2, 3 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | 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 | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | | 2.66 | -4 | | | -4 |
| SS-RSRPNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | | -87.34 | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  |  | | |  |
| IoNote3 | | Config 1, 2, 3 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 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: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

A.13.4.3.1.2-3: SS-SINR Intra frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | | **Unit** | **Test 1** | **Test 2** |
|  | | | | |  | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | | |  | freq1 | freq1 |
| Duplex mode | | | | Config 1 |  | FDD | FDD |
|  | | | | Config 2,3 |  | TDD | TDD |
| TDD configuration | | | | Config 1 |  | Not Applicable | Not Applicable |
|  | | | | Config 2 |  | TDDConf.1.1 | TDDConf.1.1 |
|  | | | | Config 3 |  | TDDConf.2.1 | TDDConf.2.1 |
| Downlink initial BWP configuration | | | | |  | DLBWP.0.1 | DLBWP.0.1 |
| Downlink dedicated BWP configuration | | | | |  | DLBWP.1.1 | DLBWP.1.1 |
| Uplink initial BWP configuration | | | | |  | ULBWP.0.1 | ULBWP.0.1 |
| Uplink dedicated BWP configuration | | | | |  | ULBWP.1.1 | ULBWP.1.1 |
| DRX Cycle configuration | | | | | ms | Not Applicable | Not Applicable |
| TRS configuration | | | | Config 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| Config 2 |  | TRS.1.1 TDD | TRS.1.1 TDD |
| Config 3 |  | TRS.1.2 TDD | TRS.1.2 TDD |
| 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 |  | SR.2.1 TDD | SR.2.1 TDD |
| RMSI 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 |  | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | | | Config 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
|  | | | | Config 2 |  | CCR.1.1 TDD | CCR.1.1 TDD |
|  | | | | Config 3 |  | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Patterns | | | | |  | OP.1 | OP.1 |
| SS-RSSI-Measurement | | | | |  | Not Applicable | Not Applicable |
| SMTC configuration | | | Config 1  Config 2,3 | |  | SMTC.2 | SMTC.2 |
|  | SMTC.1 | SMTC.1 |
| SSB configuration | | | | Config 1,2 |  | SSB.1 FR1 | SSB.1 FR1 |
|  | | | | Config 3 |  | SSB.2 FR1 | SSB.2 FR1 |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1,2 | kHz | 15 | 15 |
|  | | | | Config 3 |  | 30 | 30 |
| 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 | | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/15kHz | -93 | -116 |
|  | | | | NR\_FDD\_FR1\_B |  |  | -115.5 |
|  | | | | NR\_TDD\_FR1\_C |  |  | -115 |
|  | | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -114.5 |
|  | | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -114 |
|  | | | | NR\_FDD\_FR1\_F |  |  | -113.5 |
|  | | | | NR\_FDD\_FR1\_G |  |  | -113 |
|  | | | | NR\_FDD\_FR1\_H |  |  | -112.5 |
| Note2 | Config 1,2 | | | | dBm/SCS | -93 | Same as Noc for 15 kHz |
|  | Config 3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -90 | -113 |
|  |  | | | NR\_FDD\_FR1\_B |  |  | -112.5 |
|  |  | | | NR\_TDD\_FR1\_C |  |  | -112 |
|  |  | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -111.5 |
|  |  | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -111 |
|  |  | | | NR\_FDD\_FR1\_F |  |  | -110.5 |
|  |  | | | NR\_FDD\_FR1\_G |  |  | -110 |
|  |  | | | NR\_FDD\_FR1\_H |  |  | -109.5 |
|  | | | | | dB | 0 | -5.46 |
|  | | | | | dB | 4.54 | -4 |
| SS-RSRPNote3 | Config 1,2 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -88.46 | -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 |
|  | Config 3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -85.46 | -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 |
| SS-SINR Note3 | | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dB | 0 | -5.46 |
|  | | | | 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 |  |  |  |
| IoNote3 | | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -57.5 | -85.51 |
|  | |  | | NR\_FDD\_FR1\_B |  |  | -85.01 |
|  | |  | | NR\_TDD\_FR1\_C |  |  | -84.51 |
|  | |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -84.01 |
|  | |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -83.51 |
|  | |  | | NR\_FDD\_FR1\_F |  |  | -83.01 |
|  | |  | | NR\_FDD\_FR1\_G |  |  | -82.51 |
|  | |  | | NR\_FDD\_FR1\_H |  |  | -82.01 |
|  | | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -51.41 | -79.41 |
|  | |  | | NR\_FDD\_FR1\_B |  |  | -78.91 |
|  | |  | | NR\_TDD\_FR1\_C |  |  | -78.41 |
|  | |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -77.91 |
|  | |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -77.41 |
|  | |  | | NR\_FDD\_FR1\_F |  |  | -76.91 |
|  | |  | | NR\_FDD\_FR1\_G |  |  | -76.41 |
|  | |  | | NR\_FDD\_FR1\_H |  |  | -75.91 |
| Propagation condition | | | | | - | AWGN | AWGN |
| Antenna configuration | | | | | - | 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: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: 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.13.4.3.1.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

### A.13.4.4 L1-RSRP measurement for beam reporting with CCA serving cell

#### A.13.4.4.1 SSB based L1-RSRP measurement

##### A.13.4.4.1.1 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 clause 10.1.33.1 for L1-RSRP measurements based on SSB with the testing configurations for NR cells in Table A.13.4.4.1.1-1.

Table A.13.4.4.1.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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 | |

##### A.13.4.4.1.2 Test parameters

In this set of test cases there are two cells in the test, PCell (Cell 1) and a SCell under CCA (Cell2). Cell 2 operates on a carrier frequency with CCA and transmits SSBs in DBT window according to DL CCA model.

Two sub-tests (Test 1 and Test 2) are provided with different *Noc* on Cell 2. The test parameters for the Cell 1 and Cell 2 are given in Table A.13.4.4.1.2-1 below. The absolute and relative accuracy of L1-RSRP measurements are tested by using the parameters in Table A.13.4.4.1.2-1.

The same test is applicable for UE supporting any one or both semi-static channel access or dynamic channel access and for network configuring any of semi-static channel occupancy or dynamic channel occupancy.

There is no measurement gap configured in the test. Before the test, UE is configured one SSB resource set with two SSB resources. On Cell 2, UE is configured to perform L1-RSRP measurement based on the SSB resources 0 and 1.

Table A.13.4.4.1.2-1: FR1 SSB based L1-RSRP test parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | | | Test 2 | | |
| Cell 1 | Cell 2 | | Cell 1 | Cell 2 | |
| Active PCell/SCell Configuration | | 1~3 |  | PCell | SCell | | PCell | SCell | |
| SSB GSCN | | 1~3 |  | freq1 | freq2 | | freq1 | freq2 | |
| DL CCA model | | 1~3 |  | N/A | As specifieed in A.3.20.2.1 | | N/A | As specifieed in A.3.20.2.1 | |
| UL CCA model | | 1~3 |  | N/A | As specified in A.3.20.2.2 | | N/A | As specified in A.3.20.2.2 | |
| Duplex mode | | 1 |  | FDD | TDD | | FDD | TDD | |
| 2,3 |  | TDD | TDD |
| TDD configuration | | 1 |  | N/A | TDDConf.1.1 CCA | | N/A | TDDConf.1.1 CCA | |
| 2 |  | TDDConf.1.1 | TDDConf.1.1 |
| 3 |  | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 40: NRB,c = 106 | | 10: NRB,c = 52 | 40: NRB,c = 106 | |
| 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 CCA | | SR.1.1 FDD | SR.1.1 CCA | |
| 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 CCA | | CR.1.1 FDD | CR.1.1 CCA | |
| 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 CCA | | CCR.1.1 FDD | CCR.1.1 CCA | |
| 2 |  | CCR.1.1 TDD | CCR.1.1 TDD |
| 3 |  | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration for Semi-static channel access | | 1 |  | SSB.3 FR1 | SSB.3 CCA | | SSB.3 FR1 | SSB.3 CCA | |
| 2 |  | SSB.3 FR1 | SSB.3 FR1 |
| 3 |  | SSB.4 FR1 | SSB.4 FR1 |
| SSB configuration for Dynamic channel access | | 1 |  | SSB.3 FR1 | SSB.4 CCA | | SSB.3 FR1 | SSB.4 CCA | |
| 2 |  | SSB.3 FR1 | SSB.3 FR1 |
| 3 |  | SSB.4 FR1 | SSB.4 FR1 |
| TRS configuration | | 1 |  | TRS.1.1 FDD | TRS.1.2 TDD | | TRS.1.1 FDD | TRS.1.2 TDD | |
| 2 |  | TRS.1.1 TDD | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD | TRS.1.2 TDD |
| 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 | | |
| Dedicated BWP configuration | | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | | | DLBWP.1.1  ULBWP.1.1 | | |
| SMTC configuration | | 1~3 |  | SMTC.1 | | N/A | SMTC.1 | | N/A |
| DBT Window Configuration | | 1~3 |  | N/A | | DBT.1 | N/A | | DBT.1 |
| reportConfigType | | 1~3 |  | periodic | | | periodic | | |
| reportQuantity | | 1~3 |  | ssb-Index-RSRP | | | ssb-Index-RSRP | | |
| Number of reported RS | | 1~3 |  | 2 | | | 2 | | |
| 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 | | | -94.65 | - | |
| NR\_FDD\_FR1\_B | - | |
| NR\_TDD\_FR1\_C | - | |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | - | |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | - | |
| NR\_FDD\_FR1\_F | - | |
| NR\_FDD\_FR1\_G | - | |
| NR\_FDD\_FR1\_H | - | |
| NR\_TDD\_FR1\_I | - | -113 | |
| Note2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1~3 | dBm/SSB SCS | -91.65 | | | -91.65 | - | |
| NR\_FDD\_FR1\_B | - | |
| NR\_TDD\_FR1\_C | - | |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | - | |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | - | |
| NR\_FDD\_FR1\_F | - | |
| NR\_FDD\_FR1\_G | - | |
| NR\_FDD\_FR1\_H | - | |
| NR\_TDD\_FR1\_I | - | -110 | |
|  | | 1~3 | dB | 10 | | | 10 | -3 | |
| SS-RSRPNote3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1~3 | dBm/SCS | -81.65 | | | -81.65 | - | |
| NR\_FDD\_FR1\_B | - | |
| NR\_TDD\_FR1\_C | - | |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | - | |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | - | |
| NR\_FDD\_FR1\_F | - | |
| NR\_FDD\_FR1\_G | - | |
| NR\_FDD\_FR1\_H | - | |
| NR\_TDD\_FR1\_I | - | -113 | |
| IoNote3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1~3 | dBm/  38.16MHz | -50.19 | | | -50.19 | - | |
| NR\_FDD\_FR1\_B | - | |
| NR\_TDD\_FR1\_C | - | |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | - | |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | - | |
| NR\_FDD\_FR1\_F | - | |
| NR\_FDD\_FR1\_G | - | |
| NR\_FDD\_FR1\_H | - | |
| NR\_TDD\_FR1\_I | - | -77.19 | |
|  | | 1~3 | dB | 10 | | | 10 | -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.13.4.4.1.3 Test Requirements

In both Test 1 and Test 2, the L1-RSRP measurement accuracy for SSB#0 and SSB#1 of Cell 2 shall fulfil the requirements in clauses 10.1.33.1.

### A.13.4.5 RSSI

#### A.13.4.5.1 Intra-frequency RSSI measurement accuracy on a carrier with CCA

##### A.13.4.5.1.1 Test Purpose and Environment

The purpose of this test is to verify that the RSSI measurement accuracy is within the specified limits. This test will partially verify the RSSI measurement accuracy requirements in Section 10.1.34.1.

##### A.13.4.5.1.2 Test parameters

In all test cases, Cell 1 is the PCell on a licensed FR1 band and Cell 2 is the SCell with CCA. RSSI is measured on channel number 2. Supported test configurations are shown in table A.13.4.5.1.2-1. The accuracy of RSSI intra-frequency measurements is tested by using the parameters in A.13.4.5.1.2-2 and A.13.4.5.1.2-3.

Table A.13.4.5.1.2-1: Intra frequency RSSI supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.4.5.1.2-2: RSSI Intra frequency test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Configurations | Unit | Test 1 | |
| Cell 1 | Cell 2 |
| RF Channel Number | |  |  | 1 | 2 |
| BWchannel | |  | MHz | 40 | 40 |
| SSB configuration | Semi-static channel access Note 1, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.1 CCA |
| Dynamic channel access Note 2, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.2 CCA |
| PCCA\_DL | |  |  | 1 | TBD |
| PCCA\_UL | |  |  | 1 | TBD |
| DL CCA model | |  |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | |  |  | N/A | As specified in A.3.20.2.2 |
| Measurement bandwidth | |  |  | Same as channel access bandwidth | |
| Channel access bandwidth | |  | MHz | 20 | |
| DRX Cycle configuration | |  | ms | Not Applicable | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 CCA |
| 2,3 | SR.1.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 CCA |
| 2,3 | CR.1.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 CCA |
| 2,3 | CCR.1.1 TDD |
| OCNG Patterns | |  |  | OP.1 | OP.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) | |  |  |  |  |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -106 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -87 |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | 2.5 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | -Infinity |
| SS-RSRP in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -103.5 | -103.5 |
| SS-RSRP in slots corresponding to RSSI measurement time configuration (RMTC) | |  |  | -103.5 | -Infinity |
| Io within measurement bandwidth in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -101.6 | -101.6 |
| Io within measurement bandwidth in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -101.6 | -87 |
| Propagation condition | |  | - | AWGN | |
| Note 1: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 2: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.13.4.5.1.2-3: RSSI RMTC parameters

|  |  |
| --- | --- |
| measDurationSymbols-r16 | sym14or12 |
| rmtc-Periodicity-r16 | ms40 |
| rmtc-SubframeOffset-r16 | 20 |
| ref-SCS-CP-r16 | kHz15 |
| ReportInterval | ms120 |

##### A.13.4.5.1.3 Test Requirements

The average RSSI measurement accuracy shall fulfil the requirements in sections 10.1.34.1. The nominal RSSI used to evaluate the requirement shall be based on Io in slots corresponding to RSSI measurement time configuration (RMTC).

#### A.13.4.5.2 Inter-frequency RSSI measurement accuracy on a carrier with CCA

##### A.13.4.5.2.1 Test Purpose and Environment

The purpose of this test is to verify that the RSSI measurement accuracy is within the specified limits. This test will partially verify the RSSI measurement accuracy requirements in Section 10.1.34.2.

##### A.13.4.5.2.2 Test parameters

In all test cases, Cell 1 is the PCell on a licensed FR1 band and Cell 2 is the neighbour with CCA. RSSI is measured on channel number 2. Supported test configurations are shown in table A.13.4.5.2.2-1. The accuracy of RSSI inter-frequency measurements is tested by using the parameters in A.13.4.5.2.2-2 and A.13.4.5.2.3.

Table A.13.4.5.2.2-1: Inter frequency RSSI supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.4.5.2.2-2: RSSI Inter frequency test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Configurations | Unit | Test 1 | |
| Cell 1 | Cell 2 |
| RF Channel Number | |  |  | 1 | 2 |
| BWchannel | |  | MHz | 40 | 40 |
| SSB configuration | Semi-static channel access Note 1, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.1 CCA |
| Dynamic channel access Note 2, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.2 CCA |
| PCCA\_DL | |  |  | 1 | TBD |
| PCCA\_UL | |  |  | 1 | TBD |
| DL CCA model | |  |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | |  |  | N/A | As specified in A.3.20.2.2 |
| Measurement bandwidth | |  |  | Same as channel access bandwidth | |
| Channel access bandwidth | |  | MHz | 20 | |
| DRX Cycle configuration | |  | ms | Not Applicable | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | NA |
| 2,3 | SR.1.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | NA |
| 2,3 | CR.1.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | NA |
| 2,3 | CCR.1.1 TDD |
| OCNG Patterns | |  |  | OP.1 | NA |
| EPRE ratio of PSS to SSS | |  | dB | 0 | NA |
| 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) | |  |  |  |  |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -106 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -87 |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | 2.5 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | -Infinity |
| SS-RSRP in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -103.5 | -103.5 |
| SS-RSRP in slots corresponding to RSSI measurement time configuration (RMTC) | |  |  | -103.5 | -Infinity |
| Io within measurement bandwidth in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -101.6 | -101.6 |
| Io within measurement bandwidth in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -101.6 | -87 |
| Propagation condition | |  | - | AWGN | |
| Note 1: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 2: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.13.4.5.2.2-3: RSSI RMTC parameters

|  |  |
| --- | --- |
| measDurationSymbols-r16 | sym14or12 |
| rmtc-Periodicity-r16 | ms40 |
| rmtc-SubframeOffset-r16 | 20 |
| ref-SCS-CP-r16 | kHz15 |
| ReportInterval | ms120 |

##### A.13.4.5.2.3 Test Requirements

The average RSSI measurement accuracy shall fulfil the requirements in sections 10.1.34.2. The nominal RSSI used to evaluate the requirement shall be based on Io in slots corresponding to RSSI measurement time configuration (RMTC).

### A.13.4.6 Channel occupancy

#### A.13.4.6.1 Intra-frequency channel occupancy measurement accuracy on SCC with CCA

##### A.13.4.6.1.1 Test Purpose and Environment

The purpose of this test is to verify that the channel occupancy measurement accuracy is within the specified limits. This test will partially verify the channel occupancy measurement accuracy requirements in Section 10.1.35.1.

##### A.13.4.6.1.2 Test parameters

In all test cases, Cell 1 is the PCell on a licensed FR1 band and Cell 2 is the SCell with CCA. Channel occupancy is measured on channel number 2. Supported test configurations are shown in table A.13.4.6.1.2-1. The accuracy of channel occupancy intra-frequency measurements is tested by using the parameters in A.13.4.6.1.2-2 and A.13.4.6.1.2-3.

Table A.13.4.6.1.2-1: Intra frequency CO supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.4.6.1.2-2: CO Intra frequency test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Configurations | Unit | Test 1 | |
| Cell 1 | Cell 2 |
| RF Channel Number | |  |  | 1 | 2 |
| BWchannel | |  | MHz | 40 | 40 |
| SSB configuration | Semi-static channel access Note 1, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.1 CCA |
| Dynamic channel access Note 2, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.2 CCA |
| PCCA\_DL | |  |  | 1 | TBD |
| PCCA\_UL | |  |  | 1 | TBD |
| DL CCA model | |  |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | |  |  | N/A | As specified in A.3.20.2.2 |
| Measurement bandwidth | |  |  | Same as channel access bandwidth | |
| Channel access bandwidth | |  | MHz | 20 | |
| DRX Cycle configuration | |  | ms | Not Applicable | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 CCA |
| 2,3 | SR.1.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 CCA |
| 2,3 | CR.1.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 CCA |
| 2,3 | CCR.1.1 TDD |
| OCNG Patterns | |  |  | OP.1 | OP.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) | |  |  |  |  |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -106 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -87 |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | 2.5 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | -Infinity |
| SS-RSRP in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -103.5 | -103.5 |
| SS-RSRP in slots corresponding to RSSI measurement time configuration (RMTC) | |  |  | -103.5 | -Infinity |
| Io within measurement bandwidth in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/BW | -101.6 | -101.6 |
| Io within measurement bandwidth in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/BW | -101.6 | -87 |
| Propagation condition | |  | - | AWGN | |
| channelOccupancyThreshold | |  | dBm | -83 | |
| Note 1: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 2: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.13.4.6.1.2-3: CO RMTC parameters

|  |  |
| --- | --- |
| measDurationSymbols-r16 | sym14or12 |
| rmtc-Periodicity-r16 | ms40 |
| rmtc-SubframeOffset-r16 | 20 |
| ref-SCS-CP-r16 | kHz15 |
| ReportInterval | ms120 |

##### A.13.4.6.1.3 Test Requirements

The nominal reported *channelOccupancy s*hall be TBD. At least 90% of channel occupancy reports made by the UE shall indicate this value.

#### A.13.4.6.2 Inter-frequency channel occupancy measurement accuracy on a carrier with CCA

##### A.13.4.6.2.1 Test Purpose and Environment

The purpose of this test is to verify that the channel occupancy measurement accuracy is within the specified limits. This test will partially verify the channel occupancy measurement accuracy requirements in Section 10.1.35.2.

##### A.13.4.6.2.2 Test parameters

In all test cases, Cell 1 is the PCell on a licensed FR1 band and Cell 2 is the neighbour with CCA. Channel occupancy is measured on channel number 2. Supported test configurations are shown in table A.13.4.6.2.2-1. The accuracy of channel occupancy inter-frequency measurements is tested by using the parameters in A.13.4.6.2.2-2 and A.13.4.6.2.3.

Table A.13.4.6.2.2-1: Inter frequency CO supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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. | |

Table A.13.4.6.2.2-2: CO Inter frequency test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Configurations | Unit | Test 1 | |
| Cell 1 | Cell 2 |
| RF Channel Number | |  |  | 1 | 2 |
| BWchannel | |  | MHz | 40 | 40 |
| SSB configuration | Semi-static channel access Note 1, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.1 CCA |
| Dynamic channel access Note 2, 3 | 1,2,3 |  | Configuration 1,2: SSB.1 FR1  Configuration 3: SSB.2 FR1 | SSB.2 CCA |
| PCCA\_DL | |  |  | 1 | TBD |
| PCCA\_UL | |  |  | 1 | TBD |
| DL CCA model | |  |  | N/A | As specifieed in A.3.20.2.1 |
| UL CCA model | |  |  | N/A | As specified in A.3.20.2.2 |
| Measurement bandwidth | |  |  | Same as channel access bandwidth | |
| Channel access bandwidth | |  | MHz | 20 | |
| DRX Cycle configuration | |  | ms | Not Applicable | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | NA |
| 2,3 | SR.1.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | NA |
| 2,3 | CR.1.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | NA |
| 2,3 | CCR.1.1 TDD |
| OCNG Patterns | |  |  | OP.1 | NA |
| EPRE ratio of PSS to SSS | |  | dB | 0 | NA |
| 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) | |  |  |  |  |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -106 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -106 | -87 |
| in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | 2.5 |
| in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dB | 2.5 | -Infinity |
| SS-RSRP in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/SCS | -103.5 | -103.5 |
| SS-RSRP in slots corresponding to RSSI measurement time configuration (RMTC) | |  |  | -103.5 | -Infinity |
| Io within measurement bandwidth in slots not corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/BW | -101.6 | -101.6 |
| Io within measurement bandwidth in slots corresponding to RSSI measurement time configuration (RMTC) | |  | dBm/BW | -101.6 | -87 |
| Propagation condition | |  | - | AWGN | |
| channelOccupancyThreshold | |  | dBm | -83 | |
| Note 1: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 2: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.13.4.6.2.2-3: CO RMTC parameters

|  |  |
| --- | --- |
| measDurationSymbols-r16 | sym14or12 |
| rmtc-Periodicity-r16 | ms40 |
| rmtc-SubframeOffset-r16 | 20 |
| ref-SCS-CP-r16 | kHz15 |
| ReportInterval | ms120 |

##### A.13.4.6.2.3 Test Requirements

The nominal reported *channelOccupancy s*hall be TBD. At least 90% of channel occupancy reports made by the UE shall indicate this value.

# A.14 NR standalone tests for Satellite access

## A.14.1 RRC\_IDLE state mobility

#### A.14.1.1 Cell reselection to FR1 intra-frequency NR case

##### A.14.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.3.

##### A.14.1.1.2 Test Parameters

The test scenario comprises of 2 cells on 1 NR carrier configured each in a different satellite as given in tables A.14.1.1.2-1, A.14.1.1.2-2 and A.14.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.14.1.1.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.1.2-2: General test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | Cell1 |  |
| T2 end condition | Active cell |  | Cell2 |  |
|  | Neighbour cells |  | Cell1 |  |
| Final condition | Active cell |  | Cell1 |  |
|  | Neighbour cells |  | Cell2 |  |
| RF Channel Number | |  | 1 |  |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | Not configured |  |
| T1 | | s | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 40  (NOTE 1) | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 15  (NOTE 1) | T3 needs to be defined so that cell re-selection reaction time is taken into account. |
| NOTE 1: If the test is performed in a LEO configuration, and the scaling factor Kmulti\_SMTC defined in clause 4.2C.2.3 is greater than 1, according to UE capabilities, the duration of times T2 and T3 shall be scaled for the same factor to allow the UE to complete the cell reselection within the duration of the test case. | | | | |

Table A.14.1.1.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | | NSC.1 for GSO test  NSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | | SR.1.1 FDD | | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| SSB configuration |  | SSB.1 FR1 | | | SSB.5 FR1 | | |
| SMTC configuration |  | #1: SMTC.1 for Cell 1  #2: SMTC.4 for Cell 2 | | | #1: SMTC.1 for Cell 1  #2: SMTC.4 for Cell 2 | | |
| RLM-RS |  | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | -130 | | | -130 | | |
| Pcompensation | dB | 0 | | | 0 | | |
| Qhysts | dB | 0 | | | 0 | | |
| Qoffsets, n | dB | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | | SS-RSRP | | |
|  | dB | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
| Note2 | dBm/SCS | -98 | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | |
|  | dB | 16 | 13 | 16 | -infinity | 16 | 13 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -82 | -infinity | -82 | -85 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | -52.21 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 0 | 0 | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 60 | | | 60 | | |
| Propagation Condition |  | AWGN | | | | | |

##### A.14.1.1.3 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than:

34 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.1.2-2); or

66 s if Kmulti\_SMTC is equal to 2.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on cell 1.

The cell re-selection delay to an already detected cell shall be less than:

8 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.1.2-2); or

14.5 s if Kmulti\_SMTC is equal to 2.

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

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: Kmulti\_SMTC \*Tdetect, NR\_Intra + TSI-NR, and to an already detected cell can be expressed as: Kmulti\_SMTC \*Tevaluate, NR\_ intra + TSI-NR,

Where:

Tdetect, NR\_Intra See Table 4.2C.2.3-1 in clause 4.2C.2.3

Tevaluate, NR\_ intra See Table 4.2C.2.3-1 in clause 4.2C.2.3

Kmulti\_SMTC is described in clause 4.2C.2.3

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 20ms period and 80 ms period, respectively.

If Kmulti\_SMTC = 1, Kmulti\_SMTC \*Tevaluate, NR\_Intra + TSI-NR = 7.68 s; allow 8 s. And Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 33.28 s, allow 34s.

If K\_multi\_SMTC = 2, Kmulti\_SMTC \*Tevaluate, NR\_Intra + TSI-NR = 14.08 s; allow 14.5 s. And Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 65.28 s, allow 66s.

#### A.14.1.2 Cell reselection to FR1 intra-frequency NR cell for UE configured with the feature for enhanced requirements

##### A.14.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.3.

##### A.14.1.2.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.2.2-1, A.14.1.2.2-2 and A.14.1.2.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2. The flag *enhancedMeasurementLEO-r17* should be set.

Table A.14.1.2.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.2.2-2: General test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | Cell1 |  |
| T2 end condition | Active cell |  | Cell2 |  |
|  | Neighbour cells |  | Cell1 |  |
| Final condition | Active cell |  | Cell1 |  |
|  | Neighbour cells |  | Cell2 |  |
| RF Channel Number | |  | 1 |  |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | Not configured |  |
| T1 | | s | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 40  (NOTE 1) | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 15  (NOTE 1) | T3 needs to be defined so that cell re-selection reaction time is taken into account. |
| NOTE 1: If the test is performed in a LEO configuration, and the scaling factor Kmulti\_SMTC defined in clause 4.2C.2.3 is greater than 1, according to UE capabilities, the duration of times T2 and T3 shall be scaled for the same factor to allow the UE to complete the cell reselection within the duration of the test case. | | | | |

Table A.14.1.2.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | | NSC.1 for GSO test  NSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | | SR.1.1 FDD | | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| SSB configuration |  | SSB.1 FR1 | | | SSB.X FR1 | | |
| SMTC configuration |  | #1: SMTC.2 for Cell 1  #2: SMTC.7 for Cell 2 | | | #1: SMTC.2 for Cell 1  #2: SMTC.7 for Cell 2 | | |
| RLM-RS |  | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | -130 | | | -130 | | |
| Pcompensation | dB | 0 | | | 0 | | |
| Qhysts | dB | 0 | | | 0 | | |
| Qoffsets, n | dB | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | | SS-RSRP | | |
|  | dB | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
| Note2 | dBm/SCS | -98 | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | |
|  | dB | 16 | 13 | 16 | -infinity | 16 | 13 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -82 | -infinity | -82 | -85 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | -52.21 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 0 | 0 | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 60 | | | 60 | | |
| Propagation Condition |  | AWGN | | | | | |
| Parameter | Unit | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| PDSCH RMC |  | SR.1.1 FDD | | | SR.1.1 FDD | | |
| RMSI CORESET |  | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Dedicated CORESET |  | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | -130 | | | -130 | | |
| Pcompensation | dB | 0 | | | 0 | | |
| Qhysts | dB | 0 | | | 0 | | |
| Qoffsets, n | dB | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | | SS-RSRP | | |
|  | dB | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
| Note2 | dBm/SCS | -98 | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | |
|  | dB | 16 | 13 | 16 | -infinity | 16 | 13 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -82 | -infinity | -82 | -85 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | -52.21 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 0 | 0 | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 60 | | | 60 | | |
| Propagation Condition |  | AWGN | | | | | |

##### A.14.1.2.3 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than:

11 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.2.2-2); or

20 s if Kmulti\_SMTC is equal to 2.

The cell reselection delay to an already detected cell is defined as the time from the beginning of time period T3, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on cell 1.

The cell re-selection delay to an already detected cell shall be less than:

6 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.2.2-2); or

9 s if Kmulti\_SMTC is equal to 2.

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

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: Kmulti\_SMTC \*Tdetect, NR\_Intra\_enh + TSI-NR, and to an already detected cell can be expressed as: Kmulti\_SMTC \*Tevaluate, NR\_ intra\_enh + TSI-NR,

Where:

Tdetect, NR\_Intra\_enh See Table 4.2C.2.3-2 in clause 4.2C.2.3

Tevaluate, NR\_ Intra\_enh See Table 4.2C.2.3-2 in clause 4.2C.2.3

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 20ms period and 80 ms period, respectively.

If Kmulti\_SMTC = 1, Kmulti\_SMTC \*Tevaluate, NR\_Intra\_enh + TSI-NR = 5.12 s; allow 6 s. And Kmulti\_SMTC \*Tdetect, NR\_ Intra\_enh + TSI-NR = 10.24 s, allow 11 s.

If K\_multi\_SMTC = 2, Kmulti\_SMTC \*Tevaluate, NR\_Intra\_enh + TSI-NR = 8.96 s; allow 9 s. And Kmulti\_SMTC \*Tdetect, NR\_Intra\_enh + TSI-NR = 19.2 s, allow 20s.

#### A.14.1.3 Time-based cell reselection to FR1 intra-frequency NR cell

##### A.14.1.3.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.3.

##### A.14.1.3.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.a3.2-1, A.14.1.a3.2-2 and A.14.1.a3.2-3. The test consists of two successive time periods, with time duration of T1 and T2, respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2. t-Service broadcasted in SIB19 of Cell 1 is set to the time point that is 36s after start of T2.

Table A.14.1.3.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.3.2-2: General test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | Cell1 |  |
| T2 end condition | Active cell |  | Cell2 |  |
| Neighbour cells |  | Cell1 |  |
| RF Channel Number | |  | 1 |  |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | Not configured |  |
| T1 | | s | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 40  (NOTE 1) | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| NOTE 1: If the test is performed in a LEO configuration, and the scaling factor Kmulti\_SMTC defined in clause 4.2C.2.3 is greater than 1, according to UE capabilities, the duration of time T2 shall be scaled for the same factor to allow the UE to complete the cell reselection within the duration of the test case. | | | | |

Table A.14.1.3.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | SR.1.1 FDD | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | CR.1.1 FDD | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | CCR.1.1 FDD | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | ULBWP.0.1 | |
| SSB configuration |  | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | #1: SMTC.1 for Cell 1 and Cell 2 | | #1: SMTC.1 for Cell 1 and Cell 2 | |
| RLM-RS |  | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | -130 | | -130 | |
| Pcompensation | dB | 0 | | 0 | |
| Qhysts | dB | 0 | | 0 | |
| Qoffsets, n | dB | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | SS-RSRP | |
|  | dB | 16 | -3.11 | -infinity | 2.79 |
| Note2 | dBm/SCS | -98 | | | |
| Note2 | dBm/15 kHz | -98 | | | |
|  | dB | 16 | 13 | -infinity | 16 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -infinity | -82 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | Same as parameters specified in Cell 1 columns- | |
| Treselection | s | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 40 | | 40 | |
| Propagation Condition |  | AWGN | | | |

##### A.14.1.3.3 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than :

34 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.3.2-2); or

66 s if Kmulti\_SMTC is equal to 2.

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

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: Kmulti\_SMTC \*Tdetect, NR\_Intra + TSI-NR,

Where:

Tdetect, NR\_Intra See Table 4.2C.2.3-1 in clause 4.2C.2.3

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 20ms period and 80 ms period, respectively.

If Kmulti\_SMTC = 1, Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 33.28 s, allow 34s.

If Kmulti\_SMTC = 2, Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 65.28 s, allow 66s.

#### A.14.1.4 Location-based cell reselection to FR1 intra-frequency NR cell

##### A.14.1.4.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.3.

##### A.14.1.4.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.a4.2-1, A.14.1.a4.2-2 and A.14.1.a4.2-3. The test consists of two successive time periods, with time duration of T1 and T2, respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

At 4s after the start of T2, the UE location is changed such that the distance to the reference location broadcasted in SIB19 of Cell 1 is exceeded by the configured value in *distanceThresh* plus 50m.

Table A.14.1.4.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.4.2-2: General test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | Cell1 |  |
| T2 end condition | Active cell |  | Cell2 |  |
| Neighbour cells |  | Cell1 |  |
| RF Channel Number | |  | 1 |  |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | Not configured |  |
| T1 | | s | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 40  (NOTE 1) | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| NOTE 1: If the test is performed in a LEO configuration, and the scaling factor Kmulti\_SMTC defined in clause 4.2C.2.3 is greater than 1, according to UE capabilities, the duration of time T2 shall be scaled for the same factor to allow the UE to complete the cell reselection within the duration of the test case. | | | | |

Table A.14.1.4.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | SR.1.1 FDD | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | CR.1.1 FDD | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | CCR.1.1 FDD | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | ULBWP.0.1 | |
| SSB configuration |  | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | #1: SMTC.1 for Cell 1 and Cell 2 | | #1: SMTC.1 for Cell 1 and Cell 2 | |
| RLM-RS |  | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | -130 | | -130 | |
| Pcompensation | dB | 0 | | 0 | |
| Qhysts | dB | 0 | | 0 | |
| Qoffsets, n | dB | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | SS-RSRP | |
|  | dB | 16 | -3.11 | -infinity | 2.79 |
| Note2 | dBm/SCS | -98 | | | |
| Note2 | dBm/15 kHz | -98 | | | |
|  | dB | 16 | 13 | -infinity | 16 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -infinity | -82 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | Same as parameters specified in Cell 1 columns- | |
| Treselection | s | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 40 | | 40 | |
| Propagation Condition |  | AWGN | | | |

##### A.14.1.4.3 Test Requirements

The cell reselection delay to a newly detectable cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than:

34 s if Kmulti\_SMTC is equal to 1 (see note on Table A.14.1.3.2-2); or

66 s if Kmulti\_SMTC is equal to 2.

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

NOTE: The cell re-selection delay to a newly detectable cell can be expressed as: Kmulti\_SMTC \*Tdetect, NR\_Intra + TSI-NR, and to an already detected cell can be expressed as: Kmulti\_SMTC \*Tevaluate, NR\_ intra + TSI-NR,

Where:

Tdetect, NR\_Intra See Table 4.2C.2.3-1 in clause 4.2C.2.3

Tevaluate, NR\_ intra See Table 4.2C.2.3-1 in clause 4.2C.2.3

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 20ms period and 80 ms period, respectively.

If Kmulti\_SMTC = 1, Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 33.28 s, allow 34s.

If Kmulti\_SMTC = 2, Kmulti\_SMTC \*Tdetect, NR\_ intra + TSI-NR = 65.28 s, allow 66s.

#### A.14.1.5 Cell reselection to FR1 inter-frequency NR case

##### A.14.1.5.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.4.

##### A.14.1.5.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.5.2-1, A.14.1.5.2-2 and A.14.1.5.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.14.1.5.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.5.2-2: General test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | 1 | Cell1 |  |
| T2 end condition | Active cell |  | 1 | Cell2 |  |
|  | Neighbour cells |  | 1 | Cell1 |  |
| Final condition | Active cell |  | 1 | Cell1 |  |
|  | Neighbour cells |  | 1 | Cell2 |  |
| RF Channel Number | |  | 1 | 1 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1 | SSB.1 FR1 |  |
| SMTC configuration#1 | |  | 1 | SMTC.2 | Configured in SIB2 of Cell 1 |
| SMTC.6 | Configured in SIB2 of Cell 2 |
| SMTC configuration#2 | |  | 1 | SMTC.2 | Configured in SIB2 of Cell 1 |
| SMTC.6 | Configured in SIB2 of Cell 2 |
| DRX cycle length | | s | 1 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| Ephemeris information | |  | 1 | [TBD] |  |
| T1 | | s | 1 | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 1 | 40 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 1 | 15 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.5.2-3: Cell specific test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | |
|  |  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| Satellite information |  | 1 | SSC.1 for GSO test  SSC.2 for NGSO test | | | SSC.1 for GSO test  SSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | | SR.1.1 FDD | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| OCNG Pattern |  | 1 | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -130 | | | -130 | | |
| Pcompensation | dB | 1 | 0 | | | 0 | | |
| Qhysts | dB | 1 | 0 | | | 0 | | |
| Qoffsets, n | dB | 1 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1 | SS-RSRP | | | SS-RSRP | | |
|  | dB | 1 | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
| Note2 | dBm/SCS | 1 | -98 | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | |
|  | dB | 1 | 16 | 13 | 16 | -infinity | 16 | 13 |
| SS-RSRP Note3 | dBm/SCS | 1 | -82 | -85 | -82 | -infinity | -82 | -85 |
| Io | dBm/9.36 MHz | 1 | -53.94 | -52.21 | -52.21 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SintersearchP | dB | 1 | 60 | | | 60 | | |
| Propagation Condition |  | 1 | 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.14.1.5.3 Test Requirements

The cell reselection delay to a higher priority cell is defined as the time from the beginning of time period T3, to the moment when the UE camps again on cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on cell 2.

The cell re-selection delay to a higher priority cell shall be less than 68 s.

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on cell 1.

The cell re-selection delay to a lower priority cell shall be less than 8 s.

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

NOTE: The cell re-selection delay to a higher priority cell can be expressed as: Thigher\_priority\_search + Tevaluate, NR\_ inter + TSI-NR, and to a lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, NR\_ inter See Table 4.2C.2.4-1 in clause 4.2C.2.4

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority

#### A.14.1.6 Cell reselection to FR1 inter-frequency NR cell for UE configured with [capability for enhanced requirements]

##### A.14.1.6.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.4.

##### A.14.1.6.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.6.2-1, A.14.1.6.2-2 and A.14.1.6.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.14.1.6.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.6.2-2: General test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | Cell1 |  |
| T2 end condition | Active cell |  | Cell2 |  |
|  | Neighbour cells |  | Cell1 |  |
| Final condition | Active cell |  | Cell1 |  |
|  | Neighbour cells |  | Cell2 |  |
| RF Channel Number | |  | 1 |  |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | SSB.1 FR1 |  |
| SMTC configuration#1 | |  | SMTC.2 | Configured in SIB2 of Cell 1 |
| SMTC.6 | Configured in SIB2 of Cell 2 |
| SMTC configuration#2 | |  | SMTC.2 | Configured in SIB2 of Cell 1 |
| SMTC.6 | Configured in SIB2 of Cell 2 |
| DRX cycle length | | s | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | Not configured |  |
| Ephemeris information | |  | [TBD] |  |
| T1 | | s | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 40 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 15 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.6.2-3: Cell specific test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | | SSC.1 for GSO test  SSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | | SR.1.1 FDD | | |
| RMSI CORESET RMC configuration |  | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Dedicated CORESET RMC configuration |  | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | -130 | | | -130 | | |
| Pcompensation | dB | 0 | | | 0 | | |
| Qhysts | dB | 0 | | | 0 | | |
| Qoffsets, n | dB | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | | SS-RSRP | | |
|  | dB | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
| Note2 | dBm/SCS | -98 | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | |
|  | dB | 16 | 13 | 16 | -infinity | 16 | 13 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -82 | -infinity | -82 | -85 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | -52.21 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 0 | 0 | 0 | 0 | 0 | 0 |
| SintersearchP | dB | 60 | | | 60 | | |
| Propagation Condition |  | AWGN | | | | | |

##### A.14.1.6.3 Test Requirements

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on cell 1.

The cell re-selection delay to a lower priority cell shall be less than 3 s.

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

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2C.2.4-1 in clause 4.2C.2.4

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

#### A.14.1.7 Time-based Cell reselection to FR1 inter-frequency NR satellite access case

##### A.14.1.7.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.4.

##### A.14.1.7.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.7.2-1, A.14.1.7.2-2 and A.14.1.7.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2. t-Service broadcasted in SIB19 of Cell 1 is set to the time point that is 36s after start of T2.

Table A.14.1.7.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.7.2-2: General test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | 1 | Cell1 |  |
| T2 end condition | Active cell |  | 1 | Cell2 |  |
|  | Neighbour cells |  | 1 | Cell1 |  |
| RF Channel Number | |  | 1 | 1 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 1 | 40 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.7.2-3: Cell specific test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | SR.1.1 FDD | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | CR.1.1 FDD | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | CCR.1.1 FDD | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | ULBWP.0.1 | |
| SSB configuration |  | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | #1: SMTC.1 for Cell 1 and Cell 2 | | #1: SMTC.1 for Cell 1 and Cell 2 | |
| RLM-RS |  | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | -130 | | -130 | |
| Pcompensation | dB | 0 | | 0 | |
| Qhysts | dB | 0 | | 0 | |
| Qoffsets, n | dB | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | SS-RSRP | |
|  | dB | 16 | -3.11 | -infinity | 2.79 |
| Note2 | dBm/SCS | -98 | | | |
| Note2 | dBm/15 kHz | -98 | | | |
|  | dB | 16 | 13 | -infinity | 16 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -infinity | -82 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | Same as parameters specified in Cell 1 columns- | |
| Treselection | s | 0 | 0 | 0 | 0 |
| SintersearchP | dB | 40 | | 40 | |
| Propagation Condition |  | AWGN | | | |

##### A.14.1.7.3 Test Requirements

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a lower priority cell shall be less than [36] s.

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

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2C.2.4-1 in clause 4.2C.2.4

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 80ms period.

#### A.14.1.8 Location-based Cell reselection to FR1 inter-frequency NR satellite access case

##### A.14.1.8.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for satellite access specified in clause 4.2C.2.4.

##### A.14.1.8.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.14.1.8.2-1, A.14.1.8.2-2 and A.14.1.8.2-3. The test consists of two successive time periods, with time duration of T1and T2, respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.At 4s after the start of T2, the UE location is changed such that the distance to the reference location broadcasted in SIB19 of Cell 1 is exceeded by the configured value in *distanceThresh* plus 50m.

Table A.14.1.8.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.8.2-2: General test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
|  | |  |
| Initial condition | Active cell |  | 1 | Cell1 |  |
| T2 end condition | Active cell |  | 1 | Cell2 |  |
|  | Neighbour cells |  | 1 | Cell1 |  |
| RF Channel Number | |  | 1 | 1 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 1 | 40 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.8.2-3: Cell specific test parameters for inter frequency NR cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Cell 1 | | Cell 2 | |
|  |  | T1 | T2 | T1 | T2 |
| Satellite information |  | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | |
| PDSCH RMC configuration |  | SR.1.1 FDD | | SR.1.1 FDD | |
| RMSI CORESET configuration |  | CR.1.1 FDD | | CR.1.1 FDD | |
| Dedicated CORESET configuration |  | CCR.1.1 FDD | | CCR.1.1 FDD | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | ULBWP.0.1 | |
| SSB configuration |  | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | #1: SMTC.1 for Cell 1 and Cell 2 | | #1: SMTC.1 for Cell 1 and Cell 2 | |
| RLM-RS |  | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | -130 | | -130 | |
| Pcompensation | dB | 0 | | 0 | |
| Qhysts | dB | 0 | | 0 | |
| Qoffsets, n | dB | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | SS-RSRP | | SS-RSRP | |
|  | dB | 16 | -3.11 | -infinity | 2.79 |
| Note2 | dBm/SCS | -98 | | | |
| Note2 | dBm/15 kHz | -98 | | | |
|  | dB | 16 | 13 | -infinity | 16 |
| SS-RSRP Note3 | dBm/SCS | -82 | -85 | -infinity | -82 |
| Io | dBm/9.36 MHz | -53.94 | -52.21 | Same as parameters specified in Cell 1 columns- | |
| Treselection | s | 0 | 0 | 0 | 0 |
| SintersearchP | dB | 40 | | 40 | |
| Propagation Condition |  | AWGN | | | |

##### A.14.1.8.3 Test Requirements

The cell reselection delay to a lower priority cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on Cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Registration procedure for mobility and periodic registration update on Cell 2.

The cell re-selection delay to a lower priority cell shall be less than [36] s.

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

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2C.2.4-1 in clause 4.2C.2.4

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280ms is assumed in this test case provided that SIB1 and SIB19 are scheduled with 80ms period.

#### A.14.1.9 Cell reselection to FR1 inter-frequency NR case for UE fulfilling low mobility relaxed measurement criterion

##### A.14.1.9.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements specified in clause 4.2C.2.7, for UE fulfilling low mobility relaxed measurement criterion.

##### A.14.1.9.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers respectively as given in tables A.14.1.9.2-1, A.14.1.9.2-2 and A.14.1.9.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

As specified in the Test Purpose, the UE is configured with the relaxed measurement criterion for UE with low mobility defined in clause [5.2.4.9.1] in [1]. So, Cell 2 and Cell 1 configure the UE as follows:

*[lowMobilityEvalutation]* [2] criterion is configured according to the parameters listed in Table A.14.1.9.2-3;

*[cellEdgeEvaluation]* [2] criterion is not configured;

*[combineRelaxedMeasCondition]* [2] is not configured;

Table A.14.1.9.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description of serving cell |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.9.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case for UE fulfilling low mobility criterion

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1 | Cell2 | The UE camps on cell 2 in the initial phase, it fulfills Low Mobility relaxation measurements criterion, and during T1 period the UE reselects to cell 1 |
| Neighbour cells |  | 1 | Cell1 |
| T1 end condition | Active cell |  | 1 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
| Neighbour cells |  | 1 | Cell2 |
| T2 end condition | Active cell |  | 1 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T2 |
| Neighbour cells |  | 1 | Cell1 |
| RF Channel Number | |  | 1 | 1, 2 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| SSB Configuration | |  | 1 | SSB.1 FR1 |  |
| SMTCconfiguration | |  | 1 | SMTC pattern 2 | Configured in SIB4 of Cell 1 |
| SMTC pattern 6 | Configured in SIB4 of Cell 2 |
| DRX cycle length | | s | 1 | 0.64 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | 25 s | T1 is defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1 | 25 s | T2 is defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.9.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case in AWGN for UE fulfilling low mobility criterion

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | |
|  |  |  | T1 | T2 | T1 | | T2 |
| Satellite information |  | 1 | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | SR.1.1 FDD | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | CCR.1.1 FDD | | |
| OCNG Pattern |  | 1 | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1 | DLBWP.0.1 | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1 | ULBWP.0.1 | | ULBWP.0.1 | | |
| RLM-RS |  | 1 | SSB | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -140 | | -140 | | |
| Pcompensation | dB | 1 | 0 | | 0 | | |
| Qhysts | dB | 1 | 0 | | 0 | | |
| Qoffsets, n | dB | 1 | 0 | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1 | SS-RSRP | | SS-RSRP | | |
|  | dB | 1 | 14 | 14 | -4 | 12 | |
| Note2 | dBm/SCS | 1 | -98 | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | |
|  | dB | 1 | 14 | 14 | -4 | | 12 |
| SS-RSRP Note3 | dBm/SCS | 1 | -84 | -84 | -102 | | -86 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -68.60 | | -57.78 |
| Treselection | s | 1 | 0 | 0 | 0 | | 0 |
| SnonintersearchP | dB | 1 | Not sent | | Not sent | | |
| Threshx, highP | dB | 1 | 48 | | 48 | | |
| Threshserving, lowP | dB | 1 | 44 | | 44 | | |
| Threshx, lowP | dB | 1 | 50 | | 50 | | |
| SSearchDeltaP | dB | 1 | 3 | | 3 | | |
| TSearchDeltaP | s | 1 | 5 | | 5 | | |
| Propagation Condition |  | 1 | 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.14.1.9.3 Test Requirements

The cell reselection delay to an already detected lower priority cell for UE fulfilling low mobility relaxed measurements is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to a lower priority cell for UE fulfilling low mobility relaxed measurements shall be less than 17s.

The cell reselection delay to an already detected higher priority cell for UE fulfilling low mobility relaxed measurements is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRCSetupRequest message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to an already detected higher priority cell for UE fulfilling low mobility relaxed measurements shall be less than 17s.

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

NOTE: The cell re-selection delay to a known lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2.2.10.2-1 in clause 4.2.2.10.2

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 16.64s, allow 17s for the cell re-selection delay to an already detected lower priority cell and 16.64s for the cell re-selection delay to an already detected higher priority cell, which we allow 17s for UE fulfilling low mobility relaxed measurements in the test case.

#### A.14.1.10 Cell reselection to FR1 inter-frequency NR case for UE fulfilling not-at-cell edge relaxed measurement criterion

##### A.14.1.10.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements specified in clause 4.2C.2.7, for UE fulfilling not-at-cell edge relaxed measurement criterion.

##### A.14.1.10.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers respectively as given in tables A.14.1.10.2-1, A.14.1.10.2-2 and A.14.1.10.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

As specified in the Test Purpose, the UE is configured with the relaxed measurement criterion for UE not-at-cell edge as defined in clause 5.2.4.9.2 in [1]. So, Cell 2 and Cell 1configures the UE as follows:

*[cellEdgeEvaluation]* [2] criterion is configured according to the parameters listed in Table A.14.1.9.2-3;

*[lowMobilityEvalutation]* [2] criterion is not configured;

*[combineRelaxedMeasCondition]* [2] is not configured;

Table A.14.1.10.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description of serving cell |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.1.10.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case for UE fulfilling not-at-cell edge criterion

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1 | Cell2 | The UE camps on cell 2 in the initial phase, it fulfills Not-at-cell edge relaxation measurements criterion, and during T1 period the UE reselects to cell 1 |
| Neighbour cells |  | 1 | Cell1 |
| T1 end condition | Active cell |  | 1 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
| Neighbour cells |  | 1 | Cell2 |
| T2 end condition | Active cell |  | 1 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T2 |
| Neighbour cells |  | 1 | Cell1 |
| RF Channel Number | |  | 1 | 1, 2 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| SSB Configuration | |  | 1 | SSB.1 FR1 |  |
| SMTCconfiguration | |  | 1 | SMTC pattern 2 | Configured in SIB4 of Cell 1 |
| SMTC pattern 6 | Configured in SIB4 of Cell 2 |
| DRX cycle length | | s | 1 | 0.64 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | 20 s | T1 is defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1 | 20 s | T2 is defined so that cell re-selection reaction time is taken into account. |

Table A.14.1.10.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case in AWGN for UE fulfilling not-at-cell edge criterion

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | |
| T1 | T2 | T1 | | T2 |
| Satellite information |  | 1 | SSC.1 for GSO test  SSC.2 for NGSO test | | NSC.1 for GSO test  NSC.2 for NGSO test | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | SR.1.1 FDD | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | CCR.1.1 FDD | | |
| OCNG Pattern |  | 1 | OP.1 defined in A.3.2.1 | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1 | DLBWP.0.1 | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1 | ULBWP.0.1 | | ULBWP.0.1 | | |
| RLM-RS |  | 1 | SSB | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -140 | | -140 | | |
| Pcompensation | dB | 1 | 0 | | 0 | | |
| Qhysts | dB | 1 | 0 | | 0 | | |
| Qoffsets, n | dB | 1 | 0 | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1 | SS-RSRP | | SS-RSRP | | |
|  | dB | 1 | 14 | 14 | -4 | 12 | |
| Note2 | dBm/SCS | 1 | -98 | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | |
|  | dB | 1 | 14 | 14 | -4 | | 12 |
| SS-RSRP Note3 | dBm/SCS | 1 | -84 | -84 | -102 | | -86 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -68.60 | | -57.78 |
| Treselection | s | 1 | 0 | 0 | 0 | | 0 |
| SnonintersearchP | dB | 1 | Not sent | | Not sent | | |
| Threshx, highP | dB | 1 | 48 | | 48 | | |
| Threshserving, lowP | dB | 1 | 44 | | 44 | | |
| Threshx, lowP | dB | 1 | 50 | | 50 | | |
| SSearchThresholdP | dB | 1 | 50 | | 50 | | |
| SSearchThresholdQ | s | 1 | Not Configured | | | | |
| Propagation Condition |  | 1 | 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.14.1.10.3 Test Requirements

The cell reselection delay to an already detected lower priority cell for UE fulfilling not-at-cell edge relaxed measurements is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 1, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Tracking Area Update procedure on cell 1.

The cell re-selection delay to an already detected lower priority cell for UE fulfilling not-at-cell edge relaxed measurements shall be less than 17s.

The cell reselection delay to an already detected higher priority cell for UE fulfilling not-at-cell-edge relaxed measurements is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the RRCSetupRequest message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to an already detected higher priority cell for UE fulfilling not-at-cell-edge relaxed measurements shall be less than 17s.

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

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2.2.10.3-1 in clause 4.2.2.10

TSI-NR Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell; 1280 ms is assumed in this test case.

This gives a total of 16.64s, allow 17s for the cell re-selection delay to an already detected lower priority cell and 16.64s for the cell re-selection delay to an already higher priority cell, which we allow 17s for UE fulfilling not-at-cell edge relaxed measurements in the test case.

## A.14.2 RRC\_CONNECTED state mobility

### A.14.2.1 Handover

#### A.14.2.1.1 Intra-frequency SAN Handover from FR1 to FR1

##### A.14.2.1.1.1 Test Purpose and Environment

This test is to verify the requirement for Intra-frequency SAN Handover from FR1 to FR1 specified in clause 6.1C.1.

##### A.14.2.1.1.2 Test Parameters

The test scenario comprises of 1 NR FDD carrier and 2 cells as given in table A.14.2.1.1.2-1, A.14.2.1.1.2-2, and A.14.2.1.1.2-3. Both handover delay and interruption length are tested.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure intra-frequency neighbour cell with Event A3 report.

Starting T2, cell 2 becomes detectable and offset better than cell 1. The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.14.2.1.1.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.1.2-2: General test parameters Intra-frequency SAN handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| RF Channel Number | |  | 1 | One NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 |  |
| Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellites configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellites configuration |
| UE position (N,S, H) | |  | [(0, 0, 0)] | Set by AT command |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | S | 1 |  |

Table A.14.2.1.1.2-3: Cell specific test parameters for Intra frequency SAN handover test case

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| NR RF Channel Number | | Config 1,2 |  | 1 | | | 1 | | |
| BWchannel | | MHz | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| BWP BW | | MHz | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| TACommon | | Config 1,2 | s | 0 | | | 0 | | |
| TACommonDrift | | s | 0 | | | 0 | | |
| TACommonDriftVariation | | s | 0 | | | 0 | | |
| Koffset | | Config 1 | ms | [239] | | | [239] | | |
|  | | Config 2 | [4] | | | [4] | | |
| Kmac | | Config 1,2 | ms | 0 | | | 0 | | |
| DRx Cycle | | ms | Not Applicable | | | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | | | |
| OCNG Patterns | |  | OP.1 | | | | | |
| SMTC Configuration | |  | SMTC.1 | | | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | | | |
| BWP configuration | Initial DL BWP | Config 1,2 |  | 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 | | Config 1,2 | dB | 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 | | Config 1,2 | dBm/ 15kHz | -98 | | | | | |
| Note2 | | dBm/ SCS | -98 | | | | | |
|  | | dB | 8 | -3.3 | -3.3 | -Infinity | 2.36 | 2.36 |
|  | | dB | 8 | 8 | 8 | -Infinity | 11 | 11 |
| SSB\_RP | | dBm/ SCS | -90 | -90 | -90 | -Infinity | -87 | -87 |
| IoNote3 | | dBm/ 9.36MHz | -61.41 | -57.06 | -57.06 | -61.41 | -57.06 | -57.06 |
| 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. | | | | | | | | | |

##### A.14.2.1.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 72 ms from the beginning of time period T3.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2]. Tinterrupt is defined in clause 6.1C.1.2.2.

Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin ms

Here: Tsearch = 0; TIU = 20ms; Tprocessing = 20ms; T∆ = 20ms; Tmargin = 2ms.

This gives a total of 72 ms.

#### A.14.2.1.2 Inter-frequency SAN Handover from FR1 to FR1

##### A.14.2.1.2.1 Test Purpose and Environment

This test is to verify the requirement for Inter-frequency SAN Handover from FR1 to FR1 specified in clause 6.1C.1.

##### A.14.2.1.2.2 Test Parameters

The test scenario comprises of 2 NR FDD carriers and one cell on each carrier as given in table A.14.2.1.2.2-1, A.14.2.1.2.2-2 and A.14.2.1.2.2-3. Both handover delay and interruption length are tested.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure inter frequency meighboure cell with Event A3 report and a gap patterns are configured in the test case.

Starting T2, cell 2 becomes detectable and offset better than cell 1. The RRC message implying handover to cell 2 shall be sent to the UE during period T2, after the UE has reported Event A3. The start of T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.14.2.1.2.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.2.2-2: General test parameters Inter-frequency SAN handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| RF Channel Number | |  | 1, 2 | Two NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellite configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellite configuration |
| UE position (N,S, H) | |  | [(0, 0, 0)] | Set by AT command |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

Table A.14.2.1.2.2-3: Cell specific test parameters for Inter frequency SAN handover test case

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| NR RF Channel Number | | Config 1,2 |  | 1 | | | 2 | | |
| BWchannel | | MHz | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| BWP BW | | MHz | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| TACommon | | Config 1,2 | s | 0 | | | 0 | | |
| TACommonDrift | | s | 0 | | | 0 | | |
| TACommonDriftVariation | | s | 0 | | | 0 | | |
| Koffset | | Config 1 | ms | [239] | | | [239] | | |
|  | | Config 2 | [4] | | | [4] | | |
| Kmac | | Config 1,2 | ms | 0 | | | 0 | | |
| DRx Cycle | | ms | Not Applicable | | | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | | | |
| OCNG Patterns | |  | OP.1 | | | | | |
| SMTC Configuration | |  | SMTC.1 | | | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | | | |
| BWP configuration | Initial DL BWP | Config 1,2 |  | 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 | | Config 1,2 | dB | 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 | | Config 1,2 | dBm/ 15kHz | -98 | | | | | |
| Note2 | | dBm/ SCS | -98 | | | | | |
|  | | dB | 4 | 4 | 4 | -Infinity | 9 | 9 |
|  | | dB | 4 | 4 | 4 | -Infinity | 9 | 9 |
| SSB\_RP | | dBm/ SCS | -94 | -94 | -94 | -Infinity | -89 | -89 |
| IoNote3 | | dBm/ 9.36MHz | -64.59 | -64.59 | -64.59 | -70.05 | -60.53 | -60.53 |
| 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. | | | | | | | | | |

##### A.14.2.1.2.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 72 ms from the beginning of time period T3.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2]. Tinterrupt is defined in clause 6.1C.1.2.2.

Tinterrupt = Tsearch + TIU + Tprocessing + T∆ + Tmargin ms

Here: Tsearch = 0; TIU = 20ms; Tprocessing = 20ms; T∆ = 20ms; Tmargin = 2ms.

This gives a total of 72 ms.

#### A.14.2.1.3 Intra-frequency SAN time-based conditional Handover from FR1 to FR1

##### A.14.2.1.3.1 Test Purpose and Environment

This test is to verify the requirement for intra-frequency SAN time-based conditional handover from FR1 to FR1 specified in clause 6.1C.2.

##### A.14.2.1.3.2 Test Parameters

The test scenario comprises of 1 NR FDD carrier and 2 cells as given in table A.14.2.1.3.2-1, and A.14.2.1.3.2-2. Both handover delay and interruption length are tested.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying time-based handover to cell 2 with Event CondEvent T1 shall be sent to UE, at a time earlier than TRRC (10ms) before the beginning of T2.

Starting T2, cell 2 becomes detectable and offset better than cell 1 and time condition event t1-Threshold-r17 is fulfilled.

Table A.14.2.1.3.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.3.2-2: General test parameters for Intra-frequency SAN time-based conditional handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| RF Channel Number | |  | 1 | One NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 | FDD duplex mode cell |
|  | Neighbouring cell |  | Cell 2 | FDD duplex mode cell |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellite configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellite configuration |
| UE position (N,S, H) | |  | [(0, 0, 0)] | Set by AT command |
| t1-Threshold-r17.condEventT1-r17 | | s | T2 | Entering condition |
| duration-r17.condEventT1-r17 | | slot | 1000 | Give 1s search duration |
| A3-Offset in condition | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤ 2 |  |

Table A.14.2.1.3.2-3: Cell specific test parameters for Intra-frequency SAN time-based conditional handover from FR1 to FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | Config 1,2 |  | 1 | | 1 | |
| BWchannel | |  | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| BWP BW | |  | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| TACommon | | Config 1,2 | s | 0 | | 0 | |
| TACommonDrift | |  | s | 0 | | 0 | |
| TACommonDriftVariation | |  | s | 0 | | 0 | |
| Koffset | | Config 1 | ms | [239] | | [239] | |
|  | | Config 2 | ms | [4] | | [4] | |
| Kmac | | Config 1,2 | ms | 0 | | 0 | |
| DRX Cycle | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | |
| OCNG Patterns | |  | OP.1 | | | |
| SMTC Configuration | |  | SMTC.1 | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | |
| BWP configuration | Initial DL BWP | Config 1,2 |  | 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 | | Config 1,2 | dB | 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 | | Config 1,2 | dBm/ 15kHz | -98 | | | |
| Note2 | | dBm/ SCS | -98 | | | |
|  | | dB | 8 | -3.3 | -Infinity | 2.36 |
|  | | dB | 8 | 8 | -Infinity | 11 |
| SSB\_RP | | dBm/ SCS | -90 | -90 | -Infinity | -87 |
| IoNote3 | | dBm/ 9.36MHz | -61.41 | -57.06 | -61.41 | -57.06 |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | |

##### A.14.2.1.3.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 872 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 6.1C.2, can be expressed as:

DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

RRC procedure delay TRRC = 10 ms and is specified in clause 12 in TS 38.331 [2].

TEvent\_DU = start of T2

Tmeasure = 600 + 200 ms; Tinterrupt = 62ms; TCHO\_execution = 10ms.

This gives a total of 872 ms.

#### A.14.2.1.4 Inter-frequency SAN time-based conditional Handover from FR1 to FR1

##### A.14.2.1.4.1 Test Purpose and Environment

This test is to verify the requirement for inter -frequency SAN time-based conditional handover from FR1 to FR1 specified in clause 6.1C.2.

##### A.14.2.1.4.2 Test Parameters

The test scenario comprises of 2 NR FDD carrier and one cell on each carrier as given in table A.14.2.1.4.2-1, and A.14.2.1.4.2-2. Both handover delay and interruption length are tested.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure inter-frequency neighbour cell and Gap pattern ID gp0. The RRC message implying time-based handover to cell 2 with Event CondEvent T1 shall be sent to UE, at a time earlier than TRRC (10ms) before the beginning of T2.

Starting T2, cell 2 becomes detectable and offset better than cell 1 and after 1000ms of T2, time condition event t1-Threshold-r17 is fulfilled.

Table A.14.2.1.4.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.4.2-2: General test parameters for Inter-frequency SAN time-based conditional handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| RF Channel Number | |  | 1, 2 | Two NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 | FDD duplex mode cell |
|  | Neighbouring cell |  | Cell 2 | FDD duplex mode cell |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellite configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellite configuration |
| UE position (N,S, H) | |  | [(0, 0, 0)] | Set by AT command |
| t1-Threshold-r17.condEventT1-r17 | | s | T2 | Entering condition |
| duration-r17.condEventT1-r17 | | slot | 1000 | Give 1s search duration |
| A3-Offset in condition | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤ 2 |  |

Table A.14.2.1.4.2-3: Cell specific test parameters for Inter-frequency SAN time-based conditional handover from FR1 to FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | Config 1, 2 |  | 1 | | 2 | |
| BWchannel | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| BWP BW | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| TACommon | | Config 1, 2 | s | 0 | | 0 | |
| TACommonDrift | | s | 0 | | 0 | |
| TACommonDriftVariation | | s | 0 | | 0 | |
| Koffset | | Config 1 | ms | [239] | | [239] | |
|  | | Config 2 | ms | [4] | | [4] | |
| Kmac | | Config 1, 2 | ms | 0 | | 0 | |
| DRX Cycle | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | |
| OCNG Patterns | |  | OP.1 | | | |
| SMTC Configuration | |  | SMTC.1 | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | |
| BWP configuration | Initial DL BWP | Config 1, 2 |  | 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 | | Config 1, 2 | dB | 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 | | Config 1, 2 | dBm/ 15kHz | -98 | | | |
| Note2 | | dBm/ SCS | -98 | | | |
|  | | dB | 4 | 4 | -Infinity | 9 |
|  | | dB | 4 | 4 | -Infinity | 9 |
| SSB\_RP | | dBm/ SCS | -94 | -94 | -Infinity | -89 |
| IoNote3 | | dBm/ 9.36MHz | -64.59 | -64.59 | -70.05 | -60.53 |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | |

##### A.14.2.1.4.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 l later than 1000ms and ess than 1072 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 6.1C.2, can be expressed as:

DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

RRC procedure delay TRRC = 10 ms and is specified in clause 12 in TS 38.331 [2].

TEvent\_DU = start of T2

Tmeasure = max(600 + 200, 1000) ms; Tinterrupt = 62ms; TCHO\_execution = 10ms.

This gives a total of 1072 ms.

#### A.14.2.1.5 Intra-frequency SAN distance-based conditional Handover from FR1 to FR1

##### A.14.2.1.5.1 Test Purpose and Environment

This test is to verify the requirement for intra-frequency SAN distance-based conditional handover from FR1 to FR1 specified in clause 6.1C.2.

##### A.14.2.1.5.2 Test Parameters

The test scenario comprises of 1 NR FDD carrier and 2 cells as given in table A.14.2.1.5.2-1, and A.14.2.1.5.2-2. Both handover delay and interruption length are tested.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure intra-frequency neighbour cell. The RRC message implying distance-based handover to cell 2 with Event D1 shall be sent to UE, at a time earlier than TRRC (10ms) before the beginning of T2.

Starting T2, cell 2 becomes detectable and offset better than cell 1 and location condition event condEventD1-r17 is fulfilled.

Table A.14.2.1.5.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.5.2-2: General test parameters for Intra-frequency SAN distance-based conditional handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| RF Channel Number | |  | 1 | One NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 | FDD duplex mode cell |
|  | Neighbouring cell |  | Cell 2 | FDD duplex mode cell |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellite configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellite configuration |
| UE position (N,S, H) at T1 start | |  | [(0, 0, 0)] | Set by AT command |
| UE moving speed | | km/h | [(108, 0, 0)] | Set by AT command |
| referenceLocation1-r17.condEventD1-r17 | | m | [(-700, 0, 0)] | Reference location for serving cell |
| referenceLocation2-r17.condEventD1-r17 | | m | [(1300, 0, 0)] | Reference location for target cell |
| distanceThreshFromReference1-r17.condEventD1-r17 | | 50m | [20] | D1-1 Location condition is fulfilled at T2 |
| distanceThreshFromReference2-r17.condEventD1-r17 | | 50m | [20] | D1-2 Location condition is fulfilled at T2 |
| hysteresis-r17.condEventD1-r17 | | 10m | 0 |  |
| timeToTrigger-r17.condEventD1-r17 | | s | 0 |  |
| A3-Offset in condition | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 12 |  |
| T2 | | s | ≤ 6 |  |

Table A.14.2.1.5.2-3: Cell specific test parameters for Intra-frequency SAN distance-based conditional handover from FR1 to FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | Config 1, 2 |  | 1 | | 1 | |
| BWchannel | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| BWP BW | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| TACommon | | Config 1, 2 | s | 0 | | 0 | |
| TACommonDrift | | s | 0 | | 0 | |
| TACommonDriftVariation | | s | 0 | | 0 | |
| Koffset | | Config 1 | ms | [239] | | [239] | |
|  | | Config 2 | ms | [4] | | [4] | |
| Kmac | | Config 1, 2 | ms | 0 | | 0 | |
| DRX Cycle | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | |
| OCNG Patterns | |  | OP.1 | | | |
| SMTC Configuration | |  | SMTC.1 | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | |
| BWP configuration | Initial DL BWP | Config 1, 2 |  | 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 | | Config 1, 2 | dB | 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 | | Config 1, 2 | dBm/ 15kHz | -98 | | | |
| Note2 | | dBm/ SCS | -98 | | | |
|  | | dB | 8 | -3.3 | -Infinity | 2.36 |
|  | | dB | 8 | 8 | -Infinity | 11 |
| SSB\_RP | | dBm/ SCS | -90 | -90 | -Infinity | -87 |
| IoNote3 | | dBm/ 9.36MHz | -61.41 | -57.06 | -61.41 | -57.06 |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | |

##### A.14.2.1.5.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 872 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 6.1C.2, can be expressed as:

DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

RRC procedure delay TRRC = 10 ms and is specified in clause 12 in TS 38.331 [2].

TEvent\_DU = start of T2

UE moving speed, v = (108km/h\*1000/3600) = 30m/s.

At start of T2,

distance to source cell reference location is 30 m/s \* 12 s – (-700)m = 1060m, and D1-1 = 1000m

distance to target cell reference location is 30 m/s \* 12 s – 1300m = -940m, and D1-2 = 1000m

i.e. D1-1 and D1-2 conditions are fulfilled at start of T2 with >=50m location margin.

Tmeasure = max(600 + 200 ms, 0) = 800 ms;

Tinterrupt = 62ms; TCHO\_execution = 10ms.

This gives a total of 800ms + 62ms + 10ms = 872 ms.

#### A.14.2.1.6 Inter-frequency SAN distance-based conditional Handover from FR1 to FR1

##### A.14.2.1.6.1 Test Purpose and Environment

This test is to verify the requirement for inter -frequency SAN distance-based conditional handover from FR1 to FR1 specified in clause 6.1C.2.

##### A.14.2.1.6.2 Test Parameters

The test scenario comprises of 2 NR FDD carrier and one cell on each carrier as given in table A.14.2.1.6.2-1, and A.14.2.1.6.2-2. Both handover delay and interruption length are tested.

The test consists of two successive time periods, with time durations of T1 and T2 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2. During T1, the UE is configured to measure inter-frequency neighbour cell and Gap pattern ID gp0. The RRC message implying distance-based handover to cell 2 with Event D1 shall be sent to UE, at a time earlier than TRRC (10ms) before the beginning of T2.

Starting T2, cell 2 becomes detectable and offset better than cell 1 and after 11670ms of T2, location condition event condEventD1-r17 is fulfilled.

Table A.14.2.1.6.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| 2 | NGSO, NR FDD, 15kHz SSB SCS, 10 MHz BW |
| Note: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases. | |

Table A.14.2.1.6.2-2: General test parameters for Inter -frequency SAN distance-based conditional handover from FR1 to FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| RF Channel Number | |  | 1, 2 | Two NR NTN satellite RF channel |
| Initial conditions | Active cell |  | Cell 1 | FDD duplex mode cell |
|  | Neighbouring cell |  | Cell 2 | FDD duplex mode cell |
| Final condition | Active cell |  | Cell 2 |  |
| Satellite configuration | Config 1 |  | RMC in [A.x] | For GSO satellite configuration |
| Config 2 |  | RMC in [A.x] | For NGSO satellite configuration |
| UE position (N,S, H) at T2 start | |  | [(0, 0, 0)] | Set by AT command |
| UE moving speed | | km/h | [(108, 0, 0)] | Set by AT command |
| referenceLocation1-r17.condEventD1-r17 | | m | [(-700, 0, 0)] | Reference location for serving cell |
| referenceLocation2-r17.condEventD1-r17 | | m | [(1300, 0, 0)] | Reference location for target cell |
| distanceThreshFromReference1-r17.condEventD1-r17 | | 50m | [20] | D1-1 Location condition is fulfilled at T2 |
| distanceThreshFromReference2-r17.condEventD1-r17 | | 50m | [20] | D1-2 Location condition is fulfilled at T2 |
| hysteresis-r17.condEventD1-r17 | | 10m | 0 |  |
| timeToTrigger-r17.condEventD1-r17 | | s | 0 |  |
| A3-Offset in condition | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 1 |  |
| T2 | | s | 12 |  |

Table A.14.2.1.6.2-3: Cell specific test parameters for Inter-frequency SAN distance-based conditional handover from FR1 to FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Test configuration | Unit | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | Config 1, 2 |  | 1 | | 2 | |
| BWchannel | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| BWP BW | | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| TACommon | | Config 1, 2 | s | 0 | | 0 | |
| TACommonDrift | | s | 0 | | 0 | |
| TACommonDriftVariation | | s | 0 | | 0 | |
| Koffset | | Config 1 | ms | [239] | | [239] | |
|  | | Config 2 | ms | [4] | | [4] | |
| Kmac | | Config 1, 2 | ms | 0 | | 0 | |
| DRX Cycle | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | |  | SR.1.1 FDD | | | |
| CORESET Reference Channel | |  | CR.1.1 FDD | | | |
| TRS configuration | |  | TRS.1.1 FDD | | | |
| OCNG Patterns | |  | OP.1 | | | |
| SMTC Configuration | |  | SMTC.1 | | | |
| SSB Configuration | |  | SSB.1 FR1 | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 15 kHz | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 15 kHz | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | |
| BWP configuration | Initial DL BWP | Config 1, 2 |  | 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 | | Config 1, 2 | dB | 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 | | Config 1, 2 | dBm/ 15kHz | -98 | | | |
| Note2 | | dBm/ SCS | -98 | | | |
|  | | dB | 4 | 4 | -Infinity | 9 |
|  | | dB | 4 | 4 | -Infinity | 9 |
| SSB\_RP | | dBm/ SCS | -94 | -94 | -Infinity | -89 |
| IoNote3 | | dBm/ 9.36MHz | -64.59 | -64.59 | -70.05 | -60.53 |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | |

##### A.14.2.1.6.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 later than 11670ms and less than 11741 ms from the beginning of time period T2.

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

NOTE: The handover delay is defined in clause 6.1C.2, can be expressed as:

DCHO = TRRC + TEvent\_DU + Tmeasure + Tinterrupt + TCHO\_execution

where:

RRC procedure delay TRRC = 10 ms and is specified in clause 12 in TS 38.331 [2].

TEvent\_DU = start of T2

UE moving speed, v = (108km/h\*1000/3600) = 30m/s.

At 1667ms after start of T2,

distance to source cell reference location is 30 m/s \* 11.67 s – (-700)m = 1050m, and D1-1 = 1000m

distance to target cell reference location is 30 m/s \* 11.67 s – 1300m = -950m, and D1-2 = 1000m

i.e. D1-1 and D1-2 conditions are fulfilled at T2 + 11670ms with >=50m location margin.

Tmeasure = max(600 + 200 ms, 11670ms) = 11670ms;

Tinterrupt = 62ms; TCHO\_execution = 10ms.

This gives a total of 11670ms + 62ms + 10ms = 11741 ms.

### A.14.2.2 RRC Connection Mobility Control

#### A.14.2.2.1 SA: RRC Re-establishment for SAN

##### A.14.2.2.1.1 Intra-frequency RRC Re-establishment in FR1

A.14.2.2.1.1.1 Test Purpose and Environment

The purpose is to verify that the NR intra-frequency RRC re-establishment delay in FR1 with known target cell is within the specified limits. These tests will verify the requirements in clause 6.2C.1.

The test parameters are given in table A.14.2.2.1.1.1-1, table A.14.2.2.1.1.1-2 and table A.14.2.2.1.1.1-3 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.2.2.1.1.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.2.2.1.1.1-2: General test parameters for NR intra-frequency RRC Re-establishment test case in FR1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell1 |  |
|  | Neighbour cells |  | 1, 2 | Cell2 |  |
| Final condition | Active cell |  | 1, 2 | Cell2 |  |
| RF Channel Number | |  | 1, 2 | 1 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
| N310 | | - | 1, 2 | 1 | Maximum consecutive out-of-sync indications from lower layers |
| N311 | | - | 1, 2 | 1 | Minimum consecutive in-sync indications from lower layers |
| T310 | | ms | 1, 2 | 0 | Radio link failure timer; |
| T311 | | ms | 1, 2 | 3000 | RRC re-establishment timer |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SMTC configuration | |  | 1, 2 | SMTC.2 |  |
| DRX cycle length | | s | 1, 2 | OFF |  |
| PRACH configuration | |  | 1, 2 | FR1 PRACH configuration 1 | Table A.3.8.2.1-1 |
| T1 | | s | 1, 2 | 5 |  |
| T2 | | ms | 1, 2 | 640 | Time for the UE to detect RLF  (Summation of TEvaluate\_out\_SSB defined in clause 8.1C in TS 38.133, T310 and the period for UE turns off transmitter defined in clause 8.1C.5 in TS 38.133 ) |
| T3 | | s | 1, 2 | 2 |  |

Table A.14.2.2.1.1.1-3: Cell specific test parameters for NR intra-frequency RRC Re-establishment test case in FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | | Cell 2 | | | | |
|  |  |  | T1 | | T2 | | T3 | T1 | T2 | | | T3 |
| Satellite information |  | 1 | SSC.1 | | | | | NSC.1 | | | | |
|  |  | 2 | SSC.2 | | | | | NSC.2 | | | | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | | | | SR.1.1 FDD | | | | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | | | | CR.1.1 FDD | | | | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | | | | CCR.1.1 FDD | | | | |
| OCNG Pattern |  | 1, 2 | OP.1 defined in A.3.2.1 | | | | | OP.1 defined in A.3.2.1 | | | | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | | | | TRS.1.1 FDD | | | | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0.1 | | | | | DLBWP.0.1 | | | | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0.1 | | | | | ULBWP.0.1 | | | | |
| Active DL BWP confgiuration |  | 1, 2 | DLBWP.1.1 | N/A | | N/A | | N/A | | N/A | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | N/A | | N/A | | N/A | | N/A | ULBWP.1.1 | |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | | | | SSB.1 FR1 | | | | |
| RLM-RS |  | 1, 2 | SSB | | | | | SSB | | | | |
|  | dB | 1, 2 | 1.54 | | -infinity | | -infinity | -3.79 | 4 | | | 4 |
| Note2 | dBm/SCS | 1, 2 | -98 | | | | | | | | | |
| Note2 | dBm/15 kHz | 1, 2 | -98 | | | | | | | | | |
|  | dB | 1, 2 | 7 | | -infinity | | -infinity | 4 | 4 | | | 4 |
| SS-RSRP Note3 | dBm/SCS | 1, 2 | -91 | | -infinity | | -infinity | -94 | -94 | | | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -60.74 | | -64.59 | | -64.59 | -60.74 | -64.59 | | | -64.59 |
| Propagation Condition |  | 1, 2 | 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.14.2.2.1.1.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known NR intra frequency cell shall be less than 1.6 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Tre-establish\_delay= TUL\_grant + TUE\_re-establish\_delay.

Where:

TUL\_grant = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence TUL\_grant is not used.

Nfreq = 1

Tidentify\_intra\_NR = 200 ms

TSI = 1280 ms, provided that SIB1 and SIB19 are scheduled with 20ms period; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target intra-frequency NR cell.

TPRACH = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of [1545] ms, allow [1.6] s in the test case.

##### A.14.2.2.1.2 Inter-frequency RRC Re-establishment in FR1

A.14.2.2.1.2.1 Test Purpose and Environment

The purpose is to verify that the NR inter-frequency RRC re-establishment delay in FR1 without known target cell is within the specified limits. These tests will verify the requirements in clause 6.2C.1.

The test parameters are given in table A.14.2.2.1.2.1-1, table A.14.2.2.1.2.1-2 and table A.14.2.2.1.2.1-3 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, becomes inactive. The time period T3 starts after the occurrence of the radio link failure. During T1, the UE shall be configured with the carrier frequency of cell 2 (with RF Channel Number #2) to ensure that the UE has the context of the carrier frequency of cell 2 by the end of T1.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.2.2.1.2.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.2.2.1.2.1-2: General test parameters for NR inter-frequency RRC Re-establishment test case in FR1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell1 |  |
|  | Neighbour cells |  | 1, 2 | Cell2 |  |
| Final condition | Active cell |  | 1, 2 | Cell2 |  |
| RF Channel Number | |  | 1, 2 | 1, 2 |  |
| Time offset between cells | |  | 1, 2 | 3 ms | Asynchronous cells |
| N310 | | - | 1, 2 | 1 | Maximum consecutive out-of-sync indications from lower layers |
| N311 | | - | 1, 2 | 1 | Minimum consecutive in-sync indications from lower layers |
| T310 | | ms | 1, 2 | 0 | Radio link failure timer; |
| T311 | | ms | 1, 2 | 5000 | RRC re-establishment timer |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SMTC configuration | |  | 1, 2 | SMTC.2 |  |
| DRX cycle length | | s | 1, 2 | OFF |  |
| PRACH configuration | |  | 1, 2 | FR1 PRACH configuration 1 | Table A.3.8.2.1-1 |
| T1 | | s | 1, 2 | 5 |  |
| T2 | | ms | 1, 2 | 640 | Time for the UE to detect RLF  (Summation of TEvaluate\_out\_SSB defined in clause 8.1C in TS 38.133, T310 and the period for UE turns off transmitter defined in clause 8.1C.5 in TS 38.133 ) |
| T3 | | s | 1, 2 | 5 |  |

Table A.14.2.2.1.2.1-3: Cell specific test parameters for NR inter-frequency RRC Re-establishment test case in FR1

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | Cell 2 | | | | |
|  |  |  | T1 | | T2 | T3 | T1 | T2 | | | T3 |
| Satellite information |  | 1 | SSC.1 | | | | NSC.1 | | | | |
|  |  | 2 | SSC.2 | | | | NSC.2 | | | | |
| RF Channel Number |  | 1, 2 | 1 | | | | 2 | | | | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | | | SR.1.1 FDD | | | | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | | | CR.1.1 FDD | | | | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | | | CCR.1.1 FDD | | | | |
| OCNG Pattern |  | 1, 2 | OP.1 defined in A.3.2.1 | | | | OP.1 defined in A.3.2.1 | | | | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | | | TRS.1.1 FDD | | | | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0.1 | | | | DLBWP.0.1 | | | | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0.1 | | | | ULBWP.0.1 | | | | |
| Active DL BWP confgiuration |  | 1, 2 | DLBWP.1.1 | N/A | | N/A | N/A | | N/A | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | N/A | | N/A | N/A | | N/A | ULBWP.1.1 | |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | | | SSB.1 FR1 | | | | |
| RLM-RS |  | 1, 2 | SSB | | | | SSB | | | | |
|  | dB | 1, 2 | 4 | | -infinity | -infinity | -infinity | -infinity | | | 7 |
| Note2 | dBm/SCS | 1, 2 | -98 | | | | | | | | |
| Note2 | dBm/15 kHz | 1, 2 | -98 | | | | | | | | |
|  | dB | 1, 2 | 4 | | -infinity | -infinity | -infinity | -infinity | | | 7 |
| SS-RSRP Note3 | dBm/SCS | 1, 2 | -94 | | -infinity | -infinity | -infinity | -infinity | | | -91 |
| Io | dBm/9.36 MHz | 1, 2 | -64.59 | | -70. 05 | -70. 05 | -70. 05 | -70. 05 | | | -62.26 |
| Propagation Condition |  | 1, 2 | 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.14.2.2.1.2.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown NR inter frequency cell shall be less than 3 s.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Tre-establish\_delay= TUL\_grant + TUE\_re-establish\_delay.

Where:

TUL\_grant = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence TUL\_grant is not used.

Nfreq = 2

Tidentify\_intra\_NR = 800 ms

Tidentify\_inter\_NR = 800 ms

TSI = 1280 ms, provided that SIB1 and SIB19 are scheduled with 20ms period; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target inter-frequency NR cell.

TPRACH = 15 ms; it is the additional delay caused by the random access procedure.

This gives a total of [2945] ms, allow [3] s in the test case.

#### A.14.2.2.2 Random Access

##### A.14.2.2.2.1 4-step RA type contention based random access test in FR1 for NR standalone

###### A.14.2.2.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2C.2.2 and Clause 7.1C.2 in an AWGN model.

For this test one cell is used and configured as PCell in FR1. Supported test parameters are shown in Table A.14.2.2.2.1.1-1. UE capable of SA with PCell in FR1 needs to be tested by using the parameters in Table A.14.2.2.2.1.1-2.

Table A.14.3.2.2.1.1-1: Supported test configurations for contention based random access test for satellite access

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.2.2.2.1.1-2: General test parameters for contention based random access test for satellite access

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test-1 | Comments |
| SSB Configuration | | Config 1 |  | SSB pattern 1 in FR1 | As defined in A.3.10, except for number of SSBs per SS-burst and SS/PBCH block index as below |
|  | | Config 2 |  | SSB pattern 2 in FR1 |  |
| Number of SSBs per SS-burst | | |  | 2 | Different from the definition in A.3.10 |
| SS/PBCH block index | | |  | 0,1 | Different from the definition in A.3.10 |
| Duplex Mode for Cell 1 | | Config 1 |  | FDD |  |
|  | | Config 2 |  | FDD |  |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.1.1 FDD |  |
| OCNG Pattern Note 1 | | |  | OP.1 | As defined in A.3.2.1. |
| PDSCH parameters Note 4 | | Config 1, 2 |  | SR.1.1 FDD | As defined in A.3.1.1. |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 FDD |  |
| Dedicated CORESET Reference Channel | | Config 1, 2 |  | CCR.1.1 FDD |  |
| NR RF Channel Number | | |  | 1 |  |
| EPRE ratio of PSS to SSS | | | dB | 0 |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | dB |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | dB |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | dB |  |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | dB |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | dB |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | dB |  |  |
| SSB with index 0 |  | | dB | 3 | Power of SSB with index 0 is set to be above configured *rsrp-ThresholdSSB* |
|  |  | Config 1, 2 | dBm/15kHz | -98 |  |
|  |  | | dB | 3 |  |
|  | SS-RSRP Note 3 | | dBm/ SCS | -95 |  |
| SSB with index 1 |  | | dB | -17 | Power of SSB with index 1 is set to be below configured *rsrp-ThresholdSSB* |
|  |  | Config 1, 2 | dBm/15kHz | -98 |  |
|  |  | | dB | -17 |  |
|  | SS-RSRP Note 3 | | dBm/ SCS | -115 |  |
| Io Note 2 | | Config 1, 2 | dBm | -65.3/9.36MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | dBm/ SCS | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power () | | | dBm | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| PRACH Configuration | | |  | FR1 PRACH configuration 1 | As defined in A.3.8. |
| Propagation Condition | | | - | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: Void  Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required. | | | | | |

###### A.14.2.2.2.1.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.14.2.2.2.1.2.1 Random Access Preamble Transmission

To test the UE behavior specified in Clause 6.2C.2.2.1.1 the System Simulator shall receive the Random Access Preamble which belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured *rsrp-ThresholdSSB*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.1.2.2 Random Access Response Reception

To test the UE behavior specified in Clause 6.2C.2.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.1.2.3 No Random Access Response Reception

To test the UE behavior specified in clause 6.2C.2.2.1.3 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.1.2.4 Receiving an UL grant for msg3 retransmission

To test the UE behavior specified in clause 6.2C.2.2.1.4 the System Simulator shall provide an UL grant for msg3 retransmission following a successful Random Access Response.

The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

A.14.2.2.2.1.2.5 Reception of an Incorrect Message over Temporary C-RNTI

To test the UE behavior specified in Clause 6.2C.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element *not* matching the CCCH SDU transmitted in msg3 uplink message.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires unless the received message includes a UE Contention Resolution Identity MAC control element and the UE Contention Resolution Identity included in the MAC control element matches the CCCH SDU transmitted in the uplink message.

A.14.2.2.2.1.2.6 Reception of a Correct Message over Temporary C-RNTI

To test the UE behavior specified in Clause 6.2C.2.2.1.5 the System Simulator shall send a message addressed to the temporary C-RNTI with a UE Contention Resolution Identity included in the MAC control element matching the CCCH SDU transmitted in the msg3 uplink message.

The UE shall send ACK if the Contention Resolution is successful.

A.14.2.2.2.1.2.7 Contention Resolution Timer expiry

To test the UE behavior specified in Clause 6.2C.2.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

##### A.14.2.2.2.2 4-step RA type non-contention based random access test in FR1 for NR standalone

###### A.14.2.2.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits. This test will verify the requirements in Clause 6.2C.2.2 and Clause 7.1C.2 in an AWGN model.

For this test one cell is used and configured as PCell in FR1. Supported test parameters are shown in Table A.14.2.2.2.2.1-1. UE capable of SA with PCell in FR1 needs to be tested by using the parameters in Table A.14.2.2.2.2.1-2 for SSB-based non-contention based random access test (Test 1) and CSI-RS-based non-contention based random access test (Test 2). Test 2 is only applicable to UE which supports csi-RSRP-AndRSRQ-MeasWithSSB or csi-RSRP-AndRSRQ-MeasWithoutSSB.

Table A.14.2.2.2.2.1-1: Supported test configurations for non-contention based random access test for satellite access

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

**Table A.14.2.2.2.2.1-2: General test parameters for non-contention based random access test satellite access**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test-1 | Test-2 | Comments |
| SSB Configuration | | Config 1 |  | SSB pattern 1 in FR1 | SSB pattern 1 in FR1 | As defined in A.3.10, except for number of SSBs per SS-burst and SS/PBCH block index as below |
|  | | Config 2 |  | SSB pattern 2 in FR1 | SSB pattern 2 in FR1 |
| Number of SSBs per SS-burst | | |  | 2 | 2 | Different from the definition in A.3.10 |
| SS/PBCH block index | | |  | 0,1 | 0,1 | Different from the definition in A.3.10 |
| CSI-RS Configuration | | Config 1, 2 |  | N/A | CSI-RS.1.1 FDD | As defined in A.3.1.4 |
| Duplex Mode for Cell 1 | | Config 1, 2 |  | FDD | FDD |  |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.1.1 FDD | TRS.1.1 FDD |  |
| OCNG Pattern Note 1 | | |  | OP.1 | OP.1 | As defined in A.3.2.1. |
| PDSCH parameters Note 4 | | Config 1, 2 |  | SR.1.1 FDD | SR.1.1 FDD | As defined in A.3.1.1. |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 FDD | CR.1.1 FDD |  |
| Dedicated CORESET Reference Channel | | Config 1, 2 |  | CCR.1.1 FDD | CCR.1.1 FDD |  |
| NR RF Channel Number | | |  | 1 | 1 |  |
| EPRE ratio of PSS to SSS | | | dB | 0 | 0 |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | dB |  |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | dB |  |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | dB |  |  |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | dB |  |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | dB |  |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | dB |  |  |  |
| SSB with index 0 |  | | dB | 3 | 3 | Power of SSB with index 0 is set to be above configured *rsrp-ThresholdSSB* |
|  |  | Config 1, 2 | dBm/15kHz | -98 | -98 |  |
|  |  | | dB | 3 | 3 |  |
|  | SS-RSRP Note 3 | | dBm/ SCS | -95 | -95 |  |
| SSB with index 1 |  | | dB | -17 | -17 | Power of SSB with index 1 is set to be below configured *rsrp-ThresholdSSB* |
|  |  | Config 1, 2 | dBm/15kHz | -98 | -98 |  |
|  |  | | dB | -17 | -17 |  |
|  | SS-RSRP Note 3 | | dBm/ SCS | -115 | -115 |  |
| Io Note 2 | | Config 1, 2 | dBm | -65.3/9.36MHz | -65.3/9.36MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | dBm/ SCS | -5 | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power () | | | dBm | 23 | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| PRACH Configuration | | |  | FR1 PRACH configuration 2 | FR1 PRACH configuration 3 | As defined in A.3.8.2. |
| Propagation Condition | | | - | AWGN | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: Void  Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required. | | | | | | |

###### A.14.2.2.2.2.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink. In the test, the non-contention based random access procedure is not initialized for Other SI requested from UE or beam failure recovery.

A.14.2.2.2.2.2.1 SSB-based Random Access Preamble Transmission

In Test-1, to test the UE behavior specified in Clause 6.2C.2.2.2.1 for SSB-based Random Access Preamble tranmsision, with the contention-free Random Access Resources and the contention-free PRACH occasions associated with SSBs configured, the System Simulator shall receive the Random Access Preamble which has the Preamble Index associated with the SSB with index 0.

In addition, the System Simulator shall receive the Random Access Preamble on the PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0, and the selected PRACH occasion shall belongs to the PRACH occassions permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.2.2.2 CSI-RS-based Random Access Preamble Transmission

In Test-2, to test the UE behavior specified in Clause 6.2C.2.2.2.1 for CSI-RS-based Random Access Preamble tranmsision, with the contention-free Random Access Resources and the contention-free PRACH occasions associated with CSI-RSs configured, the System Simulator shall receive the Random Access Preamble which has the Preamble Index associated with the CSI-RS configured.

In addition, the System Simulator shall receive the Random Access Preamble on the PRACH occasion which belongs to the PRACH occasions corresponding to the CSI-RS configured, and the selected PRACH occasion shall belongs to the PRACH occassions permitted by the restrictions given by the *ra-OccasionList*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.2.2.3 Random Access Response Reception

To test the UE behavior specified in Clause 6.2C.2.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

A.14.2.2.2.2.2.4 No Random Access Response Reception

To test the UE behavior specified in clause 6.2C.2.2.2.3 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS 38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window configured in *RACH-ConfigCommon*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2C.2.2. The power of the first preamble shall be 22 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1C.2.

#### A.14.2.2.3 RRC Connection Release with Redirection

##### A.14.2.2.3.1 Redirection from NR in FR1 to NR in FR1

###### A.14.2.2.3.1.1 Test Purpose and Environment

This test is to verify RRC connection release with redirection from NR to NR requirements specified in clause 6.2C.3.2.1.

###### A.14.2.2.3.1.2 Test Parameters

Supported test configurations are shown in table A.14.2.2.3.1.2-1. The time delay is tested by using the parameters in table A.14.2.2.3.1.2-2, and A.14.2.2.3.1.2-3.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. The *RRCRelease* message shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2. Cell 1 and Cell 2 belong to different tracking areas.

Table A.14.2.2.3.1.2-1: Redirection from NR to NR test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.2.2.3.1.2-2: General test parameters for Redirection from NR to NR test case

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | 2.3 |  |

Table A.14.2.2.3.1.2-3: Cell specific test parameters for Redirection from NR to NR test case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | | | Cell 2 | | |
|  | | |  | T1 | | T2 | | T1 | | T2 |
| NR RF Channel Number | | |  | 1 | | | | 2 | | |
| Duplex mode | | Config 1, 2 |  | FDD | | | | | | |
| SSB Configuration | | Config 1, 2 |  | SSB.1 FR1 | | | | | | |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.1.1 FDD | | | | | | |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 | | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | | |
| BWP BW | | Config 1 | MHz | 10: NRB,c = 52 | | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | | |
| DRx Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference measurement channel | | Config 1, 2 |  | SR.1.1 FDD | | | | | | |
| CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 FDD | | | | | | |
| OCNG Patterns | | |  | OCNG pattern 1 | | | | | | |
| SMTC configuration | | Config 1,2 |  | SMTC.1 FR1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 | | | | | | |
| BWP configuration | | 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 | | | | | | |
| 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 | | | | | | |
| Note2 | Config 1,2 | | dBm/SCS | -98 | | | | | | |
|  | Config 3 | |  | -95 | | | | | | |
|  | | | dB | 4 | 4 | | -infinity | | 4 | |
|  | | | dB | 4 | 4 | | -infinity | | 4 | |
| IoNote3 | Config 1,2 | | dBm/  9.36MHz | -64.59 | -64.59 | | -70.05 | | -64.59 | |
|  | Config 3 | | dBm/  38.16MHz | -58.49 | -58.49 | | -63.94 | | -58.49 | |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | | | | |

###### A.14.2.2.3.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 2240 ms from the beginning of time period T2.

The rate of correct RRC connection release redirection to NR observed during repeated tests shall be at least 90%.

NOTE: The redirection delay can be expressed as:

Tconnection\_release\_redirect\_NR = TRRC\_procedure\_delay + Tidentify-NR + TSI-NR + TRACH,

Where:

TRRC\_procedure\_delay = 110 ms in the test.

Tidentify-NR = 680 ms in the test.

TSI-NR = 1280 ms, it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target NR cell.

TRACH = 170 ms in the test.

This gives a total of 2240 ms.

## A.14.3 Timing for Satellite Access

### A.14.3.1 UE transmit timing for Satellite Access

#### A.14.3.1.1 NR UE Transmit Timing Test for FR1

##### A.14.3.1.1.1 Test Purpose and environment

The purpose of this test is to verify that the UE can follow frame timing change of the reference cell and that the UE initial transmit timing accuracy, maximum amount of timing change in one adjustment, minimum and maximum adjustment rate are within the specified limits. This test will verify the requirements in clause 7.1C.2. Supported test configurations are shown in Table A.14.3.1.1.1-1.

**Table A.14.3.1.1.1-1: Supported test configurations for FR1 PCell**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

The test consists a single NR cell (PCell). Table A.14.3.1.1.1-2 defines the parameters to be configured and strength of the transmitted signals. The transmit timing is verified by the UE transmitting SRS using the configuration defined in Table A.14.3.1.1.1-3. The test system can emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1.

Table A.14.3.1.1.1-2: Cell Specific Test Parameters for UL Transmit Timing test

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Test1 | | Test2 | |
| SSB ARFCN |  | 1,2 | 1 | | 1 | |
| Serving satellite configuration |  | 1 | SSC.1 | | | |
|  | 2 | SSC.2 | | | |
| BWchannel | MHz | 1,2 | 10: NRB,c = 52 | | | |
| Initial BWP Configuration |  | 1,2 | DLBWP.0.1  ULBWP.0.1 | | | |
| Dedicated BWP Configuration |  | 1,2 | DLBWP.1.1  ULBWP.1.1 | | | |
| DRX Cycle | ms | 1,2 | N/A | | | DRX.8Note5 |
| PDSCH Reference measurement channel |  | 1,2 | SR.1.1 FDD | | | |
| RMSI CORESET Reference Channel |  | 1,2 | CR.1.1 FDD | | | |
| Dedicated CORESET Reference Channel |  | 1,2 | CCR.1.1 FDD | | | |
| OCNG Patterns |  | 1,2 | OP.1 | | | |
| SSB configuration |  | 1,2 | SSB.1 FR1 | | | |
| SMTC Configuration |  | 1,2 | SMTC.1 | | | |
| TRS configuration |  | 1,2 | TRS.1.1 FDD | | | |
| EPRE ratio of PSS to SSS | dB | 1,2 | 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/15 kHz | 1,2 | -98 | | -98 | |
| Note2 | dBm/SCS | 1,2 | -98 | | -98 | |
|  |  | 1,2 | 3 | | 3 | |
|  |  | 1,2 | 3 | | 3 | |
| SS-RSRPNote3 | dBm/SCS | 1,2 | -95 | | -95 | |
| IoNote3 | dBm/9.36MHz | 1,2 | -65.2 | | -65.2 | |
| Propagation condition |  | 1,2 | AWGN | | | |
| SRS Config |  | 1,2 | SRSConf.1Note6 | SRSConf.2Note6 | | |
| 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.  Note 5: DRX related parameters are given in Table A.3.3.8-1  Note 6: SRS configs are given in Table A.14.3.1.1.1-3 | | | | | | |

**Table A.14.3.1.1.1-3: SRS Configuration for Timing Accuracy Test**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Field | SRSConf.1 | SRSConf.2 | Comments |
| SRS- | srs-ResourceSetId | 0 | 0 |  |
| ResourceSet | srs-ResourceIdList | 0 | 0 |  |
|  | resourceType | Periodic | Periodic |  |
|  | Usage | Codebook | Codebook |  |
| SRS-Resource | SRS-ResourceId | 0 | 0 |  |
|  | nrofSRS-Ports | Port1 | Port1 |  |
|  | transmissionComb | n2 | n2 |  |
|  | combOffset-n2 | 0 | 0 |  |
|  | cyclicShift-n2 | 0 | 0 |  |
|  | resourceMapping  startPosition | 0 | 0 |  |
|  | resourceMapping  nrofSymbols | n1 | n1 |  |
|  | resourceMapping  repetitionFactor | n1 | n1 |  |
|  | freqDomainPosition | 0 | 0 |  |
|  | freqDomainShift | 0 | 0 |  |
|  | freqHopping  c-SRS | 14 | 14 | Matches NRB,c |
|  | freqHopping  b-SRS | 0 | 0 |  |
|  | freqHopping  b-hop | 0 | 0 |  |
|  | groupOrSequenceHopping | Neither | Neither |  |
|  | resourceType | Periodic | Periodic |  |
|  | periodicityAndOffset-p | sl1, 0 | sl320, 3 | Offset to align with DRX periodicity |
|  | sequenceId | 0 | 0 | Any 10 bit number |

##### A.14.3.1.1.2 Test requirements

The test sequence shall be carried out in RRC\_CONNECTED for every test case.

Following will be the test sequence for this test

1) Set up PCell according to parameters given in Table A.14.3.1.1.1-2.

2) After connection set up with the cell, the test equipment will verify that the timing of the NR cell is within  of the first detected path of DL SSB.

a. The NTA\_offset value (in Tc units) is 25600

b. The value is derived from the higher-layer parameters *TACommon*, *TACommonDrift*, and *TACommonDriftVariation*.

c. The value is computed by the UE based on UE position and serving-satellite-ephemeris-related higher-layers parameters.

d. The values depend on the DL and UL SCS for which the test is being run and are given in Table 7.1C.2-1

e. The value (in Tc units) is [TBD].

3) If the NTN parameters are configured as GSO scenario, the test system shall adjust the timing of the DL path by values given in Table A.14.3.1.1.2-1. If the NTN parameters are configured as NGSO scenario, the test system shall adjust the timing of the DL path according to the serving-satellite-ephemeris-related higher-layers parameters.

Table A.14.3.1.1.2-1: Adjustment Value for DL Timing

|  |  |  |
| --- | --- | --- |
| SCS of SSB signals (kHz) | Adjustment Value | |
|  | Test1 | Test2 |
| 15 | +64\*64Tc | +32\*64Tc |

4) The test system shall verify that the adjustment step size and the adjustment rate shall be according to requirements specified in Clause 7.1C.2 Table 7.1C.2.1-1 until the UE transmit timing offset is within respective to the first detected path (in time) of DL SSB. Skip this step for test 2 with DRX configured.

5) The test system shall verify that the UE transmit timing offset stays within of the first detected path of DL SSB. For Test 2 the UE transmit timing offset shall be verified for the first transmission in the DRX cycle immediately after DL timing adjustment.

### A.14.3.2 Timing advance for satellite access

#### A.14.3.2.1 SA FR1 timing advance adjustment accuracy

##### A.14.3.2.1.1 Test Purpose and Environment

The purpose of the test is to verify UE Timing Advance adjustment delay and accuracy requirement defined in clause 7.3C.

##### A.14.3.2.1.2 Test Parameters

Supported test configurations are shown in table A.14.3.2.1.2-1. Both timing advance adjustment delay and accuracy are tested by using the parameters in table A.14.3.2.1.2-2, A.14.3.2.1.2-3 and A.14.3.2.1.2-4.

In all test cases, single cell served by SAN is used. Each test consists of two successive time periods, with time duration of T1 and T2 respectively. In each time period, timing advance commands are sent to the UE and Sounding Reference Signals (SRS), as specified in table A.14.3.2.1.2-4, are sent from the UE and received by the test equipment. By measuring the reception of the SRS, the transmit timing, and hence the timing advance adjustment accuracy, can be measured.

During the test, the test system shall emulate and send the GNSS signal to the test UE by AT command.

The UE shall be provided with the valid information about the SAN serving cell before the test.During time period T1, the test equipment shall send one message with a Timing Advance Command MAC Control Element, as specified in Clause 6.1.3.4 in TS 38.321 [7]. The Timing Advance Command value shall be set to 31, which according to Clause 4.2 in TS 38.213 [3] results in zero adjustment of the Timing Advance. In this way, a reference value for the timing advance used by the UE is established.

During time period T2, the test equipment shall send a sequence of messages with Timing Advance Command MAC Control Elements, with Timing Advance Command value specified in table A.14.3.2.1.2-2. This value shall result in changes of the timing advance used by the UE, and the accuracy of the change shall then be measured, using the SRS sent from the UE.

As specified in Clause 7.3C.2.1, the UE adjusts its uplink timing at slot n+k*+1+2µ* for a timing advance command received in slot n. This delay must be taken into account when measuring the timing advance adjustment accuracy, via the SRS sent from the UE.

The UE Time Alignment Timer, described in Clause 5.2 in TS 38.321 [7], shall be configured so that it does not expire in the duration of the test.

Table A.14.3.2.1.2-1: Timing advance supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.3.2.1.2-2: General test parameters for timing advance

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF channel number |  | 1 |  |
| Initial DL BWP |  | DLBWP.0.1 | As specified in Table A.3.9.2.1-1 |
| Dedicated DL BWP |  | DLBWP.1.1 | As specified in Table A.3.9.2.2-1 |
| Initial UL BWP |  | ULBWP.0.1 | As specified in Table A.3.9.3.1-1 |
| Dedicated UL BWP |  | ULBWP.1.1 | As specified in Table A.3.9.3.2-1 |
| Timing Advance Command (*TA*) value during T1 |  | 31 | *NTA\_new = NTA\_old* for the purpose of establishing a reference value from which the timing advance adjustment accuracy can be measured during T2 |
| Timing Advance Command (*TA*) value during T2 |  | 39 | For 15 kHz SCS *NTA\_new = NTA\_old + 8192\*Tc*  (based on equation in clause 4.2 of TS 38.213 [3]) |
| T1 | s | 5 |  |
| T2 | s | 5 |  |

Table A.14.3.2.1.2-3: Cell specific test parameters for timing advance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test1 | |
|  | | |  | T1 | T2 |
| Duplex mode | | Config 1,2 |  | FDD | |
| Satellite information | | Config 1 |  | SSC.1 | |
|  | | Config 2 |  | SSC.2 | |
| BWchannel | | Config 1,2 | MHz | 10: NRB,c = 52 | |
| BWP BW | | Config 1,2 | MHz | 10: NRB,c = 52 | |
| DRX Cycle | | | ms | Not Applicable | |
| PDSCH Reference measurement channel | | Config 1,2 |  | SR.1.1 FDD | |
| RMSI CORESET Reference Channel | | Config 1,2 |  | CR.1.1 FDD | |
| Dedicated CORESET Reference Channel | | Config 1,2 |  | CCR.1.1 FDD | |
| TRS configuration | | Config 1,2 |  | TRS.1.1 FDD | |
| OCNG Patterns | | |  | OCNG pattern 1 | |
| SMTC configuration | | Config 1,2 |  | SMTC.1 FR1 | |
| SSB configuration | | Config 1,2 |  | SSB.1 FR1 | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | |
| PUCCH/PUSCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | |
| EPRE ratio of PSS to SSS | | | dB | 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 | |
| Note2 | Config 1,2 | | dBm/SCS | -98 | |
|  | | | dB | 3 | |
|  | | | dB | 3 | |
| IoNote3 | Config 1,2 | | dBm/  9.36MHz | -67.57 | |
| 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | |

Table A.14.3.2.1.2-4: Sounding Reference Symbol Configuration for timing advance

|  |  |  |  |
| --- | --- | --- | --- |
| Field | | Value | Comment |
| c-SRS | Config 1,2 | 12 | Frequency hopping is disabled |
| b-SRS | | 0 |  |
| b-hop | | 0 |
| freqDomainPosition | | 0 | Frequency domain position of SRS |
| freqDomainShift | | 0 |  |
| groupOrSequenceHopping | | neither | No group or sequence hopping |
| SRS-PeriodicityAndOffset | | sl5=2 for SCS 15kHz | Once every 5 slots |
| pathlossReferenceRS | | ssb-Index=0 | SSB #0 is used for SRS path loss estimation |
| usage | | Codebook | Codebook based UL transmission |
| startPosition | | 0 | resourceMapping setting. SRS on last symbol of slot, and 1symbols for SRS without repetition. |
| nrofSymbols | | n1 |  |
| repetitionFactor | | n1 |  |
| combOffset-n2 | | 0 | transmissionComb setting |
| cyclicShift-n2 | | 0 |  |
| nrofSRS-Ports | | port1 | Number of antenna ports used for SRS transmission |
| Note: For further information see clause 6.3.2 in TS 38.331 [2]. | | | |

##### A.14.3.2.1.3 Test Requirements

The UE shall apply the signalled Timing Advance value to the transmission timing at the designated activation time i.e. k*+1+2µ* slots after the reception of the timing advance command, where k=5.

The Timing Advance adjustment accuracy shall be within the limits specified in clause 7.3C.2.2.

The rate of correct Timing Advance adjustments observed during repeated tests shall be at least 90%.

## A.14.4 Signalling characteristics

### A.14.4.1 Radio link Monitoring

#### A.14.4.1.1 Radio Link Monitoring Out-of-sync Test for FR1 SAN PCell configured with SSB-based RLM RS in non-DRX mode

##### A.14.4.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the SAN PCell. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1C.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.14.4.1.1.1-1. The test parameters are given in Tables A.14.4.1.1.1-2, A.14.4.1.1.1-3, and A.14.4.1.1.1-4 below. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.14.4.1.1.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.4.1.1.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.1.1.1-2: General test parameters for FR1 out-of-sync testing in non-DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| NTN reference configuration | | Config 1 |  | TBD |
| Config 2 | TBD |
| BWchannel | | Config 1, 2 | MHz | 10: NRB,c = 52 |
| DL initial BWP configuration | | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | Config 1, 2 |  | CCR.1.3 FDD |
| SSB Configuration | | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 15 kHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
|  | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1, 2 |  | CSI-RS.1.1 FDD |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.1.1 FDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.48 |
| T3 | | | s | 0.48 |
| D1 | | | s | 0.44 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.14.4.1.1.1-3: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 |
|  | Config 2 |  | 1 | -7 | -15 |
|  | Config 1 | dBm/15kHz | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 1 | dBm/SCS | -98 | | |
|  | Config 2 |  | -98 | | |
| Propagation condition | |  | TBD | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1C.1.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6. | | | | | |

Table A.14.4.1.1.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
|  | Value |
| gapOffset | 0 |
| Note: Ensure that RLM RS is partially overlapped with measurement gap | |

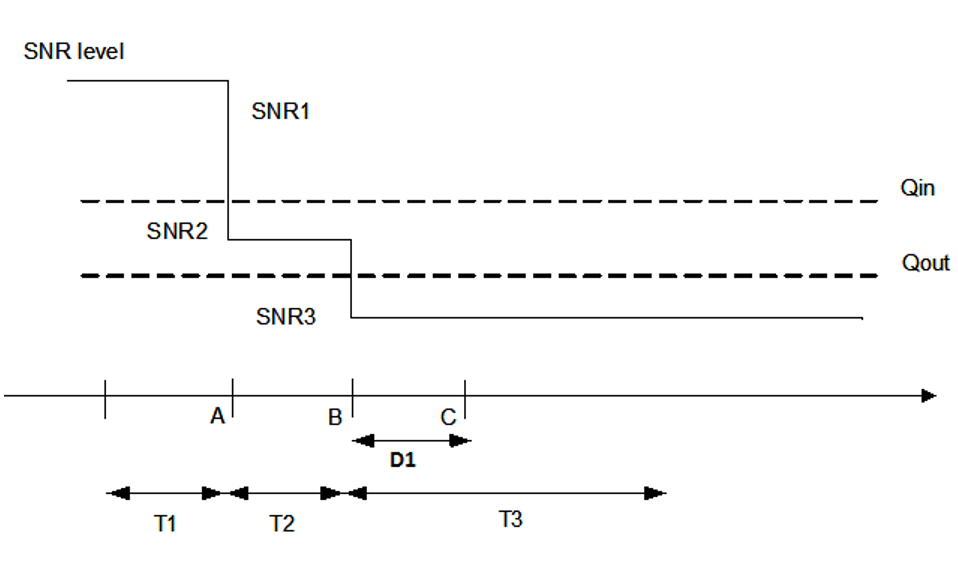


Figure A.14.4.1.1.1-1: SNR variation for out-of-sync testing

##### A.14.4.1.1.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

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

#### A.14.4.1.2 Radio Link Monitoring In-sync Test for FR1 SAN PCell configured with SSB-based RLM RS in non-DRX mode

##### A.14.4.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the SAN PCell. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1C.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.14.4.1.2.1-1. The test parameters are given in Tables A.14.4.1.2.1-2, and A.14.4.1.2.1-3 below. There is one cell (Cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.1.2.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.4.1.2.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.1.2.1-2: General test parameters for FR1 in-sync testing in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active PCell | | | |  | Cell 1 |
| RF Channel Number | | | |  | 1 |
| NTN reference configuration | | | Config 1 |  | TBD |
| Config 2 | TBD |
| BWchannel | | | Config 1, 2 | MHz | 10: NRB,c = 52 |
| DL initial BWP configuration | | | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | | | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | | Config 1, 2 |  | CCR.1.1 FDD |
| SSB Configuration | | | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | | | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2 |  | 15 kHz |
| PRACH Configuration | | | Config 1, 2 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX | | | |  | *OFF* |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 1000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1, 2 | |  | CSI-RS.1.1 FDD |
| CSI-RS for tracking | | Config 1, 2 | |  | TRS.1.1 FDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.24 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.1.2.1-3: Cell specific test parameters for FR1 (Cell 1) for in-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 2 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1 | dBm/15 kHz | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 1 | dBm/SCS | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
| Propagation condition | |  | TBD | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.6.5.1C.2.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

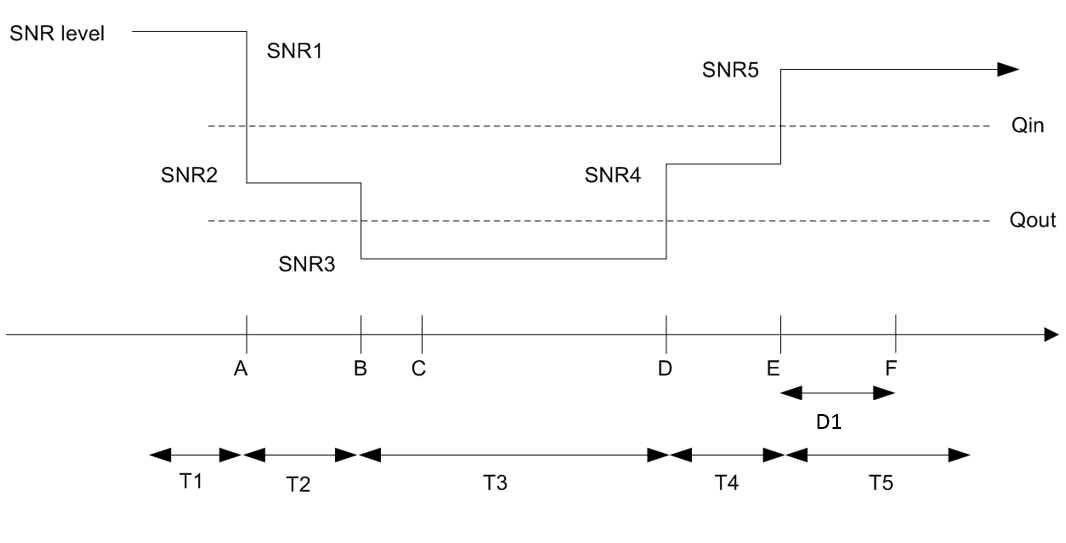


Figure A.14.4.1.2.1-1: SNR variation for in-sync testing

##### A.14.4.1.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

#### A.14.4.1.3 Radio Link Monitoring Out-of-sync Test for FR1 SAN PCell configured with SSB-based RLM RS in DRX mode

##### A.14.4.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the SAN PCell when DRX is used. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1C.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.14.4.1.3.1-1. The test parameters are given in Tables A.14.4.1.3.1-2, and A.14.4.1.3.1-3. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.14.4.1.3.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.4.1.3.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.1.3.1-2: General test parameters for FR1 out-of-sync testing in DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| NTN reference configuration | | Config 1 |  | TBD |
| Config 2 | TBD |
| BWchannel | | Config 1, 2 | MHz | 10: NRB,c = 52 |
| DL initial BWP configuration | | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | Config 1, 2 |  | CCR.1.3 FDD |
| SSB Configuration | | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 15 kHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
|  | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX Configuration | | |  | DRX.3 |
| Gap pattern ID | | |  | N.A. |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1, 2 |  | CSI-RS.1.1 FDD |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.1.1 FDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.68 |
| T3 | | | s | 0.68 |
| D1 | | | s | 0.64 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.14.4.1.3.1-3: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 |
|  | Config 2 |  | 1 | -7 | -15 |
|  | Config 1 | dBm/15kHz | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 1 | dBm/SCS | -98 | | |
|  | Config 2 |  | -98 | | |
| Propagation condition | |  | TBD | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1C.3.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6. | | | | | |

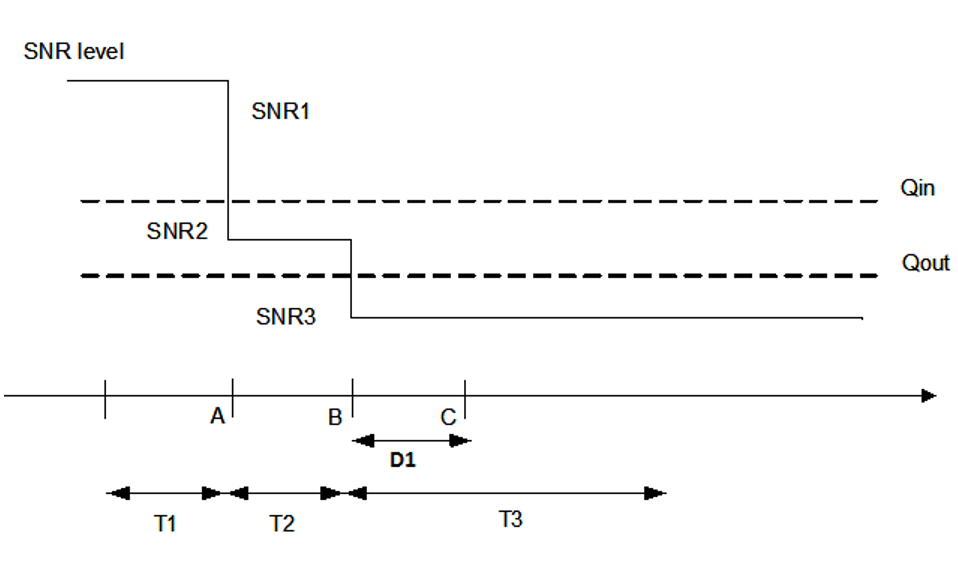


Figure A.14.4.1.3.1-1: SNR variation for out-of-sync testing

##### A.14.4.1.3.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

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

#### A.14.4.1.4 Radio Link Monitoring In-sync Test for FR1 SAN PCell configured with SSB-based RLM RS in DRX mode

##### A.14.4.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the SAN PCell when DRX is used. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1C.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.14.4.1.4.1-1. The test parameters are given in Tables A.14.4.1.4.1-2, and A.14.4.1.4.1-3. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.1.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

Table A.14.4.1.4.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.1.4.1-2: General test parameters for FR1 in-sync testing in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active PCell | | | |  | Cell 1 |
| RF Channel Number | | | |  | 1 |
| NTN reference configuration | | | Config 1 |  | TBD |
| Config 2 | TBD |
| BWchannel | | | Config 1 | MHz | 10: NRB,c = 52 |
| DL initial BWP configuration | | | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 FDD |
| SSB Configuration | | | Config 1 |  | SSB.1 FR1 |
| SMTC Configuration | | | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2 |  | 15 kHz |
| PRACH Configuration | | | Config 1, 2 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX Configuration | | | |  | DRX.3 |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 2000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 | |  | CSI-RS.1.1 FDD |
| CSI-RS for tracking | | Config 1 | |  | TRS.1.1 FDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.64 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.1.4.1-3: Cell specific test parameters for FR1 (Cell 1) for in-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
| T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 2 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1 | dBm/15 kHz | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 1 | dBm/SCS | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
| Propagation condition | |  | TBD | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.6.5.1C.4.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

Table A.6.5.1C.4.1-4: Void

Table A.6.5.1C.4.1-5: Void

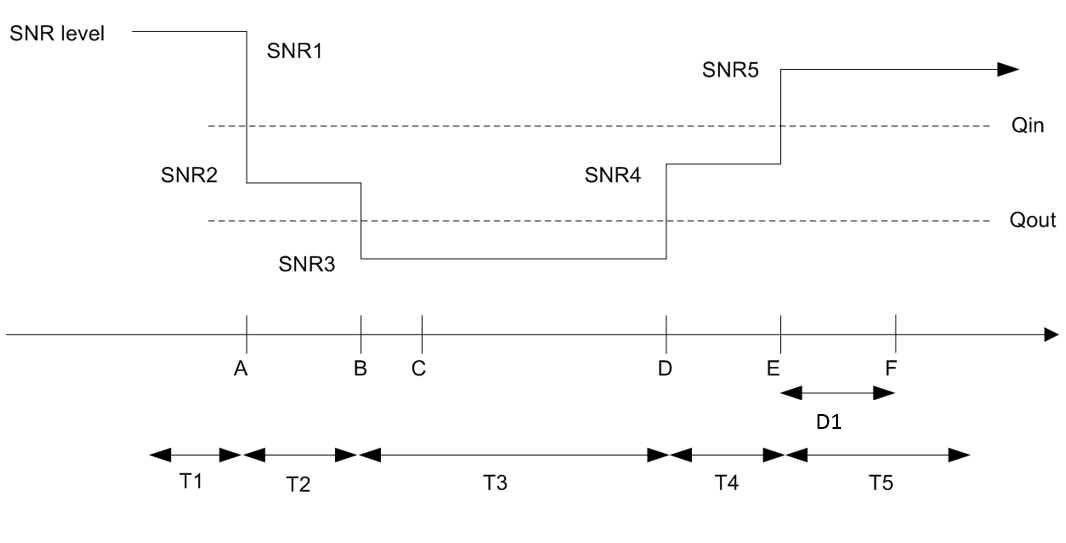


Figure A.14.4.1.4.1-1: SNR variation for in-sync testing.

##### A.14.4.1.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

#### A.14.4.1.5 Radio Link Monitoring Out-of-sync Test for FR1 SAN PCell configured with CSI-RS-based RLM in non-DRX mode

##### A.14.4.1.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the SAN PCell when no DRX is used. This test will partly verify the FR1 PCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1C.

The test parameters are given in Tables A.14.4.1.5.1-1, A.14.4.1.5.1-2, A.14.4.1.5.1-3, and A.14.4.1.5.1-3A below. There is one cell, cell 1 which is the PCell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.14.4.1.5.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting of 5ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) in test. In the test, SSB0 is configured as the BFD-RS.

During the test, the test system shall emulate and send the GNSS signal to the test UE by AT command. The UE shall be provided with the valid information about the SAN serving cells before the test.

Table A.14.4.1.5.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | NGSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.4.1.5.1-2: General test parameters for FR1 PCell for CSI-RS out-of-sync testing in non-DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| Active PCell | |  | Cell 1 |
| RF Channel Number | |  | 1 |
| Satellite information | Config 1 |  | SSC.1 |
|  | Config 2 |  | SSC.2 |
| Duplex mode | Config 1, 2 |  | FDD |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | Config 1, 2 |  | CCR.1.3 FDD |
| SSB Configuration | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 |  | 15 kHz |
| TRS configuration | Config 1, 2 |  | TRS.1.1 FDD |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.1.1 FDD |
| TCI configuration for PDCCH/PDSCH | |  | TCI.State. 2 |
| OCNG parameters | |  | OP.1 |
| CP length | |  | Normal |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| DRX | |  | *OFF* |
| Gap pattern ID | |  | *gp0* |
| Layer 3 filtering | |  | *Enabled* |
| T310 timer | | ms | *0* |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS configuration for CSI reporting | Config 1, 2 |  | CSI-RS.1.1 FDD |
| T1 | | s | 0.2 |
| T2 | | s | 0.48 |
| T3 | | s | 0.48 |
| D1 | | s | 0.44 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | |

Table A.14.4.1.5.1-3: Cell specific test parameters for FR1 for CSI-RS out-of-sync radio link monitoring in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSSPDCCH\_beta | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRSPDCCH\_DMRS\_beta | | dB |  | | |
| EPRE ratio of PBCH DMRS to SSSPBCH\_beta | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRSPSS\_beta | | dB |  | | |
| EPRE ratio of PSS to SSSSSS\_beta | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS PDSCH\_beta | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1, 2 | dB | 1 | -7 | -15 |
|  | Config 1, 2 | dBm/15kHz | -98 | | |
| Propagation condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.14.4.1.5.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is [A.3.6]. | | | | | |

Table A.14.4.1.5.1-3A: Measurement gap configuration for FR1 CSI-RS out-of-sync radio link monitoring in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
| Value |
| gapOffset | 0 |
| Note 1: Void | |



Figure A.14.4.1.5.1-1: SNR variation for CSI-RS out-of-sync testing

##### A.14.4.1.5.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 no later than time point C (D1 ms after the start of the time duration T3) on the PCell.

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

#### A.14.4.1.6 Radio Link Monitoring In-sync Test for FR1 SAN PCell configured with CSI-RS-based RLM in non-DRX mode

##### A.14.4.1.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the SAN PCell when no DRX is used. This test will partly verify the FR1 PCell CSI-RS In-sync radio link monitoring requirements in clause 8.1C.

The test parameters are given in Tables A.14.4.1.6.1-1, A.14.4.1.6.1-2, and A.14.4.1.6.1-3 below. There is one cells, cell 1 which is the PCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.1.6.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms. In the test, DRX configuration is not enabled. In the test, SSB0 is configured as the BFD-RS.

During the test, the test system shall emulate and send the GNSS signal to the test UE by AT command. The UE shall be provided with the valid information about the SAN serving cells before the test.

Table A.14.4.1.6.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | NGSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.4.1.6.1-2: General test parameters for FR1 PCell for CSI-RS in-sync testing in non-DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| Active PCell | |  | Cell 1 |
| RF Channel Number | |  | 1 |
| Satellite information | Config 1 |  | SSC.1 |
|  | Config 2 |  | SSC.2 |
| Duplex mode | Config 1, 2 |  | FDD |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | Config 1, 2 |  | CCR.1.1 FDD |
| SSB Configuration | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 |  | 15 kHz |
| TRS configuration | Config 1, 2 |  | TRS.1.1 FDD |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.1.1 FDD |
| TCI configuration for PDCCH/PDSCH | |  | TCI.State. 2 |
| OCNG parameters | |  | OP.1 |
| CP length | |  | Normal |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| In sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 0 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| DRX | |  | *OFF* |
| Gap pattern ID | |  | N.A. |
| Layer 3 filtering | |  | *Enabled* |
| T310 timer | | ms | 1000 |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS configuration for CSI reporting | Config 1, 2 |  | CSI-RS.1.1 FDD |
| T1 | | s | 0.2 |
| T2 | | s | 0.2 |
| T3 | | s | 0.44 |
| T4 | | s | 0.2 |
| T5 | | s | 0.88 |
| T6 | | S | 0.84 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | |

Table A.14.4.1.6.1-3: Cell specific test parameters for FR1 for CSI-RS in-sync radio link monitoring in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSSPDCCH\_beta | | dB | 4 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRSPDCCH\_DMRS\_beta | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSSPBCH\_beta | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRSPSS\_beta | | dB |  | | | | |
| EPRE ratio of PSS to SSSSSS\_beta | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS PDSCH\_beta | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1, 2 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1, 2 | dBm/15kHz | -98 | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.14.4.1.6.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is specified in clause A.3.6.1.1. | | | | | | | |

Chart, diagram, box and whisker chart

Description automatically generated

Figure A.14.4.1.6.1-1: SNR variation for CSI-RS in-sync testing

##### A.14.4.1.6.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting on the PCell.

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

#### A.14.4.1.7 Radio Link Monitoring Out-of-sync Test for FR1 SAN PCell configured with CSI-RS-based RLM in DRX mode

##### A.14.4.1.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the SAN PCell when DRX is used. This test will partly verify the FR1 PCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1C.

The test parameters are given in Tables A.14.4.1.7.1-1, A.14.4.1.7.1-2, and A.6.5.1.7C.1-3 below. There is one cell, cell 1 is the PCell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.14.4.1.7.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test. In the test, SSB0 is configured as the BFD-RS.

During the test, the test system shall emulate and send the GNSS signal to the test UE by AT command. The UE shall be provided with the valid information about the SAN serving cells before the test.

Table A.14.4.1.7.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | NGSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.4.1.7.1-2: General test parameters for FR1 PCell for CSI-RS out-of-sync testing in DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| Active PCell | |  | Cell 1 |
| RF Channel Number | |  | 1 |
| Satellite information | Config 1 |  | SSC.1 |
|  | Config 2 |  | SSC.2 |
| Duplex mode | Config 1, 2 |  | FDD |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | Config 1, 2 |  | CCR.1.3 FDD |
| SSB Configuration | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 |  | 15 kHz |
| TRS configuration | Config 1, 2 |  | TRS.1.1 FDD |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.1.1 FDD |
| TCI configuration for PDCCH/PDSCH | |  | TCI.State. 2 |
| OCNG parameters | |  | OP.1 |
| CP length | |  | Normal |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| DRX | |  | DRX.3 |
| Gap pattern ID | |  | N.A. |
| Layer 3 filtering | |  | Enabled |
| T310 timer | | ms | 0 |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS configuration for CSI reporting | Config 1, 2 |  | CSI-RS.1.1 FDD |
| T1 | | s | 0.2 |
| T2 | | s | 1.28 |
| T3 | | s | 1.28 |
| D1 | | s | 1.24 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | |

Table A.14.4.1.7.1-3: Cell specific test parameters for FR1 for CSI-RS out-of-sync radio link monitoring in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSSPDCCH\_beta | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRSPDCCH\_DMRS\_beta | | dB | 4 | | |
| EPRE ratio of PBCH DMRS to SSSPBCH\_beta | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRSPSS\_beta | | dB |  | | |
| EPRE ratio of PSS to SSSSSS\_beta | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS PDSCH\_beta | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1, 2 | dB | 1 | -7 | -15 |
|  | Config 1, 2 | dBm/15kHz | -98 | | |
| Propagation condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.14.4.1.7.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is specified in clause A.3.6.1.1. | | | | | |



Figure A.14.4.1.7.1-1: SNR variation for CSI-RS out-of-sync testing

##### A.14.4.1.7.2 Test Requirements

The UE behaviour during time durations T1, T2, and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 (PCell) at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 (PCell) no later than time point C (D1 ms after the start of the time duration T3) on the PCell.

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

#### A.14.4.1.8 Radio Link Monitoring In-sync Test for FR1 SAN PCell configured with CSI-RS-based RLM in DRX mode

##### A.14.4.1.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the in sync for the purpose of monitoring downlink CSI-RS based radio link quality of the SAN PCell when DRX is used. This test will partly verify the FR1 Pcell CSI-RS In-sync radio link monitoring requirements in clause 8.1C.

The test parameters are given in Tables A.14.4.1.8.1-1, A.14.4.1.8.1-2, A.14.4.1.8.1-3 and A.14.4.1.8.1-3A below. There is one cells, cell 1 which is the PCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.1.8.1-1 shows the variation of the downlink SNR in the PCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) in test. In the test, SSB0 is configured as the BFD-RS.

During the test, the test system shall emulate and send the GNSS signal to the test UE by AT command. The UE shall be provided with the valid information about the SAN serving cells before the test.

Table A.14.4.1.8.1-1: Supported test configurations for FR1 PSCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | NGSO, FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.4.1.8.1-2: General test parameters for FR1 PCell for CSI-RS in-sync testing in non-DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| Active PCell | |  | Cell 1 |
| RF Channel Number | |  | 1 |
| Satellite information | Config 1 |  | SSC.1 |
|  | Config 2 |  | SSC.2 |
| Duplex mode | Config 1, 2 |  | FDD |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.1 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.1 |
| RMSI CORESET Reference Channel | Config 1, 2 |  | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | Config 1, 2 |  | CCR.1.1 FDD |
| SSB Configuration | Config 1, 2 |  | SSB.1 FR1 |
| SMTC Configuration | Config 1, 2 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 |  | 15 kHz |
| TRS configuration | Config 1, 2 |  | TRS.1.1 FDD |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.1.1 FDD |
| TCI configuration for PDCCH/PDSCH | |  | TCI.State. 2 |
| OCNG parameters | |  | OP.1 |
| CP length | |  | Normal |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| In sync transmission parameters | DCI format |  | 1-0 |
|  | Number of Control OFDM symbols |  | 2 |
|  | Aggregation level | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 0 |
|  | DMRS precoder granularity |  | REG bundle size |
|  | REG bundle size |  | 6 |
| DRX | |  | DRX.3 |
| Gap pattern ID | |  | gp0 |
| Layer 3 filtering | |  | Enabled |
| T310 timer | | ms | 2000 |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS configuration for CSI reporting | Config 1, 2 |  | CSI-RS.1.1 FDD |
| T1 | | s | 0.2 |
| T2 | | s | 0.2 |
| T3 | | s | 1.24 |
| T4 | | s | 0.2 |
| T5 | | s | 1.88 |
| T6 | | s | 1.84 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | |

Table A.14.4.1.8.1-3: Cell specific test parameters for FR1 for CSI-RS in-sync radio link monitoring in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSSPDCCH\_beta | | dB | 4 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRSPDCCH\_DMRS\_beta | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSSPBCH\_beta | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRSPSS\_beta | | dB |  | | | | |
| EPRE ratio of PSS to SSSSSS\_beta | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS PDSCH\_beta | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1, 2 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1, 2 | dBm/15kHz | -98 | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.14.4.1.8.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is specified in clause A.3.6.1.1. | | | | | | | |

Table A.6.5.1.8.1-3A: Measurement gap configuration for FR1 CSI-RS in-sync radio link monitoring in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
| Value |
| gapOffset | 0 |
| Note 1: Void | |

Chart, diagram, box and whisker chart

Description automatically generated

Figure A.14.4.1.8.1-1: SNR variation for CSI-RS in-sync testing

##### A.14.4.1.8.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (T6 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting on the PCell.

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

### A.14.4.2 Beam Failure Detection and Link recovery procedures for satellite access

#### A.14.4.2.1 Beam Failure Detection and Link Recovery Test for FR1 PCell for satellite access configured with SSB-based BFD and LR in non-DRX mode

##### A.14.4.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.1.1-1, A.14.4.2.1.1-2, A.14.4.2.1.1-3 and A.14.4.2.1.1-4 below. There is one cell, cell 1 which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.1.1-1 shows the variation of the downlink SNR of the SSB in set q0 in the active cell to emulate SSB based beam failure. Figure A.14.4.2.1.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms) in test 1.

Table A.14.4.2.1.1-1: Supported test configurations for FR1 Pcell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.1.1-2: General test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value | Comment |
|  | | |  | Test 1 |  |
| NTN reference Serving satellite configuration | | Config 1 |  | SSC.1 |  |
| Config 2 |  | SSC.2 |  |
| Active PSCell | | |  | Cell 1 |  |
| RF Channel Number | | |  | 1 |  |
| Duplex mode | | Config 1,2 |  | FDD |  |
| BWchannel | | Config 1,2 | MHz | 10: NRB,c = 52 |  |
| DL initial BWP configuration | | Config 1,2 |  | DLBWP.0.1 |  |
| DL dedicated BWP configuration | | Config 1,2 |  | DLBWP.1.1 |  |
| UL initial BWP configuration | | Config 1,2 |  | ULBWP.0.1 |  |
| UL dedicated BWP configuration | | Config 1,2 |  | ULBWP.1.1 |  |
| TDD Configuration | | Config 1,2 |  | Not Applicable |  |
| RMSI CORESET Reference Channel | | Config 1,2 |  | CR.1.1 FDD |  |
| Dedicated CORESET Reference Channel | | Config 1,2 |  | CCR.1.1 FDD |  |
| SSB Configuration | | Config 1,2 |  | SSB.3 FR1 |  |
| SMTC Configuration | | Config 1,2 |  | SMTC.1 |  |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 |  | 15 KHz |  |
| PRACH Configuration | | Config 1,2 |  | Table A.3.8.2.2-1 |  |
| SSB Index assigned as BFD RS (q0) | | |  | 0 |  |
| SSB Index assigned as CBD RS (q1) | | |  | 1 |  |
| OCNG parameters | | |  | OP.1 |  |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | | DCI format |  | 1-0 |  |
|  | | Number of Control OFDM symbols |  | 2 |  |
|  | | Aggregation level | CCE | 8 |  |
|  | | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | dB | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | dB | 0 |  |
|  | | DMRS precoder granularity |  | REG bundle size |  |
|  | | REG bundle size |  | 6 |  |
| DRX | | |  | OFF |  |
| Gap pattern ID | | |  | gp0 |  |
| gapOffset | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | Config 1, 2 | | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
|  |  |  |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for CSI reporting | | Config 1,2 |  | CSI-RS.1.1 FDD |  |
| CSI-RS for tracking | | Config 1,2 |  | TRS.1.1 FDD |  |
| SSB Index assigned as RLM RS | |  |  | 0, 1 |  |
| T310 Timer | |  | ms | 1000 |  |
| N310 | |  |  | 2 |  |
| T1 | | | s | 0.2 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 0.37 |  |
| T3 | | | s | 0.24 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 0.17 |  |
| D1 | | | s | 0.13 |  |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.2.1.1-3: Cell specific test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR\_SSB of set q0 | Config 1,2 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1,2 | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1,2 | dBm/SCS kHz | -108 | -108 | -88 | -88 | -88 |
|  | Config 1,2 | dBm/15 KHz | -98 | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | |

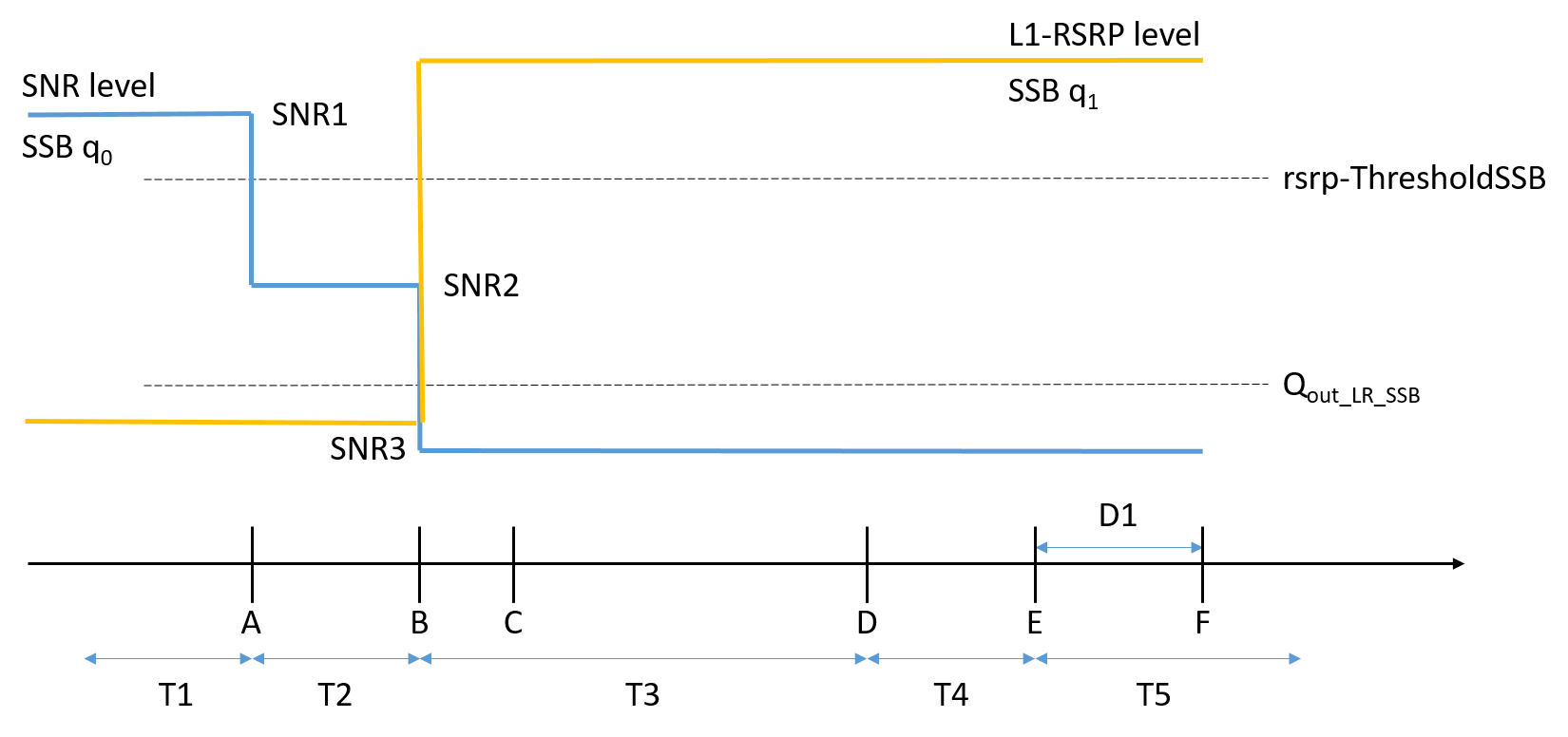


Figure A.14.4.2.1.1-1: SNR and L1-RSRP variation SSB for SSB-based beam failure detection and link recovery testing in non-DRX mode

##### A.14.4.2.1.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.14.4.2.2 Beam Failure Detection and Link Recovery Test for FR1 PCell for satellite access configured with SSB-based BFD and LR in DRX mode

##### A.14.4.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.2.1-1, A.14.4.2.2.1-2, A.14.4.2.2.1-3, A.14.4.2.2.1-4 and A.14.4.2.2.1-5 below. There is one cell, cell 1 which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.2.1-1 shows the variation of the downlink SNR of the SSB in set q0 in the active cell to emulate SSB based beam failure. Figure A.14.4.2.2.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.14.4.2.2.1-1: Supported test configurations for FR1 Pcell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.2.1-2: General test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value | Comment |
|  | | |  | Test 1 |  |
| NTN reference Serving satellite configuration | Config 1 | |  | SSC.1 |  |
| Config 2 | |  | SSC.2 |  |
| Active PSCell | | |  | Cell 1 |  |
| RF Channel Number | | |  | 1 |  |
| Duplex mode | Config 1,2 | |  | FDD |  |
| BWchannel | Config 1,2 | | MHz | 10: NRB,c = 52 |  |
| DL initial BWP configuration | Config 1,2 | |  | DLBWP.0.1 |  |
| DL dedicated BWP configuration | Config 1,2 | |  | DLBWP.1.1 |  |
| UL initial BWP configuration | Config 1,2 | |  | ULBWP.0.1 |  |
| UL dedicated BWP configuration | Config 1,2 | |  | ULBWP.1.1 |  |
| TDD Configuration | Config 1,2 | |  | Not Applicable |  |
| RMSI CORESET Reference Channel | Config 1,2 | |  | CR.1.1 FDD |  |
| Dedicated CORESET Reference Channel | Config 1,2 | |  | CCR.1.1 FDD |  |
| SSB Configuration | Config 1,2 | |  | SSB.3 FR1 |  |
| SMTC Configuration | Config 1,2 | |  | SMTC.1 |  |
| PDSCH/PDCCH subcarrier spacing | Config 1,2 | |  | 15 KHz |  |
| PRACH Configuration | Config 1,2 | |  | Table A.3.8.2.2-1 |  |
| SSB Index assigned as BFD RS (q0) | | |  | 0 |  |
| SSB Index assigned as CBD RS (q1) | | |  | 1 |  |
| OCNG parameters | | |  | OP.1 |  |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | | DCI format |  | 1-0 |  |
|  | | Number of Control OFDM symbols |  | 2 |  |
|  | | Aggregation level | CCE | 8 |  |
|  | | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | dB | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | dB | 0 |  |
|  | | DMRS precoder granularity |  | REG bundle size |  |
|  | | REG bundle size |  | 6 |  |
| DRX | | |  | DRX.7 | A.3.3.7 |
| Gap pattern ID | | |  | N.A. |  |
| rlmInSyncOutOfSyncThreshold | | |  | Absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | | Config 1,2 | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for CSI reporting | | Config 1,2 |  | CSI-RS.1.1 FDD |  |
| CSI-RS for tracking | | Config 1,2 |  | TRS.1.1 FDD |  |
| SSB Index assigned as RLM RS | |  |  | 0, 1 |  |
| T310 Timer | |  | ms | 1000 |  |
| N310 | |  |  | 2 |  |
| T1 | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 5.17 |  |
| T3 | | | s | 3.24 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 1.97 |  |
| D1 | | | s | 1.93 |  |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.2.2.1-3: Cell specific test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR\_SSB of set q0 | Config 1,2 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1,2 | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1,2 | dBm/SCS kHz | -108 | -108 | -88 | -88 | -88 |
|  | Config 1,2 | dBm/15 KHz | -98 | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Void  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | |

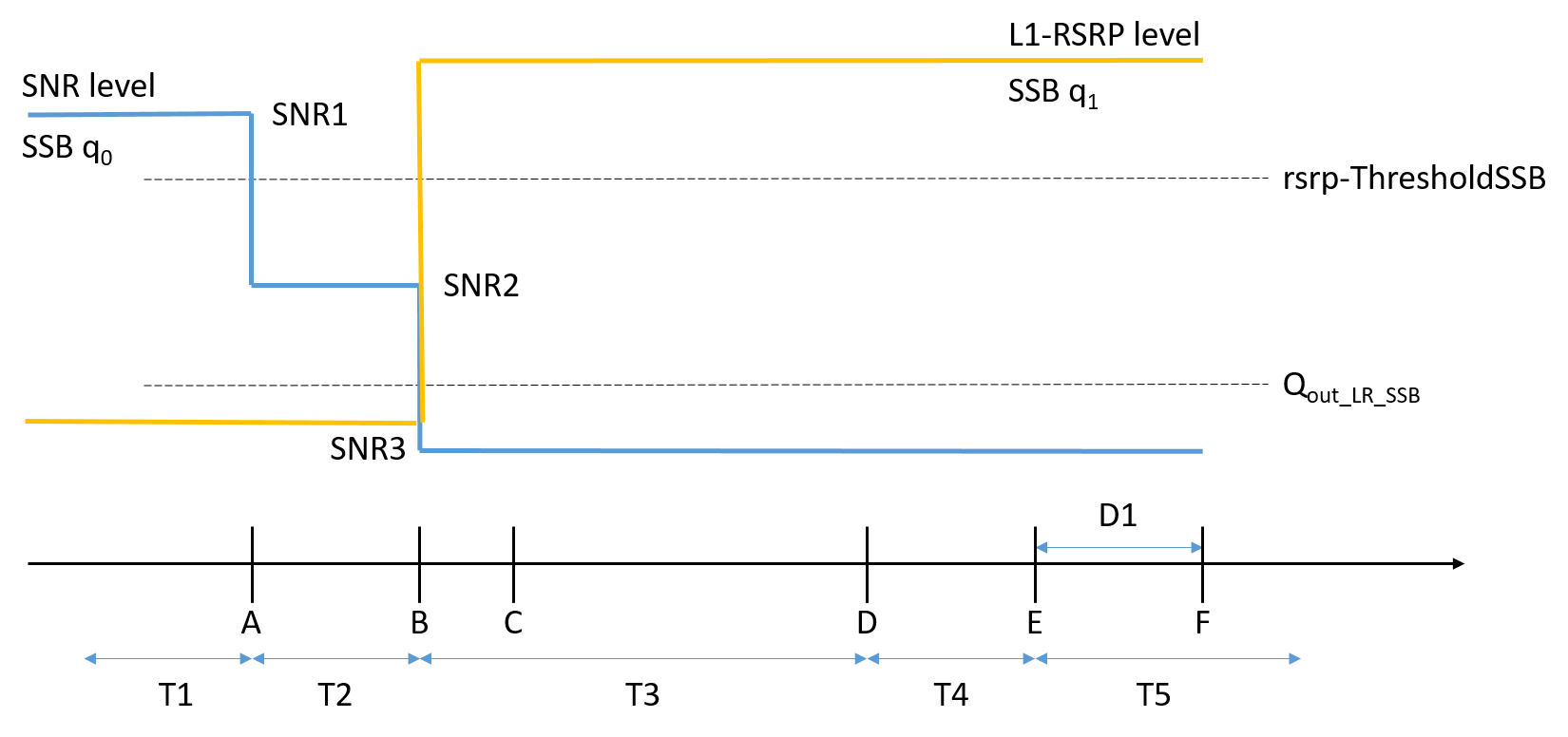


Figure A.14.4.2.2.1-1: SNR and L1-RSRP variation for SSB-based beam failure detection and link recovery testing in non-DRX mode

##### A.14.4.2.2.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 1920+10 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.14.4.2.3 Beam Failure Detection and Link Recovery Test for FR1 PCell for satellite access configured with CSI-RS-based BFD and LR in non-DRX mode

##### A.14.4.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct CSI-RS-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.3.1-1, A.14.4.2.3.1-2, and below. There is one cell, cell 1 which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.3.1-1 shows the variation of the downlink SNR of the CSI-RS in set q0 in the active cell to emulate CSI-RS based beam failure. Figure A.14.4.2.3.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is not enabled.

Table A.14.4.2.3.1-1: Supported test configurations for FR1 Pcell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.3.1-2: General test parameters for FR1 PCell for CSI-RS-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Value | Comment |
|  | | | | |  | Test 1 |  |
| NTN reference Serving satellite configuration | Config 1 | | | |  | SSC.1 |  |
| Config 2 | | | |  | SSC.2 |  |
| Active PCell | | | | |  | Cell 1 |  |
| RF Channel Number | | | | |  | 1 |  |
| Duplex mode | | Config 1,2 | | |  | FDD |  |
| TDD Configuration | | Config 1,2 | | |  | Not Applicable |  |
| RMSI CORESET Reference Channel | | Config 1,2 | | |  | CR.1.1 FDD | A.3.1.2 |
| Dedicated CORESET Reference Channel | | Config 1,2 | | |  | CCR.1.1 FDD | A.3.1.3 |
| SSB Configuration | | Config 1,2 | | |  | SSB.3 FR1 | A.3.10 |
| SSB Configuration | | Config 1,2 | | |  | SSB. 3 FR1 | A.3.10 |
| SMTC Configuration | | Config 1,2 | | |  | SMTC.1 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | | |  | 15 KHz |  |
| PRACH  Configuration | | Config 1,2 | | |  | FR1 PRACH configuration 4 | A.3.8.2 |
| csi-RS-Index assigned as beam failure detection RS in set q0 | | | | |  | 0 |  |
| OCNG parameters | | | | |  | OP.1 | A.3.2.1 |
| CP length | | | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | | DCI format | | |  | 1-0 |  |
|  | | Number of Control OFDM symbols | | |  | 2 |  |
|  | | Aggregation level | | | CCE | 8 |  |
|  | | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | | dB | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | | dB | 0 |  |
|  | | DMRS precoder granularity | | |  | REG bundle size |  |
|  | | REG bundle size | | |  | 6 |  |
| DRX | | | | |  | OFF |  |
| Gap pattern ID | | | | |  | N.A. |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 | | | | |  | 1 | N |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | | | Config 1,2 | | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | | | | Config 1,2 |  | CSI-RS.1.2 FDD | A.3.14 |
| CSI-RS configuration for CSI reporting | | | | Config 1,2 |  | CSI-RS.1.1 FDD | A.3.14 |
| TRS configuration | | | | Config 1,2 |  | TRS.1.1 FDD |  |
| CSI-RS-Index assigned as RLM RS | | | | Config 1,2 |  | CSI-RS.1.2 FDD | A.3.14 |
| T310 Timer | | | | | ms | 1000 |  |
| N310 | | | | |  | 2 |  |
| T1 | | | | | s | 0.2 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | 0.18 |  |
| T3 | | | | | s | 0.14 |  |
| T4 | | | | | s | 0 |  |
| T5 | | | | | s | 0.08 |  |
| D1 | | | | | s | 0.04 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | | | |

Table A.14.4.2.3.1-3 Cell specific test parameters for FR1 PCell for CSI-RS-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR\_CSI-RS of set q0 | Config 1,2 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1,2 | dB | -10 | -10 | 10 | 10 | 10 |
| CSI-RS\_RP of set q1 | Config 1,2 | dBm/SCS kHz | -108 | -108 | -88 | -88 | -88 |
|  | Config 1,2 | dBm/15 KHz | -98 | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Void  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | |

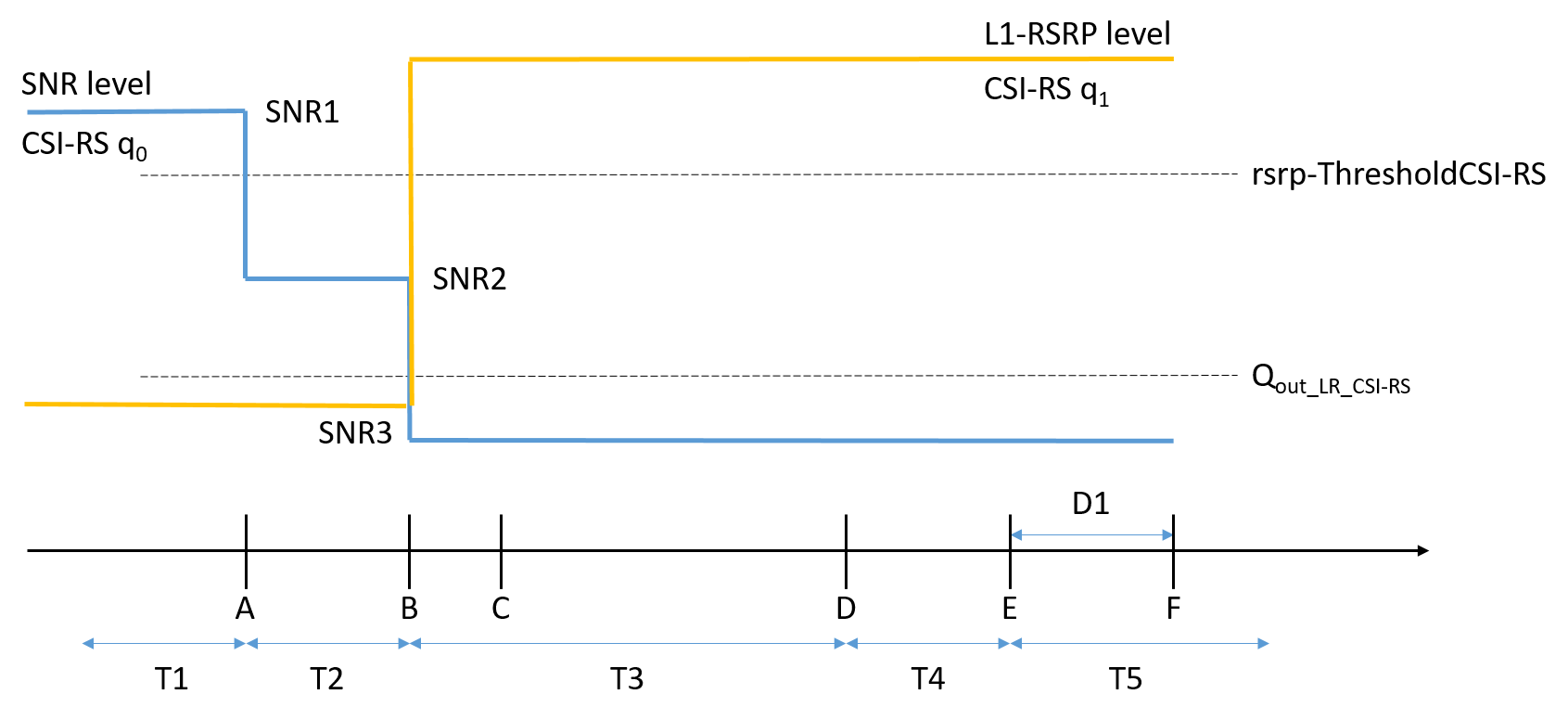


Figure A.14.4.2.3.1-1: SNR and L1-RSRP variation for CSI-RS-based beam failure detection and link recovery testing in non-DRX mode

##### A.14.4.2.3.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 30+10 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.14.4.2.4 Beam Failure Detection and Link Recovery Test for FR1 PCell for satellite access configured with CSI-RS-based BFD and LR in DRX mode

##### A.14.4.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct CSI-RS-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.4.1-1, A.14.4.2.4.1-2, A.14.4.2.4.1-3, and A.14.4.2.4.1-4 below. There is one cell, cell 1 which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.4.1-1 shows the variation of the downlink SNR of the CSI-RS in set q0 in the active cell to emulate CSI-RS based beam failure. Figure A.14.4.2.4.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.14.4.2.4.1-1: Supported test configurations for FR1 Pcell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.4.1-2: General test parameters for FR1 PCell for CSI-RS-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value | Comment |
|  | | | |  | Test 1 |  |
| NTN reference Serving satellite configuration | Config 1 | | |  | SSC.1 |  |
| Config 2 | | |  | SSC.2 |  |
| Active PCell | | | |  | Cell 1 |  |
| RF Channel Number | | | |  | 1 |  |
| Duplex mode | | Config 1,2 | |  | FDD |  |
| TDD Configuration | | Config 1,2 | |  | Not Applicable |  |
| RMSI CORESET Reference Channel | | Config 1,2 | |  | CR.1.1 FDD | A.3.1.2 |
| Dedicated CORESET Reference Channel | | Config 1,2 | |  | CCR.1.1 FDD | A.3.1.3 |
| SSB Configuration | | Config 1,2 | |  | SSB. 3 FR1 | A.3.10 |
| SMTC Configuration | | Config 1,2 | |  | SMTC.1 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | |  | 15 KHz |  |
| PRACH  Configuration | | Config 1,2 | |  | FR1 PRACH configuration 4 | A.3.8.2 |
| csi-RS-Index assigned as beam failure detection RS in set q0 | | | |  | 0 |  |
| OCNG parameters | | | |  | OP.1 | A.3.2.1 |
| CP length | | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | | DCI format | |  | 1-0 |  |
|  | | Number of Control OFDM symbols | |  | 2 |  |
|  | | Aggregation level | | CCE | 8 |  |
|  | | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | dB | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | dB | 0 |  |
|  | | DMRS precoder granularity | |  | REG bundle size |  |
|  | | REG bundle size | |  | 6 |  |
| DRX | | | |  | DRX.7 | A.3.3.7 |
| Gap pattern ID | | | |  | N.A. |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 | | | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | | | Config 1,2 | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | | Config 1,2 | |  | CSI-RS.1.2 FDD | A.3.14  .1 |
| CSI-RS configuration for CSI reporting | | Config 1,2 | |  | CSI-RS.1.1 FDD | A.3.14.1 |
| TRS configuration | | Config 1,2 | |  | TRS.1.1 FDD |  |
| CSI-RS-Index assigned as RLM RS | | Config 1,2 | |  | CSI-RS.1.2 FDD |  |
| T310 Timer | | | | ms | 1000 |  |
| N310 | | | |  | 2 |  |
| T1 | | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | s | 8.37 |  |
| T3 | | | | s | 6.44 |  |
| T4 | | | | s | 0 |  |
| T5 | | | | s | 1.97 |  |
| D1 | | | | s | 1.93 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | | |

Table A.14.4.2.4.1-3: Cell specific test parameters for FR1 PCell for CSI-RS-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR\_CSI-RS of set q0 | Config 1 | dB | 5 | -3 | -12 | -12 | -12 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| SNR\_CSI-RS of set q1 | Config 1 | dB | -10 | -10 | 10 | 10 | 10 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| CSI-RS\_RP of set q1 | Config 1 | dB/SCS kHz | -110 | -110 | -88 | -88 | -88 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | Config 1 | dBm/15 KHz | -98 | | | | |
|  |  |  |  | | | | |
|  |  |  |  | | | | |
| Propagation condition | |  | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Void  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | |

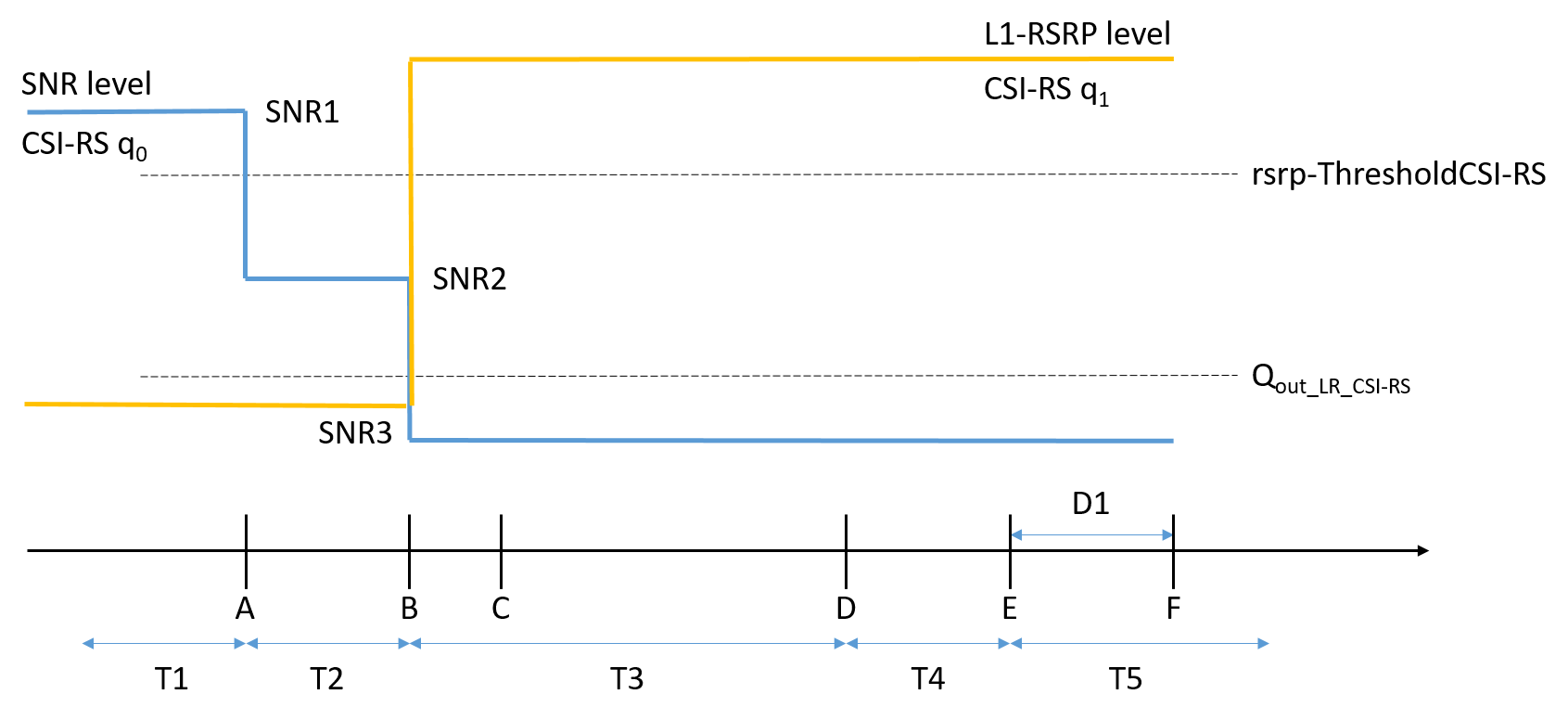


Figure A.14.4.2.4.1-1: SNR and L1-RSRP variation for CSI-RS-based beam failure detection and link recovery testing in DRX mode

##### A.14.4.2.4.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 1920+10 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.14.4.2.5 Beam Failure Detection and Link Recovery Test for FR1 SCell for satellite access configured with CSI-RS-based BFD and SSB-based LR in non-DRX mode

##### A.14.4.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.5.1-1, A.14.4.2.5.1-2, and below. There are two cells, cell 1 is the PCell and cell 2 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.5.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.14.4.2.5.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is not enabled.

Table A.14.4.2.5.1-1: Supported test configurations for FR1 PCell and Scell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.5.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value | Comment |
| Test 1 |
| NTN reference Serving satellite configuration | Config 1 | |  | SSC.1 |  |
| Config 2 | |  | SSC.2 |  |
| Active PCell | | |  | Cell 1 |  |
| RF Channel Number for PCell | | |  | 1 |  |
| Active SCell | | |  | Cell 2 |  |
| RF Channel Number for SCell | | |  | 2 |  |
| Duplex mode | Config 1,2 | |  | FDD |  |
| BW channel | Config 1,2 | |  | 10: NRB,c = 52 |  |
| TDD Configuration | Config 1,2 | |  | Not Applicable |  |
| CORESET Reference Channel | Config 1,2 | |  | CR.1.1 FDD | A.3.1.2 |
| SSB Configuration | Config 1,2 | |  | SSB.1 FR1 | A.3.10 |
| SMTC Configuration | Config 1,2 | |  | SMTC.1 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1,2 | | kHz | 15 |  |
| PRACH Configuration | Config 1,2 | |  | Table A.3.8.2.2-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | |  | 0 |  |
| OCNG parameters | | |  | OP.1 | A.3.2.1 |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | DCI format | |  | 1-0 |  |
| Number of Control OFDM symbols | |  | 2 |  |
| Aggregation level | | CCE | 8 |  |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | dB | 0 |  |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | dB | 0 |  |
| DMRS precoder granularity | |  | REG bundle size |  |
| REG bundle size | |  | 6 |  |
| DRX | | |  | OFF |  |
| Gap pattern ID | | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | Config 1,2 | | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 in activated SCell | | Config 1,2 |  | CSI-RS.1.2 FDD | A.3.14 |
| CSI-RS configuration for CSI reporting | | Config 1,2 |  | CSI-RS.1.1 FDD | A.3.14 |
| TRS configuration | | Config 1,2 |  | TRS.1.1 FDD |  |
| CSI-RS-Index assigned as RLM RS in PCell | | Config 1,2 |  | CSI-RS.1.2 FDD | A.3.14 |
| T310 Timer | | | ms | 1000 |  |
| N310 | | |  | 2 |  |
| T1 | | | s | 0.2 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 0.18 |  |
| T3 | | | s | 0.14 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 0.17 |  |
| D1 | | | s | 0.13 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.2.5.1-3: Cell specific test parameters for FR1 SCell for CSI-RS-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | **Cell1** | Test 1 Cell2 | | | | |
|  | **T1 to T5** | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  |
| EPRE ratio of PBCH DMRS to SSS | | dB |  |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  |
| EPRE ratio of OCNG DMRS to SSS | | dB |  |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  |
| SNR\_CSI-RS of set q0 | Config 1,2 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1,2 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1,2 | dBm/ | -108 | -108 | -108 | -88 | -88 | -88 |
|  | Config 1,2 | dBm/15KHz | -98 | -98 | | | | |
| Propagation condition | |  | AWGN | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Void  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | | |

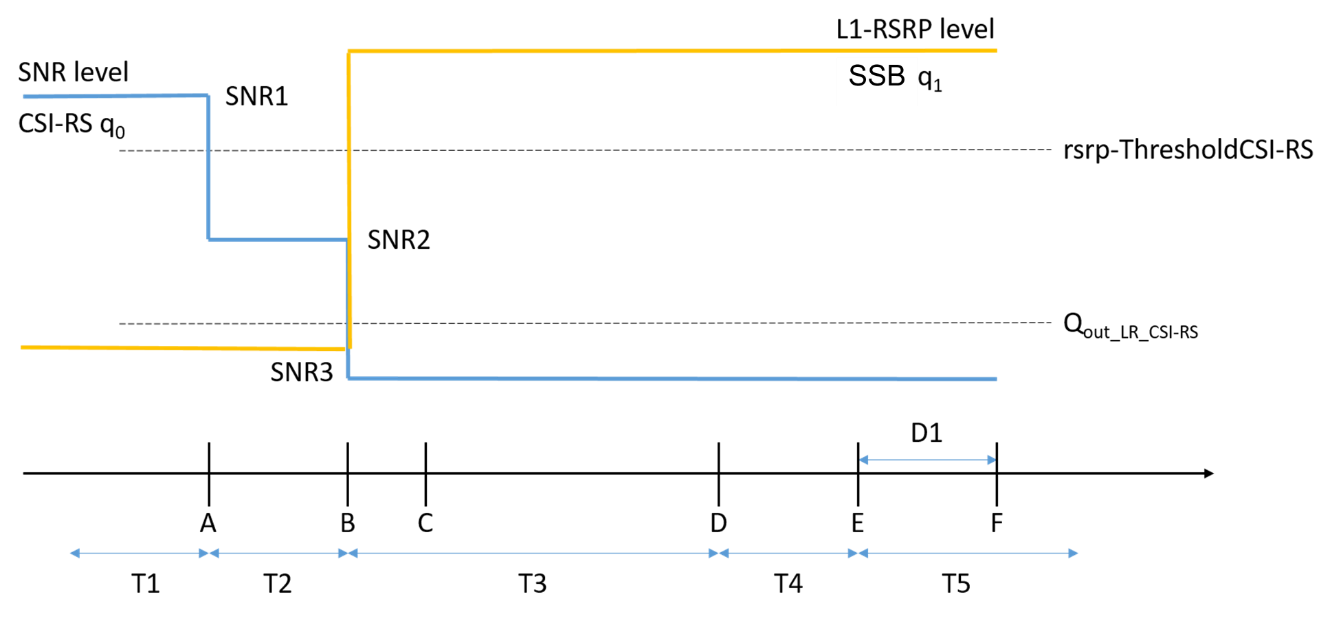


Figure A.14.4.2.5.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing in for SCell non-DRX mode

##### A.14.4.2.5.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.14.4.2.6 Beam Failure Detection and Link Recovery Test for FR1 SCell for satellite access configured with CSI-RS-based BFD and SSB-based LR in DRX mode

##### A.14.4.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell which is served by satellite access node (SAN) and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.14.4.2.6.1-1, A.14.4.2.6.1-2, A.14.4.2.6.1-3, and A.14.4.2.6.1-4 below. There are two cells, cell 1 is the PCell and cell 2 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.14.4.2.6.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.14.4.2.6.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled in SCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.14.4.2.6.1-1: Supported test configurations for FR1 PCell and Scell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.2.6.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value | Comment |
| Test 1 |
| NTN reference Serving satellite configuration | Config 1 | |  | SSC.1 |  |
| Config 2 | |  | SSC.2 |  |
| Active PCell | | |  | Cell 1 |  |
| RF Channel Number for PCell | | |  | 1 |  |
| Active SCell | | |  | Cell 2 |  |
| RF Channel Number for SCell | | |  | 2 |  |
| Duplex mode | Config 1,2 | |  | FDD |  |
| BW channel | Config 1,2 | | MHz | 10: NRB,c = 52 |  |
| TDD Configuration | Config 1,2 | |  | Not Applicable |  |
| CORESET Reference Channel | Config 1,2 | |  | CR.1.1 FDD | A.3.1.2 |
| SSB Configuration | Config 1,2 | |  | SSB.1 FR1 | A.3.10 |
| SMTC Configuration | Config 1,2 | |  | SMTC.1 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1,2 | |  | 15 KHz |  |
| PRACH Configuration | Config 1,2 | |  | Table A.3.8.2.1-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | |  | 0 |  |
| OCNG parameters | | |  | OP.1 | A.3.2.1 |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure detection transmission parameters | DCI format | |  | 1-0 |  |
| Number of Control OFDM symbols | |  | 2 |  |
| Aggregation level | | CCE | 8 |  |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | dB | 0 |  |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | dB | 0 |  |
| DMRS precoder granularity | |  | REG bundle size |  |
| REG bundle size | |  | 6 |  |
| DRX | | |  | DRX.7 | A.3.3.7 |
| Gap pattern ID | | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | Config 1,2 | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0in activated SCell | Config 1,2 | |  | CSI-RS.1.2 FDD | A.3.14.1 |
| CSI-RS configuration for CSI reporting | Config 1,2 | |  | CSI-RS.1.1 FDD | A.3.14.1 |
| TRS configuration | Config 1,2 | |  | TRS.1.1 FDD |  |
| CSI-RS-Index assigned as RLM RS in PCell | Config 1,2 | |  | CSI-RS.1.2 FDD |  |
| T310 Timer | | | ms | 1000 |  |
| N310 | | |  | 2 |  |
| T1 | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 8.37 |  |
| T3 | | | s | 6.44 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 1.97 |  |
| D1 | | | s | 1.93 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.14.4.2.6.1-3: Cell specific test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Test 1 Cell2 | | | | |
|  | **T1 to T5** | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  |
| EPRE ratio of PBCH DMRS to SSS | | dB |  |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  |
| EPRE ratio of OCNG DMRS to SSS | | dB |  |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  |
| SNR\_CSI-RS of set q0 | Config 1,2 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1,2 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1,2 | dBm/ SCS kHz | -110 | -110 | -110 | -88 | -88 | -88 |
|  | Config 1,2 | dBm/15 kHz | -98 | -98 | | | | |
| Propagation condition | |  | AWGN | AWGN | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Void  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is modified as specified in clause A.3.6. | | | | | | | | |

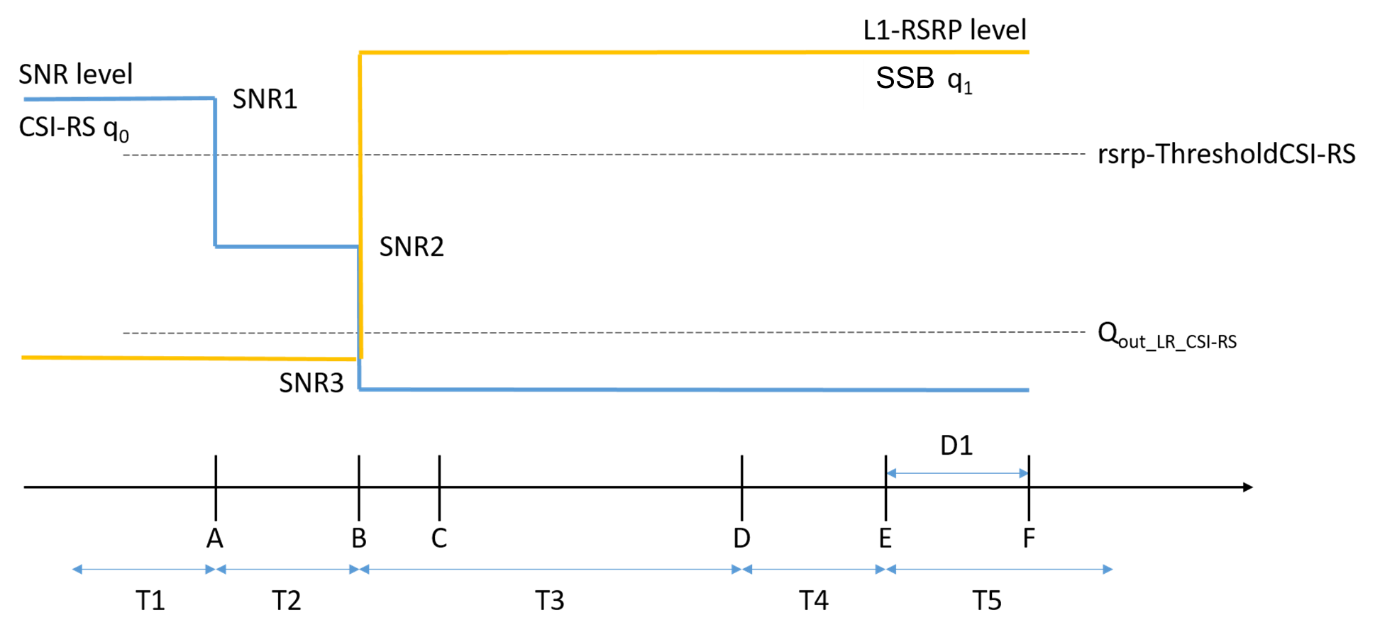


Figure A.14.4.2.6.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing for SCell in DRX mode

##### A.14.4.2.6.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

### A.14.4.3 Active BWP switch for satellite access

#### A.14.4.3.1 DCI-based and Timer-based Active BWP Switch

##### A.14.4.3.1.1 NR FR1 DL active BWP switch with non-DRX in SA

###### A.14.4.3.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement defined in clause 8.6C.

The supported test configurations are shown in Table A.14.4.3.1.1.1-1. The test scenario comprises of one cell (Cell 1) as given in Table A.14.4.3.1.1.1-2. Cell-specific parameters of the cell are specified in Table A.14.4.3.1.1.1-3 below.

PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE will have ACK/NACK sending.

Before the test starts,

- UE is connected to Cell 1 on radio channel 1.

- UE is configured with 2 different UE-specific downlink bandwidth parts, BWP-1 and BWP-2 before starting the test. BWP-1 and BWP-2 always include bandwidth of the initial DL BWP and SSB.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1.

- UE is configured with a *bwp-InactivityTimer* timer value for Cell1.

The cell has constant signal levels throughout the test.

The test consists of 3 successive time periods, with durations of T1, T2, and T3, respectively.

During T1,

Time period T1 starts when a DCI format 1\_1 command for DL BWP switch, sent from the test equipment to the UE, is received at the UE side in Cell1’s slot # denoted *i*. The UE shall switch its bandwidth part from BWP-1 to BWP-2.

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of Cell1’s DL slot (*i+TBWPswitchDelay*) as defined in clause 8.6C and starts to report valid ACK/NACK for the Cell1 no later than the first UL slot that occurs after the beginning of slot (). The UE shall be continuously scheduled on Cell1’s BWP-2 starting from the first DL slot that occurs after the beginning of slot (*i+TBWPswitchDelay*).

During T2, the test equipment won’t transmit DCI format for PDSCH reception on Cell1.

During T3,

The time period T3 starts from the slot #*j*, where j is the first slot of the subframe immediately after *bwp-InactivityTimer* timer expires. The UE shall switch its bandwidth part from BWP-2 back to the default bandwidth part – BWP-1.

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of Cell1’s slot (*j+TBWPswitchDelay*) as defined in clause 8.6C and starts to report valid ACK/NACK for the Cell1 at latest on the first UL slot that occurs after the beginning of slot (). The UE shall be continuously scheduled on Cell1’s BWP-1 starting from the first DL slot that occurs after the beginning of slot (*j+TBWPswitchDelay*).

The test equipment verifies the DL BWP switch time by counting the slots from the time when the BWP switch command is received or *bwp-InactivityTimer* timer expires till an ACK/NACK is received.

Table A.14.4.3.1.1.1-1: DL BWP switch supported test configurations

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.4.3.1.1.1-2: General test parameters for DL BWP switch in SA

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active Cell |  | Cell 1 | Cell1 on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| *bwp-InactivityTimer* | ms | 200 |  |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |
| T3 | s | 0.2 |  |

Table A.14.4.3.1.1.1-3 : NR Cell specific test parameters for DL BWP switch in SA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Cell 1** |
| Frequency Range | | | |  | FR1 |
| Duplex mode | | | Config 1 |  | FDD |
| BWchannel | | | Config 1 |  | 10 MHz: NRB,c = 52 |
| Serving Satellite Configuration | | | Config 1 |  | *[SSC.1] or [SSC.2]*  *[Note: SSC.1 and SSC.2 are Serving Satellite Configurations for GSO and NGSO, respectively. The selection between the two is up to UE capability, and SSC.2 is selected if DUT supports both]* |
| Active BWP ID | | | |  | 1, 2 |
| Initial DL BWP Configuration | | | Config 1 |  | DLBWP.0.2 Note 4 |
| Active DL BWP-1 Configuration | | | Config 1 |  | DLBWP.1.1 Note 4 |
| Active DL BWP-2 Configuration | | | Config 1 |  | DLBWP.1.3 Note 4 |
| Initial UL BWP Configuration | | | Config 1 |  | ULBWP.0.2 Note 4 |
| Active UL BWP-1 Configuration | | | Config 1 |  | ULBWP.1.1 Note 4 |
| Active UL BWP-2 Configuration | | | Config 1 |  | N/A |
| PDSCH Reference measurement channel | | | Config 1 |  | SR.1.1 FDD |
| RMSI CORESET parameters | | | Config 1 |  | CR.1.1 FDD |
| Dedicated CORESET parameters | | | Config 1 |  | CCR.1.2 FDD |
| OCNG Patterns | | | |  | OP.1 |
| SSB Configuration | | | Config 1 |  | SSB.1 FR1 |
| SMTC Configuration | | |  |  | SMTC.1 |
| Correlation Matrix and Antenna Configuration | | | |  | 1x2 Low |
| TRS Configuration | | Config 1 | |  | TRS.1.1 FDD |
| EPRE ratio of PSS to SSS | | | | dB | 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) | | | |  |  |
| NocNote 2 | Config 1 | | | dBm/SCS | -104 |
| NocNote 2 | | | | dBm/15kHz | -104 |
| SS-RSRP Note 3 | Config 1 | | | dBm/SCS | -87 |
| Ês/Iot | | | | dB | 17 |
| Ês/Noc | | | | dB | 17 |
| IoNote3 | | | Config 1 | dBm/  9.36MHz | -58.96 |
| Propagation Condition | | | |  | AWGN |
| Note 1: OCNG shall be used such that the resources in Cell 1 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. | | | | | |

###### A.14.4.3.1.1.2 Test Requirements

During T1, the UE shall start to send the ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot ().

During T3, the UE shall start to send the ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot (.

Where, *k1* is the timing between DL data receiving and acknowledgement as specified in [7].

Depending on UE capability *bwp-SwitchingDelay* [2], UE shall finish BWP switch within the time duration *TBWPswitchDelay* defined in Table 8.6C.2-1.

All of the above test requirements shall be fulfilled in order for the observed Cell1 active BWP switch delay to be counted as correct.

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

#### A.14.4.3.2 RRC-based Active BWP Switch

##### A.14.4.3.2.1 NR FR1 DL active BWP switch of Cell with non-DRX in SA

###### A.14.4.3.2.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement for RRC-based BWP switch defined in clause 8.6C.

The supported test configurations are shown in Table A.14.4.3.2.1.1-1. The test scenario comprises of one Cell (Cell 1) as given in Table A.14.4.3.2.1.1-2. Cell-specific parameters of Cell are specified in Table A.14.4.3.2.1.1-3 below.

PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE will have ACK/NACK sending.

Before the test starts,

- UE is connected to Cell 1 on radio channel 1.

- UE has bandwidth part BWP-1 in its RRC-configuration for Cell 1.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 of initial condition in Cell 1.

All cells have constant signal levels throughout the test.

The test consists of 1 time period, with duration of T1.

During T1,

Time period T1 starts when a *RRCReconfiguration* with updated bandwidth part configuration, sent from the test equipment to the UE, is completely received at the UE side in PCell’s slot # denoted *i*. The UE shall reconfigure its bandwidth part with the updated bandwidth part BWP-1 of final condition.

The UE shall be able to receive PDSCH on PCell from the first DL slot that occurs after the beginning of DL slot () as defined in clause 8.6C.3 and starts to report valid ACK/NACK for the PCell from the first UL slot that occurs after the beginning of DL slot () on BWP-1 of final condition. The UE shall be continuously scheduled on PCell’s BWP-1 of final condition starting from the first DL slot right after slot ().

TRRCprocessingDelay and TBWPswitchDelayRRC are defined in clause 8.6C.3.

The test equipment verifies the DL BWP switch time in Cell by counting the time from the time when the RRC Reconfiguration message including updated BWP configuration is sent till the time when a vaild ACK/NACK is received is received.

Table A.14.4.3.2.1.1-1: DL BWP switch supported test configurations in SA scenario

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.4.3.2.1.1-2: General test parameters for DL BWP switch in SA scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active Cell |  | Cell 1 | Cell on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| T1 | s | 0.2 |  |

Table A.14.4.3.2.1.1-3: NR Cell specific test parameters for DL BWP switch in SA scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Cell 1** |
| Frequency Range | | | |  | FR1 |
| Duplex mode | | Config 1 | |  | FDD |
| BWchannel | | Config 1 | |  | 10 MHz: NRB,c = 52 |
| Serving Satellite Configuration | | Config 1 | |  | *[SSC.1] or [SSC.2]*  *[Note: SSC.1 and SSC.2 are Serving Satellite Configurations for GSO and NGSO, respectively. The selection between the two is up to UE capability, and SSC.2 is selected if DUT supports both]* |
| Active BWP ID | | | |  | 1 |
| Initial DL BWP Configuration | | Config 1 | |  | DLBWP.0.2 |
| Initial UL BWP Configuration | | Config 1 | |  | ULBWP.0.2 |
| Initial Condition | Active DL BWP-1 Configuration | Config 1 | |  | DLBWP.1.3 |
|  | Active UL BWP-1 Configuration | Config 1 | |  | ULBWP.1.3 |
| Final  Condition | Active DL BWP-1 Configuration | Config 1 | |  | DLBWP.1.1 |
|  | Active UL BWP-1 Configuration | Config 1 | |  | ULBWP.1.1 |
| PDSCH Reference measurement channel | | Config 1 | |  | SR.1.1 FDD |
| RMSI CORESET parameters | | Config 1 | |  | CR.1.1 FDD |
| Dedicated CORESET parameters | | Config 1 | |  | CCR.1.2 FDD |
| OCNG Patterns | | | |  | OP.1 |
| SSB Configuration | | Config 1 | |  | SSB.1 FR1 |
| SMTC Configuration | | | |  | SMTC.1 |
| TRS Configuration | | | Config 1 |  | TRS.1.1 FDD |
| Antenna Configuration | | | |  | 1x2 Low |
| Propagation Condition | | | |  | AWGN |
| EPRE ratio of PSS to SSS | | | | dB | 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) | | | |  |  |
| NocNote 2 | | Config 1 | | dBm/SCS | -104 |
| SS-RSRP Note 3 | | Config 1 | | dBm/SCS | -87 |
| Ês/Iot | | | | dB | 17 |
| Ês/Noc | | | | dB | 17 |
| IoNote3 | | Config 1 | | dBm/  9.36MHz | -58.96 |
| 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. | | | | | |

###### A.14.4.3.2.1.2 Test Requirements

During T1, the UE shall be ready for the reception of uplink grant for the Cell from the first DL slot that occurs right after the begining of slot () and starts to report valid ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot ().

Where, *k1* is the timing between DL data receiving and acknowledgement as specified in [7].

All of the above test requirements shall be fulfilled in order for the observed Cell active BWP switch delay to be counted as correct.

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

### A.14.4.4 UE specific CBW change for satellite access

#### A.14.4.4.1 UE specific CBW change on PCell in FR1 in non-DRX

##### A.14.4.4.1.1 Test Purpose and Environment

The purpose of this test is to verify the UE specific CBW change delay requirement defined in clause 8.13C.

The supported test configurations are shown in Table A.14.4.4.1.1-1. The test scenario comprises of one Cell (Cell 1), which is PCell as given in Table A.14.4.4.1.1-2. Cell-specific parameters are specified in Table A.14.4.4.1.1-3.

PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE sends ACK/NACK during the test.

Before the test starts:

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

UE has bandwidth part BWP-1 in its RRC-configuration for Cell 1 (PCell).

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 of initial condition in PCell.

UE has been configured with UE specific CBW (CBW-1).

UE is indicated in *SCS-SpecificCarrier* [2] that the UE specific CBW is CBW-1 as the initial condition in Cell 1 (PCell).

Cell1 (PCell) has constant signal levels throughout the test.

The test consists of 1 time period, with duration of T1.

During T1,

Time period T1 starts when a *RRCReconfiguration* containing *SCS-SpecificCarrier* with updated UE specific CBW, sent from the test equipment to the UE, is completely received at the UE side in PCell’s slot # denoted *i*. The UE shall reconfigure its UE specific CBW with the updated CBW-2 for the final condition.

The UE shall be able to receive PDSCH on PCell from the first DL slot that occurs after the beginning of DL slot () as defined in clause 8.13C and starts to report valid ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot () on the PCell’s BWP-1 on CBW-2 for the final condition. The UE shall be continuously scheduled on the PCell’s BWP-1 on CBW-2 for the final condition starting from the first DL slot right after slot ().

and are defined in clause 8.13C.

The test equipment verifies the UE specific CBW switching delay in PCell by estimating the time from the moment the RRC Reconfiguration message including updated UE specific CBW configuration is sent until the moment a vaild ACK/NACK is received.

Table A.14.4.4.1.1-1: Supported test configurations for UE specific CBW change in SA scenario

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |

Table A.14.4.4.1.1-2: General test parameters for UE specific CBW change in SA scenario

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active Cell |  | Cell 1 | Cell on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| T1 | s | 0.2 |  |

Table A.14.4.4.1.1-3: NR Cell specific test parameters for UE specific CBW change in SA scenario

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Cell 1** |
| Frequency Range | | | |  | FR1 |
| Duplex mode | | Config 1 | |  | FDD |
| BWchannel | | Config 1 | |  | 10 MHz: NRB,c = 52 |
| Serving Satellite Configuration | | Config 1 | |  | *[SSC.1] or [SSC.2]*  *[Note: SSC.1 and SSC.2 are Serving Satellite Configurations for GSO and NGSO, respectively. The selection between the two is up to UE capability, and SSC.2 is selected if DUT supports both]* |
| Active DL BWP ID | | Config 1 | |  | 1 |
| Initial DL BWP Configuration (BWP-1) | | Config 1 | |  | DLBWP.0.2 |
| Initial UL BWP Configuration | | Config 1 | |  | ULBWP.0.2 |
| Initial Condition | Active DLCBW-1 Configureation | Config 1 | |  | DLCBW.1.1 |
|  | Active UL  CBW-1  Configuration | Config 1 | |  | ULCBW.1.1 |
| Final Condition | Active DLCBW-1 Configureation | Config 1 | |  | DLCBW.1.2 |
|  | Active UL  CBW-1  Configuration | Config 1 | |  | ULCBW.1.2 |
| PDSCH Reference measurement channel | | Config 1 | |  | SR.1.1 FDD |
| RMSI CORESET parameters | | Config 1 | |  | CR.1.1 FDD |
| Dedicated CORESET parameters | | Config 1 | |  | CCR.1.1 FDD |
| OCNG Patterns | | | |  | OP.1 |
| SSB Configuration | | Config 1 | |  | SSB.1 FR1 |
| SMTC Configuration | | | |  | SMTC.1 |
| TRS Configuration | | | Config 1 |  | TRS.1.1 FDD |
| Antenna Configuration | | | |  | 1x2 Low |
| Propagation Condition | | | |  | AWGN |
| EPRE ratio of PSS to SSS | | | | dB | 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) | | | |
| NocNote 2 | | Config 1 | | dBm/SCS | -104 |
| SS-RSRP Note 3 | | Config 1 | | dBm/SCS | -87 |
| Ês/Iot | | | | dB | 17 |
| Ês/Noc | | | | dB | 17 |
| IoNote3 | | Config 1 | | dBm/  9.36MHz | -58.96 |
| 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. | | | | | |

##### A.14.4.4.1.2 Test Requirements

During T1, the UE shall be ready for the reception of uplink grant for the PCell from the first DL slot that occurs right after the begining of slot () and starts to report valid ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot ().

Where, *k1* is the timing between DL data receiving and acknowledgement as specified in [7].

All of the above test requirements shall be fulfilled in order for the observed UE specific CBW change delay on the PCell to be counted as correct.

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

### A.14.4.5 Pathloss reference signal switching delay

#### A.14.4.5.1 MAC-CE based pathloss reference signal switch delay

##### A.14.4.5.1.1 Test Purpose and Environment

The purpose of this test is to verify the MAC-CE based pathloss reference signal switch delay requirement defined in clause 8.14C.

The supported test configurations are shown in Table A.14.4.5.1.1-1. The test scenario comprises of one cell (Cell 1) as given in Table A.14.4.5.1.1-2. Cell-specific parameters of the cell are specified in Table A.14.4.5.1.1-3 below.

The test consists of 3 successive time periods, with duration of T1, T2 and T3, respectively.

Prior to the start of the time duration T1,

- UE is connected to Cell 1 on radio channel 1.

- UE shall be fully synchronized to SSB #0.

During T1,

- The UE shall track SSB #1 so that SSB #1 as a pathloss reference signal is known to the UE.

Time period T2 starts when the UE is configured of the power headroom reporting functionality by upper layers by the test equipment and the UE shall transmit a PHR during T2.

During T2,

- UE is configured with a *phr-ProhibitTimer* timer value for Cell 1.

- UE is configured with a *phr-Tx-PowerFactorChange* value for Cell 1.

During T3,

Time period T3 starts when a PDSCH carrying MAC-CE activation for pathloss reference signal switch, sent from the test equipment to the UE to swicth the pathloss reference signal from SSB 0 to SSB 1, is received at the UE side in Cell1’s slot # denoted *i*. The UE shall switch its pathloss reference signal to the target one and send PHR.

The UE shall be able to apply the target pathloss reference signal of the serving cell on which pathloss reference signal switch occurs no later than the slot *i* + + as defined in clause 8.14. The UE shall be able to apply old pathloss reference signals until the slot *i* + + as defined in clause 8.14.

The test equipment verifies the pathloss RS switch time by counting the slots from the time when the pathloss RS switch command is transmitted till a PHR is received during T3.

Table A.14.4.5.1.1-1: MAC-CE based pathloss reference signal switch supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.4.5.1.1-2: General test parameters for MAC-CE based pathloss reference signal switch

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Active PCell | |  | Cell 1 |  |
| RF Channel Number | |  | 1 |  |
| Duplex mode | Config 1, 2 |  | FDD |  |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |  |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.1 |  |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |  |
| UL dedicated BWP configuration | Config 1, 2, |  | ULBWP.1.1 |  |
| CORESET Reference Channel | Config 1, 2 |  | CR.1.1 FDD |  |
| SSB Configuration | Config 1, 2 |  | SSB.1 FR1 |  |
| SMTC Configuration | Config 1, 2 |  | SMTC.1 |  |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 |  | 15 kHz |  |
| SSB index assigned as pathloss RS | |  | 0 in T1, 0 in T2, 1 in T3 |  |
| OCNG parameters | |  | OP.1 |  |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |  |
| DRX | |  | OFF |  |
| Gap pattern ID | |  | gp0 |  |
| *phr-ProhibitTimer* | | sub frame | 0 |  |
| *phr-Tx-PowerFactorChange* | | dB | 5 |  |
| *phr-PeriodicTimer* | | sub frame | infinity |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| T1 | | s | [2] |  |
| T2 | | s | [2] |  |
| T3 | | s | 0.2 |  |

Table A.14.4.5.1.1-3: NR Cell specific test parameters for MAC-CE based pathloss reference signal switch

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | |
| T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | | | dB |
| EPRE ratio of PSS to SSS | | | | dB |
| EPRE ratio of PDSCH DMRS to SSS | | | | dB |
| EPRE ratio of PDSCH to PDSCH DMRS | | | | dB |
| EPRE ratio of OCNG DMRS to SSS | | | | dB |
| EPRE ratio of OCNG to OCNG DMRS | | | | dB |
| SSB with index 0 |  | | | dB | [7] | | |
|  | Config 1, 2, 3 | | dBm/15kHz | [-101] | | |
|  | | | dB | [7] | | |
| SS-RSRP Note 4 | | Config 1, 2 | dBm/ SCS | [-94] | | |
| Config 3 | [-91] | | |
| SSB with index 1 |  | | | dB | [-3] | | |
|  | Config 1, 2, 3 | | dBm/15kHz | [-101] | | |
|  | | | dB | [-3] | | |
| SS-RSRP Note 4 | | Config 1, 2 | dBm/ SCS | [-104] | | |
| Config 3 | [-101] | | |
| Io Note 5 | Config 1, 2 | | | dBm | -65.3/9.36MHz | | |
| Config 3 | | | -59.2/38.16MHz | | |
| Propagation condition | | | |  | AWGN | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 5: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters. | | | | | | | |

##### A.14.4.5.1.2 Test Requirements

During T3, the UE shall start to send the PHR for PCell no later than the slot *i* + + .

During T3, the UE shall start to send the PHR for PCell no earlier than the slot *i* + + .

Where, is the timing between pathloss reference MAC-CE activation command and acknowledgement as specified in [7], is the periodicity of the target pathloss reference signal which is SSB in this test.

During T3, UE shall send L1-RSRP report with measurement results for both SSB0 and SSB1.

All of the above test requirements shall be fulfilled in order for the observed pathloss RS switch delay to be counted as correct.

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

Note: The UE shall be given proper uplink transmission grant during T2 and T3.

## A.14.5 Measurement procedure

### A.14.5.1 Intra-frequency Measurements

#### A.14.5.1.1 SA event triggered reporting tests without gap under non-DRX

##### A.14.5.1.1.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2C.5.1 and 9.2C.5.2.

##### A.14.5.1.1.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for PCell and neighbour cell are given in Table A.14.5.1.1.2-1 and A.14.5.1.1.2-2 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

UE is configured with 2 non-overlapping SMTCs for the intra-frequency measurement. The SMTC periodicity is 40ms, and SMTC1 is associated with Cell 1 with offset 0, and SMTC2 is associated with Cell 2 with offset 20ms.

Table A.14.5.1.1.2-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.5.1.1.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 |  |
| NTN reference configuration |  | 1 | TBD | For GSO |
| 2 | TBD | For NGSO |
| SMTC1 configuration |  | 1 | TBD | Period: 40ms, offset: 0 |
| SMTC2 configuration |  | 2 | TBD | Period: 40ms, offset: 20ms |
| A3-Offset | dB | 1, 2 | -4.5 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX |  | 1, 2 |  | OFF |
| Time offset between serving and neighbour cells |  | 1, 2 | 20 ms | Asynchronous cells.  The timing of Cell 2 is 20ms later than the timing of Cell 1. |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

Table A.14.5.1.1.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | TBD | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| IInitial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | --64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.1.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.1.2 SA event triggered reporting tests without gap under DRX

##### A.14.5.1.2.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2C.5.1 and 9.2C.5.2.

##### A.14.5.1.2.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for PCell are given in Table A.14.5.1.2.2-1, A.14.5.1.2.2-2 and A.14.5.1.2.2-3 below. In the measurement controlinformation, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

UE is configured with 1 SMTC for the intra-frequency measurement. Both Cell 1 and Cell 2 are associated with the configured SMTC.

Table A.14.5.1.2.2-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.5.1.2.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 with DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| Active cell |  | 1, 2 | Cell 1 | |  |
| Neighbour cell |  | 1, 2 | Cell 2 | | Cell to be identified. |
| NTN reference configuration |  | 1 | TBD | | For GSO |
| 2 | TBD | | For NGSO |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | |  |
| SMTC configuration |  | 1, 2 | SMTC.2 | |  |
| A3-Offset | dB | 1, 2 | -4.5 | |  |
| CP length |  | 1, 2 | Normal | |  |
| Hysteresis | dB | 1, 2 | 0 | |  |
| Time To Trigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.1 | DRX. 7 |  |
| Time offset between serving and neighbour cells |  | 1, 2 | 3 μs | | Synchronous cells |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | 5 | 10 |  |

Table A.14.5.1.2.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 with DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| IInitial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | --64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.2.3 Test Requirements

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.1.3 SA event triggered reporting tests without gap under non-DRX with SSB index reading

##### A.14.5.1.3.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 9.2C.5.1 and 9.2C.5.2.

##### A.14.5.1.3.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for FDD PCell and neighbour cell are given in Table A.14.5.1.3.2-1 and A.14.5.1.3.2-2 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

UE is configured with 2 overlapping SMTC for the intra-frequency measurement. The SMTC periodicity is 40ms, and SMTC1 is associated with Cell 1 with offset 0, and SMTC2 is associated with Cell 2 with offset 3ms.

Table A.14.5.1.3.2-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.5.1.3.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for FDD PCell in FR1 with SSB index reading

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| NTN reference configuration |  | 1 | TBD | For GSO |
| 2 | TBD | For NGSO |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 |  |
| SSB configuration |  | 1, 2 | SSB.1 FR1 |  |
| SMTC1 configuration |  | 1, 2 | TBD |  |
| SMTC2 configuration |  | 1, 2 | TBD |  |
| A3-Offset | dB | 1, 2 | -4.5 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX | ms | 1, 2 |  | OFF |
| Time offset between serving and neighbour cells |  | 1, 2 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

**Table A.14.5.1.3.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for FDD PCell in FR1 with SSB index reading**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | TBD | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| IInitial BWP configuration |  | 1, 2 | DLBWP.0,1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | --64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.3.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE is required to read the neighbour cell SSB index and report the acquired SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.1.4 SA event triggered reporting tests with single measurement gap under non-DRX for satellite access

##### A.14.5.1.4.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clause 9.2C.6.1 and 9.2C.6.2.

##### A.14.5.1.4.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters are given in Table A.14.5.1.4.2-1 and A.14.5.1.4.2-2 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving each cell before the test.

UE is configured with 1 SMTC for the intra-frequency measurement. Both Cell 1 and Cell 2 are associated with the configured SMTC.

Table A.14.5.1.4.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Table A.14.5.1.4.2-2: General test parameters for SA intra-frequency event triggered reporting with single measurement gap for PCell in FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 |  |
| NTN reference configuration |  | 1 | TBD | For GSO |
|  |  | 2 | TBD | For NGSO |
| Measurement gap type |  | 1, 2 | Per-UE gaps |  |
| Gap Pattern ID |  | 1, 2 | 0 | As specified in clause 9.1.2-1. |
| Measurement gap repetition periodicity | ms | 1, 2 | 40 |  |
| Measurement gap length | ms | 1, 2 | 6 |  |
| Measurement gap offset | ms | 1, 2 | 39 |  |
| A3-Offset | dB | 1, 2 | -4.5 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX | ms | 1, 2 |  | OFF |
| Time offset between serving and neighbour cells |  | 1,2 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

Table A.14.5.1.4.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting with single measurement gap for PCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | 1, 2 | SMTC.2 | | SMTC.2 | |
| CSI-RS parameters |  | 1, 2 | CSI-RS.1.2 FDD resource #0 | | N/A | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.2 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| Initial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | -64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.4.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.1.5 SA event triggered reporting tests with FNO concurrent gaps under DRX for satellite access

##### A.14.5.1.5.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clause 9.2C.6.1 and 9.2C.6.2.

##### A.14.5.1.5.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters are given in Table A.14.5.1.5.2-1, A. 14.5.1.5.2-2 and A. 14.5.1.5.2-3 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2 and Cell 3.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving each cell before the test.

The UE is configured with 2 FNO concurrent measurement gaps for the intra-frequency measurement. Serving Cell 1 is expected to be measured within MeasGapId #0 and Neighbour Cell 2 is expected to be measured within MeasGapId #1.

**Table A.14.5.1.5.2-1: Supported test configurations**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Table A.14.5.1.5.2-2: General test parameters for SA intra-frequency event triggered reporting with FNO concurrent gaps for PCell in FR1 with DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| Active cell |  | 1, 2 | Cell 1 | |  |
| Neighbour cell |  | 1, 2 | Cell 2 | | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | |  |
| NTN reference configuration |  | 1 | TBD | | For GSO |
|  | 2 | TBD | | For NGSO |
| Measurement gap type |  | 1, 2 | Per-UE gap | |  |
| Gap Pattern ID |  | 1 | 1 | | As specified in clause 9.1.2-1. |
| Measurement gap repetition periodicity | ms | 1, 2 | 40 | |  |
| Measurement gap length | ms | 1, 2 | 6 | |  |
| Measurement gap offset | ms | 1, 2 | 19 for MeasGapId #0  4 for MeasGapId #1 | |  |
| A3-Offset | dB | 1, 2 | -4.5 | |  |
| CP length |  | 1, 2 | Normal | |  |
| Hysteresis | dB | 1, 2 | 0 | |  |
| Time To Trigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.1 | DRX. 7 |  |
| Time offset between serving and neighbour cells |  | 1, 2 | 3 ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | 5 | 10 |  |

Table A.14.5.1.5.2 -3: NR Cell specific test parameters for SA intra-frequency event triggered reporting with FNO concurrent gaps for PCell in FR1 with DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.7 FR1 | |
| SMTC configuration |  | 1, 2 | SMTC.2 | | SMTC.Y | |
| CSI-RS parameters |  | 1, 2 | CSI-RS.1.2 FDD resource #0 | | N/A | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.2 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| Initial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | -64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.5.2-4: Void

Table A.14.5.1.5.2-5: Void

##### A.15.5.1.5.3 Test Requirements

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 920 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 6400 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.1.6 SA event triggered reporting tests with PPO concurrent gaps under non-DRX with SSB index reading for satellite access

##### A.14.5.1.6.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the FDD intra-frequency cell search requirements in clause 9.2C.6.1 and 9.2C.6.2.

##### A.14.5.1.6.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for FDD PCell and neighbour cells are given in Table A.14.5.1.6.2-1 and A.14.5.1.6.2-2 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

There are two BWPs configured in Cell 1, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 1. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving each cell before the test.

The UE is configured with 2 PPO concurrent measurement gaps for the intra-frequency measurement. Serving Cell 1 is expected to be measured within MeasGapId #0 and Neighbour Cell 2 is expected to be measured within MeasGapId #1. And the priority for MeasGapId #1 is higher than the priority for MeasGapId #0.

Table A.14.5.1.6.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Table A.14.5.1.6.2-2: General test parameters for SA intra-frequency event triggered reporting with PPO concurrent gaps for FDD PCell in FR1 with SSB index reading

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 |  |
| NTN reference configuration |  | 1 | TBD | For GSO |
|  |  | 2 | TBD | For NGSO |
| Measurement gap type |  | 1, 2 | Per-UE gap |  |
| Gap Pattern ID |  | 1, 2 | 0 for MeasGapId #0  1 for MeasGapId #1 | As specified in clause 9.1.2-1. |
| Measurement gap repetition periodicity | ms | 1, 2 | 40ms for MeasGapId #0  80ms for MeasGapId #1 |  |
| Measurement gap length | ms | 1, 2 | 6 |  |
| Measurement gap offset | ms | 1, 2 | 39 for MeasGapId #0  4 for MeasGapId #1 |  |
| A3-Offset | dB | 1, 2 | -4.5 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX | ms | 1, 2 |  | OFF |
| Time offset between serving and neighbour cells |  | 1, 2 | 5 ms | Asynchronous cells.  The timing of Cell 2 is 5ms later than the timing of serving Cell 1. |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

Table A.14.5.1.6.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting with PPO concurrent gaps for FDD PCell in FR1 with SSB index reading

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration |  | 1, 2 | SMTC.2 | | SMTC.Y | |
| CSI-RS parameters |  | 1, 2 | CSI-RS.1.2 FDD resource #0 | | N/A | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.2 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| Initial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | -64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.1.6.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1240 ms from the beginning of time period T2. The UE is required to read the neighbour cell SSB index and report the acquired SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.14.5.2 Inter-frequency Measurements

#### A.14.5.2.1 SA event triggered reporting tests for FR1 without SSB time index detection when DRX is not used with single gap for satellite access

##### A.14.5.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3C.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.14.5.2.1.1-1, A.14.5.2.1.1-2 and A.14.5.2.1.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.14.5.2.1.1-2 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.14.5.2.1.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note 1: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2.  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table A.14.5.2.1.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  | Test 1 |  |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell2 | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2 | 0 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 |  |
| A3-Offset | dB | Config 1,2 | -6 |  |
| Hysteresis | dB | Config 1,2 | 0 |  |
| CP length |  | Config 1,2 | Normal |  |
| TimeToTrigger | s | Config 1,2 | 0 |  |
| Filter coefficient |  | Config 1,2 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | Config 1,2 | 5 |  |
| T2 | s | Config 1,2 | 1 |  |

Table A.14.5.2.1.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
|  | |  |  | T1 | T2 | | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | | 2 | |
| Satellite information | |  | Config 1 | SSC.1 | | | NSC.1 | |
|  | |  | Config 2 | SSC.2 | | | NSC.2 | |
| Duplex mode | |  | Config 1,2 | FDD | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| BWP configuration | Initial DL BWP | Config 1 | Config 1,2 | 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 1,2 | TRS.1.1 FDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 FDD | | |  | |
| RMSI CORESET Reference Channel | |  | Config 1,2 | CR.1.1 FDD | | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1,2 | CCR.1.1 FDD | | |  | |
| SSB parameters | |  | Config 1,2 | SSB.1 FR1 | | | SSB.5 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2 | SMTC.2 | | | SMTC.5 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2 | 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 | Config 1,2 | -98 | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | -Infinity | -91 |
|  | | dB | Config 1,2 | 4 | 4 | | -Infinity | 7 |
|  | | dB | Config 1,2 | 4 | 4 | | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | -70.05 | -62.26 |
| Propagation Condition | |  | Config 1,2 | 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. | | | | | | | | |

##### A.14.5.2.1.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 920 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.2 SA event triggered reporting tests for FR1 without SSB time index detection when DRX is used with single gap for satellite access

##### A.14.5.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3C.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.14.5.2.2.1-1, A.14.5.2.2.1-2 and A.14.5.2.2.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.14.5.2.2.1-2 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.14.5.2.2.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note 1: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2.  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table A.14.5.2.2.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell2 | | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2 | 0 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 | |  |
| A3-Offset | dB | Config 1,2 | -6 | |  |
| Hysteresis | dB | Config 1,2 | 0 | |  |
| CP length |  | Config 1,2 | Normal | |  |
| TimeToTrigger | s | Config 1,2 | 0 | |  |
| Filter coefficient |  | Config 1,2 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2 | DRX.1 | DRX. 7 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | Config 1,2 | 5 | |  |
| T2 | s | Config 1,2 | [1.1] | [11] |  |

Table A.14.5.2.2.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  | |  |  | T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | 2 | |
| Satellite information | |  | Config 1 | SSC.1 | | NSC.1 | |
|  | |  | Config 2 | SSC.2 | | NSC.2 | |
| Duplex mode | |  | Config 1,2 | FDD | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | |
| BWP configuration | Initial DL BWP |  | Config 1,2 | 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 1,2 | TRS.1.1 FDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 FDD | |  | |
| RMSI CORESET Reference Channel | |  | Config 1,2 | CR.1.1 FDD | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1,2 | CCR.1.1 FDD | |  | |
| SSB parameters | |  | Config 1,2 | SSB.1 FR1 | | SSB.5 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2 | SMTC.2 | | SMTC.5 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2 | 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 | Config 1,2 | -98 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -70.05 | -62.2 |
| Propagation Condition | |  | Config 1,2 | 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.14.5.2.2.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1 | Test2 | Comment |
|  | Value | Value |  |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |  |
| drx-RetransmissionTimerDL | sl1 | sl1 |  |
| drx-RetransmissionTimerUL | sl1 | sl1 |  |
| drx-LongCycleStartOffset | ms40 | Ms640 |  |
| shortDRX | disable | disable |  |

Table A.14.5.2.2.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.14.5.2.2.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1080] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [10240] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.3 SA event triggered reporting tests for FR1 with SSB time index detection when DRX is not used with single gap for satellite access

##### A.14.5.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3C.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.14.5.2.3.1-1, A.14.5.2.3.1-2 and A.14.5.2.3.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.14.5.2.3.1-2 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.14.5.2.3.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note 1: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2.  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table A.14.5.2.3.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  | Test 1 |  |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell2 | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2 | 0 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 |  |
| A3-Offset | dB | Config 1,2 | -6 |  |
| Hysteresis | dB | Config 1,2 | 0 |  |
| CP length |  | Config 1,2 | Normal |  |
| TimeToTrigger | s | Config 1,2 | 0 |  |
| Filter coefficient |  | Config 1,2 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | Config 1,2 | 5 |  |
| T2 | s | Config 1,2 | [1.1] |  |

Table A.14.5.2.3.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
|  | |  |  | T1 | T2 | | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | | 2 | |
| Duplex mode | |  | Config 1,2 | FDD | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| BWP configuration | Initial DL BWP | Config 1 | Config 1,2 | 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 1,2 | TRS.1.1 FDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 FDD | | |  | |
| RMSI CORESET Reference Channel | |  | Config 1,2 | CR.1.1 FDD | | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1,2 | CCR.1.1 FDD | | |  | |
| SSB parameters | |  | Config 1,2 | SSB.1 FR1 | | | SSB.5 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2 | SMTC.2 | | | SMTC.5 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2 | 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 | Config 1,2 | -98 | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | -Infinity | -91 |
|  | | dB | Config 1,2 | 4 | 4 | | -Infinity | 7 |
|  | | dB | Config 1,2 | 4 | 4 | | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | -70.05 | -62.2 |
| Propagation Condition | |  | Config 1,2 | 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. | | | | | | | | |

##### A.14.5.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1040] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 UE is required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.4 SA event triggered reporting tests for FR1 without SSB time index detection when DRX is not used with two gaps in fully non-overlapped for satellite access

##### A.14.5.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the multiple gaps capable UE makes correct reporting of events. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3C.4.

In this test, there are three 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, and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.14.5.2.4.1-1, A.14.5.2.4.1-2 and A.14.5.2.4.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.14.5.2.4.1-2 is provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2 and NR cell 3.

Table A.14.5.2.4.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note 1: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2.  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table A.14.5.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  | Test 1 |  |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell2 and NR cell 3 | NR cell 2 and NR cell 3 are on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2 | 0 for MeasGapId #0  0 for MeasGapId #1 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 for MeasGapId #0  19 for MeasGapId #1 |  |
| A3-Offset | dB | Config 1,2 | -6 |  |
| Hysteresis | dB | Config 1,2 | 0 |  |
| CP length |  | Config 1,2 | Normal |  |
| TimeToTrigger | s | Config 1,2 | 0 |  |
| Filter coefficient |  | Config 1,2 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | DRX is not used |
| Time offset between serving and neighbour cell 2,3 |  | Config 1,2 | 3ms | Asynchronous cells.  The timing of Cell 2 and Cell 3 is 3ms later than the timing of Cell 1. |
| T1 | s | Config 1,2 | 5 |  |
| T2 | s | Config 1,2 | [1] |  |

Table A.14.5.2.4.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | | |
|  | |  |  | T1 | T2 | T1 | T2 | T1 | T2 | |
| NR RF Channel Number | |  | Config 1,2 | 1 | | 2 | | 2 | | |
| Satellite information | |  | Config 1 | SSC.1 | | NSC.1 | | | | |
|  | |  | Config 2 | SSC.2 | | NSC.2 | | | | |
| Duplex mode | |  | Config 1,2 | FDD | | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1,2 | DLBWP.0.1 | | NA | | NA | | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | NA | | NA | | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | NA | | NA | | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | NA | | NA | | |
| TRS configuration | |  | Config 1,2 | TRS.1.1 FDD | | NA | | NA | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | OP.1 | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 FDD | |  | |  | | |
| RMSI CORESET Reference Channel | |  | Config 1,2 | CR.1.1 FDD | |  | |  | | |
| Dedicated CORESET Reference Channel | |  | Config 1,2 | CCR.1.1 FDD | |  | |  | | |
| SSB parameters | |  | Config 1,2 | SSB.1 FR1 | | SSB.5 FR1 | | SSB.1 FR1 | | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2 | SMTC.2 | | SMTC.Y | | SMTC.1 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2 | 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 | |  |  |  | |  | |  | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |  | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |  | | |
| Note2 | | dBm/15kHz | Config 1,2 | -98 | | -98 | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | -98 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | -Infinity | | -91 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 | -Infinity | | 7 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 | -Infinity | | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -70.05 | -62.26 | -70.05 | | -62.26 |
| Propagation Condition | |  | Config 1,2 | AWGN | | 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. | | | | | | | | | | |

##### A.14.5.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [920] ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.5 void

##### A.14.5.2.5.1 void

##### A.14.5.2.5.2 void

#### A.14.5.2.6 SA event triggered reporting tests for FR1 without SSB time index detection when DRX is not used with two gaps in partially partial overalpping for satellite access

##### A.14.5.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the multiple gaps capable UE makes correct reporting of events. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3C.4.

In this test, there are three 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, and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.14.5.2.6.1-1, A.14.5.2.6.1-2 and A.14.5.2.6.1-3.

In test 1 measurement gap pattern configuration # 0 and #1 as defined in Table A.14.5.2.6.1-2 are provided.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2 and NR cell 3.

Table A.14.5.2.6.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note 1: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2.  Note 2: target NR cells have the same SCS, BW and duplex mode as NR serving cell | |

Table A.14.5.2.6.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  | Test 1 |  |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell2 and NR cell 3 | NR cell 2 and NR cell 3 are on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2 | 0 for MeasGapId #0  1 for MeasGapId #1 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 79 for MeasGapId #0  4 for MeasGapId #1 |  |
| A3-Offset | dB | Config 1,2 | -6 |  |
| Hysteresis | dB | Config 1,2 | 0 |  |
| CP length |  | Config 1,2 | Normal |  |
| TimeToTrigger | s | Config 1,2 | 0 |  |
| Filter coefficient |  | Config 1,2 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | DRX is not used |
| Time offset between serving and neighbour cell 1 |  | Config 1,2 | 3μs | Synchronous. |
| Time offset between serving and neighbour cell 2 |  | Config 1,2 | 5ms | Asynchronous.  The timing of Cell 3 is 5ms later than the timing of Cell 1. |
| T1 | s | Config 1,2 | 5 |  |
| T2 | s | Config 1,2 | 1.5 |  |

Table A.14.5.2.6.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | | |
|  | |  |  | T1 | T2 | T1 | T2 | T1 | T2 | |
| NR RF Channel Number | |  | Config 1,2 | 1 | | 2 | | 2 | | |
| Satellite information | |  | Config 1 | SSC.1 | | NSC.1 | | | | |
|  | |  | Config 2 | SSC.2 | | NSC.2 | | | | |
| Duplex mode | |  | Config 1,2 | FDD | | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1,2 | DLBWP.0.1 | | NA | | NA | | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | NA | | NA | | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | NA | | NA | | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | NA | | NA | | |
| TRS configuration | |  | Config 1,2 | TRS.1.1 FDD | | NA | | NA | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | OP.1 | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 FDD | |  | |  | | |
| RMSI CORESET Reference Channel | |  | Config 1,2 | CR.1.1 FDD | |  | |  | | |
| Dedicated CORESET Reference Channel | |  | Config 1,2 | CCR.1.1 FDD | |  | |  | | |
| SSB parameters | |  | Config 1,2 | SSB.1 FR1 | | SSB.1 FR1 | | SSB.1 FR1 | | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2 | SMTC.2 | | SMTC.2 | | SMTC.Y | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2 | 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 | |  |  |  | |  | |  | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |  | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |  | | |
| Note2 | | dBm/15kHz | Config 1,2 | -98 | | -98 | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | -98 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | -Infinity | | -91 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 | -Infinity | | 7 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 | -Infinity | | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -70.05 | -62.26 | -70.05 | | -62.26 |
| Propagation Condition | |  | Config 1,2 | AWGN | | 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. | | | | | | | | | | |

##### A.14.5.2.6.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is not required to report SSB time index.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.7 Event triggered reporting test without gap under non-DRX

##### A.14.5.2.7.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the inter-frequency cell search requirements in clauses 9.3C.7.

##### A.14.5.2.7.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) on NR RF channel 1 and a FR1 neighbour cell (Cell 2) on NR RF channel 2. The test parameters for PCell and neighbour cell are given in Table A.14.5.2.7.2-1, A.14.5.2.7.2-2 and A.14.5.2.7.2-3 below. In the measurement control information, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

UE is configured with 2 non-overlapping SMTCs for the inter-frequency measurement. The SMTC periodicity is 40ms, and SMTC1 is associated with Cell 1 with offset 0, and SMTC2 is associated with Cell 2 with offset 20ms.

Table A.14.5.2.7.2-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.5.2.7.2-2: General test parameters for inter-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 |  |
| NTN reference configuration |  | 1 | TBD | For GSO |
| 2 | TBD | For NGSO |
| SMTC1 configuration |  | 1 | TBD | Period: 40ms, offset: 0 |
| SMTC2 configuration |  | 2 | TBD | Period: 40ms, offset: 20ms |
| A3-Offset | dB | 1, 2 | -4.5 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX |  | 1, 2 |  | OFF |
| Time offset between serving and neighbour cells |  | 1, 2 | 20 ms | Asynchronous cells.  The timing of Cell 2 is 20ms later than the timing of Cell 1. |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

Table A.14.5.2.7.2-3: NR Cell specific test parameters for inter-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| IInitial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | --64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.2.7.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.2.8 Event triggered reporting tests without gap under DRX

##### A.14.5.2.8.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the inter-frequency cell search requirements in clauses 9.3C.7.

##### A.14.5.2.8.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) on NR RF channel 1 and a FR1 neighbour cell (Cell 2) on NR RF channel 2. The test parameters for PCell are given in Table A.14.5.2.8.2-1, A.14.5.2.8.2-2 and A.14.5.2.8.2-3 below. In the measurement controlinformation, 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. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

UE is configured with 1 SMTC for the inter-frequency measurement. Both Cell 1 and Cell 2 are associated with the configured SMTC.

Table A.14.5.2.8.2-1: Supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.5.2.8.2-2: General test parameters for inter-frequency event triggered reporting without gap for PCell in FR1 with DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| Active cell |  | 1, 2 | Cell 1 | |  |
| Neighbour cell |  | 1, 2 | Cell 2 | | Cell to be identified. |
| NTN reference configuration |  | 1 | TBD | | For GSO |
| 2 | TBD | | For NGSO |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | |  |
| SMTC configuration |  | 1, 2 | SMTC.2 | |  |
| A3-Offset | dB | 1, 2 | -4.5 | |  |
| CP length |  | 1, 2 | Normal | |  |
| Hysteresis | dB | 1, 2 | 0 | |  |
| Time To Trigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.1 | DRX. 7 |  |
| Time offset between serving and neighbour cells |  | 1, 2 | 3 μs | | Synchronous cells |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | 5 | 10 |  |

Table A.14.5.2.8.2-3: NR Cell specific test parameters for inter-frequency event triggered reporting without gap for PCell in FR1 with DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1, 2 | CR.1.1 FDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1, 2 | CCR.1.1 FDD | | N/A | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| TRS configuration |  | 1, 2 | TRS.1.1 FDD | | N/A | |
| IInitial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 2 | -98 | | | |
| Note 2 | dBm/15 kHz | 1, 2 | -98 | | | |
|  | dB | 1, 2 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 2 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1, 2 | -64.60 | -62.25 | --64.60 | -62.25 |
| Propagation Condition |  | 1, 2 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.14.5.2.8.3 Test Requirements

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than TBD ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

### A.14.5.3 L1-RSRP measurement for beam reporting for satellite access

#### A.14.5.3.1 SSB based L1-RSRP measurement for satellite access when DRX is not used

##### A.14.5.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells served by satellite access node (SAN) in Table A.14.5.3.1.1-1.

Table A.14.5.3.1.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test for satellite access

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.5.3.1.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1) which is served by satellite access node (SAN). The test parameters for the Cell 1 are given in Table A.14.5.3.1.2-1 and Table A.14.5.3.1.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the SSBs and report periodically. The test consists of two successive time periods, with time duration of T1 and T2 respectively. The test has higher layer parameter *timeRestrictionForChannelMeasurements* configured*.*

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

Table A.14.5.3.1.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  |  |  |  |
|  |  |  |  |
| TDD Configuration | 1 |  | N/A |
|  |  |  |  |
|  |  |  |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  |  |  |  |
|  |  |  |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  |  |  |  |
|  |  |  |  |
| OCNG Patterns | 1 |  | OP.1 |
| Initial BWP Configuration | 1 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| DRX configuration | 1 |  | Off |
| reportConfigType | 1 |  | periodic |
| reportQuantity | 1 |  | ssb-Index-RSRP |
| Number of reported RS | 1 |  | 2 |
| L1-RSRP reporting period | 1 | slot | 80 |
| T1 | 1 | s | 5 |
| T2 | 1 | s | 1 |
| EPRE ratio of PSS to SSS | 1 | dB | 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 | 1~3 |  | 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. | | | |

Table A.14.5.3.1.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Note2 | 1 | dBm/15kHz | -94.65 | | | |
| Note2 | 1 | dBm/SSB SCS | -94.65 | | | |
|  | 1 | dB | 0 | 0 | -Infinity | 3 |
| SSB RSRP Note3 | 1 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.65 |
|  |  |  |  |  |  |  |
| Io Note3 | 1 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.93 |
|  | 1 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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. | | | | | | |

##### A.14.5.3.1.3 Test Requirements

The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement in clause 10.1.19.1.1 and relative accuracy requirement in clause 10.1.19.1.2. The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.3.2 SSB based L1-RSRP measurement for satellite access when DRX is used

##### A.14.5.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells served by satellite access node (SAN)in Table A.14.5.3.2.1-1.

Table A.14.5.3.2.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test for satellite access

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.5.3.2.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1) which is served by satellite access node (SAN). The test parameters for the Cell 1 are given in Table A.14.5.3.2.2-1 and Table A.14.5.3.2.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the SSBs and report periodically. The test consists of two successive time periods, with time duration of T1 and T2 respectively. The test has higher layer parameter *timeRestrictionForChannelMeasurements* configured*.*

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

Table A.14.5.3.2.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  |  |  |  |
|  |  |  |  |
| TDD Configuration | 1 |  | N/A |
|  |  |  |  |
|  |  |  |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  |  |  |  |
|  |  |  |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  |  |  |  |
|  |  |  |  |
| OCNG Patterns | 1 |  | OP.1 |
| Initial BWP Configuration | 1 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| DRX configuration | 1 |  | DRX.3 |
| reportConfigType | 1 |  | periodic |
| reportQuantity | 1 |  | ssb-Index-RSRP |
| Number of reported RS | 1 |  | 2 |
| L1-RSRP reporting period | 1 | slot | 80 |
| T1 | 1 | s | 5 |
| T2 | 1 | s | 1 |
| EPRE ratio of PSS to SSS | 1 | dB | 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 |  | 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. | | | |

Table A.14.5.3.2.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Note2 | 1 | dBm/15kHz | -94.65 | | | |
| Note2 | 1 | dBm/SSB SCS | -94.65 | | | |
|  | 1 | dB | 0 | 0 | -Infinity | 3 |
| SSB RSRP Note3 | 1 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.65 |
| Io Note3 | 1 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.93 |
|  | 1 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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. | | | | | | |

##### A.14.5.3.2.3 Test Requirements

The UE shall send L1-RSRP report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting the absolute accuracy requirement in clause 10.1.19.1.1 and relative accuracy requirement in clause 10.1.19.1.2. The rate of correct events observed during repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.3.3 CSI-RS based L1-RSRP measurement for satellite access when DRX is not used

##### A.14.5.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells served by satellite access node (SAN) in Table A.14.5.3.3.1-1.

Table A.14.5.3.3.1-1: Applicable NR configurations for FR1 CSI-RS based L1-RSRP test for satellite access

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.5.3.3.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1) which is served by satellite access node (SAN). The test parameters for the Cell 1 are given in Table A.14.5.3.3.2-1 and Table A.14.5.3.3.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the CSI-RS and report aperiodically. The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-RSRP on aperiodic CSI-RS resources. UE is also configured to measure L1-RSRP based on SSB. After 80ms from the beginning of the test, the DCI trigger comes in slot n (0 for Config 1,2 and 8 for Config 3) of a frame and UE provides the report back based on the reporting configuration as defined in Table A.14.5.3.3.2-1.

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM and BFD based on the SSBs.

Table A.14.5.3.3.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  |  |  |  |
|  |  |  |  |
| TDD Configuration | 1 |  | N/A |
|  |  |  |  |
|  |  |  |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  |  |  |  |
|  |  |  |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  |  |  |  |
|  |  |  |  |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
|  |  |  |  |
|  |  |  |  |
| OCNG Patterns | 1 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Initial BWP Configuration | 1 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1 |  | SMTC.1 |
| DRX configuration | 1 |  | Off |
| reportConfigType | 1 |  | aperiodic |
| reportQuantity | 1 |  | cri-RSRP |
| Number of reported RS | 1 |  | 2 |
| qcl-Info | 1 |  | SSB#0 for resource#0 |
|  |  |  | SSB#1 for resource#1 |
| reportSlotOffsetList | 1 | slots | 8 |
| T1 | 1 | s | 5 |
| EPRE ratio of PSS to SSS | 1 | dB | 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 |  | 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. | | | |

Table A.14.5.3.3.2-2: CSI-RS specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | CSI-RS#0 | CSI-RS#1 |
| Note1 | 1 | dBm/15kHz | -94.65 | |
| Note1 | 1 | dBm/SSB SCS | -94.65 | |
|  |  |  |  | |
|  | 1 | dB | 0 | 3 |
| CSI-RS RSRP Note2 | 1 | dBm/SSB SCS | -94.65 | -91.65 |
|  |  |  |  |  |
| Io Note2 | 1 | dBm/9.36 MHz | -63.69 | -61.93 |
|  |  |  |  |  |
|  | 1 | dB | 0 | 3 |
| 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: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

##### A.14.5.3.3.3 Test Requirements

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot 8 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the absolute accuracy requirement in clause 10.1.20.1.1 and relative accuracy requirement in clause 10.1.20.1.2.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.14.5.3.4 CSI-RS based L1-RSRP measurement for satellite access when DRX is used

##### A.14.5.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells served by satellite access node (SAN) in Table A.14.5.3.4.1-1.

Table A.14.5.3.4.1-1: Applicable NR configurations for FR1 CSI-RS based L1-RSRP test for satellite access

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.5.3.4.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1) which is served by satellite access node (SAN). The test parameters for the Cell 1 are given in Table A.14.5.3.4.2-1 and Table A.14.5.3.4.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the CSI-RS and report aperiodically. The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-RSRP on aperiodic CSI-RS resources. UE is also configured to measure L1-RSRP based on SSB. After 80ms from the beginning of the test, the DCI trigger comes in slot n (0 for Config 1,2 and 8 for Config 3) of a frame and UE provides the report back based on the reporting configuration as defined in Table A.14.5.3.4.2-1.

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM and BFD based on the SSBs.

Table A.14.5.3.4.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  |  |  |  |
|  |  |  |  |
| TDD Configuration | 1 |  | N/A |
|  |  |  |  |
|  |  |  |  |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  |  |  |  |
|  |  |  |  |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  |  |  |  |
|  |  |  |  |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
|  |  |  |  |
|  |  |  |  |
| OCNG Patterns | 1 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  |  |  |  |
|  |  |  |  |
| Initial BWP Configuration | 1 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1 |  | SMTC.1 |
| DRX configuration | 1 |  | DRX.3 |
| reportConfigType | 1 |  | aperiodic |
| reportQuantity | 1 |  | cri-RSRP |
| Number of reported RS | 1 |  | 2 |
| qcl-Info | 1 |  | SSB#0 for resource#0 |
|  |  |  | SSB#1 for resource#1 |
| reportSlotOffsetList | 1 | slots | 8 |
| T1 | 1 | s | 5 |
| EPRE ratio of PSS to SSS | 1 | dB | 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 | 1~3 |  | 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. | | | |

Table A.14.5.3.4.2-2: CSI-RS specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **CSI-RS#0** | **CSI-RS#1** |
| Note1 | 1 | dBm/15kHz | -94.65 | |
| Note1 | 1 | dBm/SSB SCS | -94.65 | |
|  |  |  |  | |
|  | 1 | dB | 0 | 3 |
| CSI-RS RSRP Note2 | 1 | dBm/SSB SCS | -94.65 | -91.65 |
|  |  |  |  |  |
| Io Note2 | 1 | dBm/9.36 MHz | -63.69 | -61.93 |
|  |  |  |  |
|  | 1 | dB | 0 | 3 |
| 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: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

##### A.14.5.3.4.3 Test Requirements

After 80ms from the beginning of the test, the UE shall send L1-RSRP report at slot 8 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the absolute accuracy requirement in clause 10.1.20.1.1 and relative accuracy requirement in clause 10.1.20.1.2.

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

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

## A.14.6 Measurement Performance requirements

### A.14.6.1 SS-RSRP for SAN

#### A.14.6.1.1 SA: intra-frequency case measurement accuracy with FR1 serving cell and FR1 target cell

##### A.14.6.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.2C.1.1 and 10.1.2C.1.2 for intra-frequency measurements.

##### A.14.6.1.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Supported test configurations are shown in table A.14.6.1.1.2-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in A.14.6.1.1.2-2. In all test cases, Cell 1 is the PCell, and Cell 2 is the target cell.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

The NTN reference configuration for Test configuration 1 is defined in TBD for GSO, NTN reference configuration for Test configuration 1 is defined in TBD for NGSO.

Table A.14.6.1.1.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.6.1.1.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | Test 2 | | | | | | Test 3 | | | | | |
|  | | |  | Cell 1 | Cell 2 | | Cell 1 | | Cell 2 | | | | Cell 1 | | | Cell 2 | | |
| Cell ID | | |  | 489 | 0 | | 489 | | 0 | | | | 489 | | 0 | | | |
| SSB ARFCN | | |  | freq1 | | | freq1 | | | | | | freq1 | | | | | |
| BWchannel | | Config 1,2 | MHz | 10: NRB,c = 52 | | | | | | | | | | | | | | |
| BWP BW | | Config 1,2 |  | 10: NRB,c = 52 | | | | | | | | | | | | | | |
| Downlink initial BWP configuration | | |  | DLBWP.0.1 | | | | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | |  | DLBWP.1.1 | | | | | | | | | | | | | | |
| Uplink initial BWP configuration | | |  | ULBWP.0.1 | | | | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | |  | ULBWP.1.1 | | | | | | | | | | | | | | |
| TRS configuration | | Config 1,2 |  | TRS.1.1 FDD | | NA | | TRS.1.1 FDD | | | NA | TRS.1.1 FDD | | | | | | NA |
| DRX Cycle | | Config 1,2 | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | Config 1,2 |  | SR.1.1 FDD | | - | SR.1.1 FDD | | - | | | | SR.1.1 FDD | | | | | - |
| RMSI CORESET Reference Channel | | Config 1,2 |  | CR.1.1 FDD | | - | CR.1.1 FDD | | - | | | | CR.1.1 FDD | | | | | - |
| Control channel RMC | | Config 1,2 |  | CCR.1.1 FDD | | - | CCR.1.1 FDD | | - | | | | CCR.1.1 FDD | | | | | - |
| SSB configuration | | Config 1,2 |  | SSB.1 FR1 | | SSB.1 FR1 | SSB.1 FR1 | | SSB.1 FR1 | | | | SSB.1 FR1 | | | | SSB.1 FR1 | |
| Time offset with Cell 1 | | Config 1,2 | ms | - | | 3 | - | | 3 | | | | - | | | | 3 | |
| SMTC configuration | | Config 1,2 |  | SMTC.2 | | | | | | | | | | | | | | |
| OCNG Patterns | |  |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | 0 | 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 | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |  | |  |  | | |  | | | |  | | | |  |
| Note2 | Config 1,2 | NR\_FDD\_FR1\_A | dBm/15Khz | -106 | | | -88 | | | | | | | -114 | | | | |
| Note2 | Config 1,2 | | dBm/SCS | -106 | | | -88 | | | | | | | Same as Noc/15kHz | | | | |
|  | | | dB | 2.46 | | -5.97 | 2.46 | | | -5.97 | | | | -0.01 | | | | -4.76 |
|  | | | dB | 6 | | 1 | 6 | | | 1 | | | | 3 | | | | 0 |
| SS-RSRPNote3 | Config 1,2 | NR\_FDD\_FR1\_A | dBm/SCS | -100 | | -105 | -82 | | | -87 | | | | -111.00 | | | | -114.00 |
| IoNote3 | Config 1,2 | NR\_FDD\_FR1\_A | dBm/  9.36MHz | -70.09 | | | -52.09 | | | | | | | -80.03 | | | | |
| Propagation condition | | | - | AWGN | | | | | | | | | | | | | | |
| Antenna configuration | | |  | 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: 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. | | | | | | | | | | | | | | | | | | |

##### A.14.6.1.1.3 Test Requirements

The SS-RSRP measurement accuracy for cell 1 and cell 2 shall fulfil absolute requirement in clause 10.1.2C.1.1 and relative requirement in clause 10.1.2C.1.2.

#### A.14.6.1.2 SA inter-frequency case measurement accuracy with FR1 serving cell and FR1 target cell

##### A.14.6.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.4C.1.1 and 10.1.4C.1.2 for inter-frequency measurements with the testing configurations for NR cells in Table A.14.6.1.2.1-1.

During the test, the test system shall emulate and send the GNSS signal to the test UE. The test parameters for GNSS signals are defined in B.4.1. The UE shall be provided with the valid information about the SAN serving the each cell in the test before the test.

The NTN reference configuration for Test configuration 1 is defined in TBD for GSO, NTN reference configuration for Test configuration 1 is defined in TBD for NGSO.

**Table A.14.6.1.2.1-1: Applicable NR configurations for FR1 inter-frequency SS-RSRP accuracy test**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.6.1.2.2 Test parameters

In this set of test cases there are two cells in the test, PCell (Cell 1) and a FR1 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.14.6.1.2.2-1 below. Both absolute and relative accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.14.6.1.2.2-1. The inter-frequency measurements are supported by a measurement gap.

Table A.14.6.1.2.2-1: SS-RSRP inter-frequency 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 | MHz | 10: NRB,c = 52 | | | | 10: NRB,c = 52 | | |
| PDSCH Reference measurement channel | | 1, 2 |  | SR.1.1 FDD | | | - | SR.1.1 FDD | | - |
| RMSI CORESET Reference Channel | | 1, 2 |  | CR.1.1 FDD | | | - | CR.1.1 FDD | | - |
| Dedicated CORESET Reference Channel | | 1, 2 |  | CCR.1.1 FDD | | | - | CCR.1.1 FDD | | - |
| SSB configuration | | 1, 2 |  | SSB.1 FR1 | | | | SSB.1 FR1 | | |
| OCNG Patterns | | 1, 2 |  | OP.1 | | | | OP.1 | | |
| TRS configuration | | 1, 2 |  | TRS.1.1 FDD | | - | | TRS.1.1 FDD | |  |
| Initial BWP Configuration | | 1, 2 |  | DLBWP.0.1  ULBWP.0.1 | | | | DLBWP.0.1  ULBWP.0.1 | | |
| Dedicated BWP configuration | | 1, 2 |  | DLBWP.1.1  ULBWP.1.1 | | | | DLBWP.1.1  ULBWP.1.1 | | |
| Time offset with Cell 1 | | 1, 2 | ms | - | 3 | | | - | 3 | |
| SMTC configuration | | 1, 2 |  | SMTC.2 | | | | SMTC.2 | | |
| 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 | |  |  |  | | |  |  | |  |
| Note2 | NR\_FDD\_FR1\_A | 1,2 | dBm/15kHz | -94.65 | | | | ( for Channel 2 +8dB) | | -115 |
| Note2 | NR\_FDD\_FR1\_A | 1,2 | dBm/SSB SCS | -94.65 | | | | ( for Channel 2 +8dB) | | -115 |
|  | | 1,2 | dB | 10 | | | 10 | 13 | | -3 |
| SS-RSRPNote3 | NR\_FDD\_FR1\_A | 1,2 | dBm/SCS | -84.65 | | | | (RSRP for Cell 2 +25dB) | | -118.00 |
| IoNote3 | NR\_FDD\_FR1\_A | 1,2 | dBm/  9.36MHz | -56.28 | | | | (Io for Channel 2 +19.75dB) | | -85.28 |
|  | | 1,2 | dB | 10 | | | 10 | 13 | | -3 |
| Propagation condition | | 1,2 | - | AWGN | | | | AWGN | | |
| Antenna configuration | | 1,2 |  | 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. | | | | | | | | | | |

##### A.14.6.1.2.3 Test Requirements

The SS-RSRP measurement accuracy for Cell 1 and Cell 2 shall fulfil the absolute requirement in clause 10.1.4C.1.1 and relative requirement in clause 10.1.4C.1.2.

### A.14.6.2 SS-RSRQ

#### A.14.6.2.1 SA: Intra-frequency measurement accuracy with FR1 serving cell and FR1 target cell for satellite access

##### A.14.6.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.7C.

##### A.14.6.2.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.14.6.2.1.2-1. The absolute accuracy of SS-RSRQ intra-frequency measurement is tested by using the parameters in Table A.14.6.2.1.2-2. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.14.6.2.1.21: SS-RSRQ Intra frequency SS-RSRQ supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.6.2.1.2-2: SS-RSRQ Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | | Test 2 | | | | Test 3 | | |
|  | | | |  | Cell 1 | | | Cell 2 | | Cell 1 | | Cell 2 | | Cell 1 | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | | | | | freq1 | | | | freq1 | | |
| Duplex mode | | | Config 1,2 |  | FDD | | | | | | | | | | | |
| BWchannel | | | Config 1,2 | MHz | 10: NRB,c = 52 | | | | | | | | | | | |
| Gap Pattern ID | | |  |  | 0 | | | | | | | | | | | |
| BWP configuration | | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | | | | | |
|  | | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | | | | | |
|  | | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | | | | | |
|  | | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | Config 1,2 |  | SR.1.1 FDD | | - | | | SR.1.1 FDD | | - | | SR.1.1 FDD | | - |
| RMSI CORESET Reference Channel | | | Config 1,2 |  | CR.1.1 FDD | | - | | | CR.1.1 FDD | | - | | CR.1.1 FDD | |  |
| Control Channel RMC | | | Config 1,2 |  | CCR.1.1 FDD | | - | | | CCR.1.1 FDD | | - | | CCR.1.1 FDD | | - |
| TRS Configuration | | | Config 1,2 |  | TRS.1.1 FDD | | - | | | TRS.1.1 FDD | | - | | TRS.1.1 FDD | | - |
| OCNG Patterns | | | |  | OP. 1 | | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | | |
| Time offset with Cell 1 | | | Config 1,2 | ms | - | 3 | | | - | | 3 | | - | | 3 | |
| SMTC configuration | | | Config 1,2 |  | SMTC.2 | | | | | | | | | | | |
| SSB configuration | | | Config 1,2 |  | SSB.1 FR1 | | | | | | | | | | | |
| CSI-RS for tracking | | | Config 1,2 |  | TRS.1.1 FDD | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz | 15 kHz | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | | | 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 | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  | | |  | |  | |  | |  |
| Note2 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/15kHz | -85 | | | | | -101 | | | | -114 | | |
| Note2 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/SCS | -85 | | | | | -101 | | | | -114 | | |
|  | | | | dB | -1.76 | | | | | -4.7 | | | | -5..46 | | -5.46 |
|  | | | | dB | 3 | | 3 | | | -2.9 | | -2.9 | | -4 | | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/SCS | -82 | | -82 | | | -103.9 | | -103.9 | | -118 | | -118 |
| SS-RSRQ Note3 | | | NR\_FDD\_SAB\_FR1\_A | dB | TBD | | -14.84 | | | -14.84 | | -16.76 | | -16.76 | | -17.34 |
| IoNote3 | | Config 1,2 | NR\_FDD\_SAB\_FR1\_A | dBm/  9.36MHz | -50 | | | | | -70 | | | | -83.5 | | |
| Propagation condition | | | | - | AWGN | | AWGN | | | AWGN | | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | | 1x2 | | | 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.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: void | | | | | | | | | | | | | | | | |

##### A.14.6.2.1.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.7C.1.1.

#### A.14.6.2.2 SA Inter-frequency measurement accuracy with FR1 serving cell and FR1 target cell for satellite access

##### A.14.6.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause TBD.

##### A.14.6.2.2.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.14.6.2.2.2-1. Both absolute accuracy and relative accuracy requirements of SS-RSRQ inter-frequency measurement are tested by using test parameters in Table A.14.6.2.2.2-2. In all test cases, Cell 1 is the PCell and Cell 2 is target cell.

Table A.14.6.2.2.2-1: SS-RSRQ Inter frequency SS-RSRQ supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | GSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NGSO, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| Note: If UE supports both NGSO and GSO, the test case Config 1 can be skipped if the UE passes test case Config 2. | |

Table A.14.6.2.2.2-2: SS-RSRQ Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | Test 2 | | | | | | Test 3 | | | | |
|  | | | |  | Cell 1 | | Cell 2 | | Cell 1 | | | Cell 2 | | | Cell 1 | | | Cell 2 | |
| SSB ARFCN | | | |  | freq1 | freq2 | | | freq1 | | | | freq2 | | freq1 | | freq2 | | |
| Duplex mode | | Config 1,2 | |  | FDD | | | | | | | | | | | | | | |
| BWchannel | | Config 1,2 | | MHz | 10: NRB,c = 52 | | | | | | | | | | | | | | |
| Gap pattern ID | | Config 1,2 | |  | 0 | | | | | | | | | | | | | | |
| BWP BW | | Config 1,2 | |  | 10: NRB,c = 52 | | | | | | | | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | Config 1,2 | |  | SR.1.1 FDD | - | | | SR.1.1 FDD | | | - | | | SR.1.1 FDD | | | - | |
| RMSI CORESET Reference Channel | | Config 1,2 | |  | CR.1.1 FDD | - | | | R.1.1 FDD | | | - | | | CR.1.1 FDD | | |  | |
| Dedicated CORESET Reference Channel | | Config 1,2 | |  | CCR.1.1 FDD | - | | | CCR.1.1 FDD | | | - | | | CCR.1.1 FDD | | | - | |
| TRS Configuration | | Config 1,2 | |  | TRS.1.1 FDD | - | | | TRS.1.1 FDD | | | - | | | TRS.1.1 FDD | | | - | |
| OCNG Patterns | | | |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| Time offset with Cell 1 | | Config 1,2 | | ms | - | | | 3 | | - | 3 | | | - | | 3 | | | |
| SMTC configuration | | Config 1,2 | |  | SMTC pattern 2 | | | | | | | | | | | | | | |
| SSB configuration | | Config 1,2 | |  | SSB pattern 1 in FR1 | | | | | | | | | | | | | | |
| CSI-RS for tracking | | Config 1,2 | |  | TRS.1.1 FDD | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | | kHz | 15 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | | | 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 | | | |  |  |  | | |  | | |  | | |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | | |  | | |  | | |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | | |  | | |  | | |  | | |  | |
| Note2 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/15kHz | -80.18 | | | | -106 | | | | | | -116 | | | | |
| Note2 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/15kHz | -80.18 | | | | -106 | | | | | | -116 | | | | |
|  | | | | dB | -1.75 | | | | -1.75 | | | | | | 3 | | | -1.75 | |
|  | | | | dB | -1.75 | | | | -1.75 | | | | | | 3 | | | -1.75 | |
| SS-RSRPNote3 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/SCS | -81.93 | -81.93 | | | -107.75 | | | -107.75 | | | -113 | | | | -117.75 |
| SS-RSRQNote3 | | | NR\_FDD\_SAB\_FR1\_A | dB | -14.77 | -14.77 | | | -14.76 | | | -14.76 | | | -12.56 | | | | -14.76 |
| IoNote3 | Config 1,2 | | NR\_FDD\_SAB\_FR1\_A | dBm/9.36MHz | -50 | | | | -75.83 | | | | | | -83.28 | | | | -85.83 |
| Propagation condition | | | | - | AWGN | AWGN | | | AWGN | | | AWGN | | | AWGN | | | AWGN | |
| Antenna configuration | | | |  | 1x2 | 1x2 | | | 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.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2. | | | | | | | | | | | | | | | | | | | |

##### A.14.6.2.2.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.9C.1.1 and 10.1.9C.1.2.

### A.14.6.3 SS-SINR

#### A.14.6.3.1 SA intra-frequency measurement accuracy with FR1 serving cell and FR1 target cell

##### A.14.6.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.12C.1.1.

##### A.14.6.3.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.14.6.3.1.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.14.6.3.1.2-2. In all test cases, Cell 1 is the PCell and Cell 2 is the target cell.

Table A.14.6.3.1.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.6.3.1.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 1 | Cell 2 | | Cell 1 | | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | | | freq1 | | | |
| Duplex mode | | | Config 1 |  | FDD | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
|  | | |  |  |  | | | | | | |
|  | | |  |  |  | | | | | | |
|  | | |  |  |  | | | | | | |
| TRS configuration | | | Config 1, 2 |  | TRS.1.1 FDD |  | | TRS.1.1 FDD | | |  |
| PDSCH Reference measurement channel | | | Config 1, 2 |  | SR.1.1 FDD | - | | SR.1.1 FDD | | | - |
| RMSI CORESET Reference Channel | | | Config 1, 2 |  | CR.1.1 FDD | - | | CR.1.1 FDD | | |  |
| Dedicated CORESET Reference Channel | | | Config 1, 2 |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | | | - |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
|  | | | |  |  | | | | | | |
| SMTC configuration | | | Config 1, 2 |  | SMTC.2 | | | | | | |
| Time offset with Cell 1 | | | Config 1, 2 | ms | - | | 3 | | - | 3 | |
| SSB configuration | | | Config 1, 2 |  | SSB.1 FR1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2 | kHz | 15 | | | | | | |
| EPRE ratio of PSS to SSS | | | | 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 | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | |  | | |  |
| Note2 | | | NR\_FDD\_SAB\_FR1\_A, | dBm/15kHz | -93 | | | -116 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_B |  |  | | | -115.5 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_C |  |  | | | -115 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_D |  |  | | | -114.5 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_E |  |  | | | -114 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_F, |  |  | | | -113.5 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_G |  |  | | | -113 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_H |  |  | | | -112.5 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_I |  |  | | | -112 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1, 2 | | | dBm/SCS | -93 | | | Same as Noc for 15kHz | | | |
|  | | | | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | 2.66 | | -4 | | | -4 |
| SS-RSRPNote3 | Config 1, 2 | | NR\_FDD\_SAB\_FR1\_A, | dBm/SCS | -88.46 | -90.34 | | -120 | | | -120 |
|  |  | | NR\_FDD\_SAB\_FR1\_B |  |  |  | | -119.5 | | | -119.5 |
|  |  | | NR\_FDD\_SAB\_FR1\_C |  |  |  | | -119 | | | -119 |
|  |  | | NR\_FDD\_SAB\_FR1\_D |  |  |  | | -118.5 | | | -118.5 |
|  |  | | NR\_FDD\_SAB\_FR1\_E |  |  |  | | -118 | | | -118 |
|  |  | | NR\_FDD\_SAB\_FR1\_F, |  |  |  | | -117.5 | | | -117.5 |
|  |  | | NR\_FDD\_SAB\_FR1\_G |  |  |  | | -117 | | | -117 |
|  |  | | NR\_FDD\_SAB\_FR1\_H |  |  |  | | -116.5 | | | -116.5 |
|  |  | | NR\_FDD\_SAB\_FR1\_I |  |  |  | | -116 | | | -116 |
|  |  | | NR\_FDD\_SAB\_FR1\_J |  |  |  | | -115.5 | | | -115.5 |
| SS-SINR Note3 | | | NR\_FDD\_SAB\_FR1\_A, | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | NR\_FDD\_SAB\_FR1\_B |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_C |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_D |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_E |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_F, |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_G |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_H |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_I |  |  |  | |  | | |  |
|  | | | NR\_FDD\_SAB\_FR1\_J |  |  |  | |  | | |  |
| IoNote3 | | Config 1, 2 | NR\_FDD\_SAB\_FR1\_A, | dBm/  9.36MHz | -57.5 | | | -85.51 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_B |  |  | | | -85.01 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_C |  |  | | | -84.51 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_D |  |  | | | -84.01 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_E |  |  | | | -83.51 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_F, |  |  | | | -83.01 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_G |  |  | | | -82.51 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_H |  |  | | | -82.01 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_I |  |  | | | -81.51 | | | |
|  | |  | NR\_FDD\_SAB\_FR1\_J |  |  | | | -81.01 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 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: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2. | | | | | | | | | | | |

##### A.14.6.3.1.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.12C.1.1.

#### A.14.6.3.2 SA Inter-frequency measurement accuracy with FR1 serving cell and FR1 target cell

##### A.14.6.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.14C.1.1 and 10.1.14C.1.2.

##### A.14.6.3.2.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.14.6.3.2.2-1. Both absolute accuracy and relative accuracy requirements of SS-SINR inter-frequency measurement are tested by using test parameters in Table A.14.6.3.2.2-2. In all test cases, Cell 1 is the PCell and Cell 2 is target cell.

Table A.14.6.3.2.2-1: SS-SINR Inter frequency SS-SINR supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.14.6.3.2.2-2: SS-SINR Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | | | Test 3 | | | |
|  | | | |  | Cell 1 | Cell 2 | | Cell 1 | | | Cell 2 | | Cell 1 | | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | freq2 | | freq1 | | | freq2 | | freq1 | | freq2 | |
| Duplex mode | | Config 1 | |  | FDD | | | | | | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | | | | | | |
| Gap pattern ID | | | |  | 0 | | - | | 0 | - | | 0 | | - | | |
| TRS configuration | | Config 1, 2 | |  | TRS.1.1 FDD |  | | TRS.1.1 FDD | | |  | | TRS.1.1 FDD | | |  |
| PDSCH Reference measurement channel | | Config 1, 2 | |  | SR.1.1 FDD | - | | SR.1.1 FDD | | | - | | SR.1.1 FDD | | | - |
| RMSI CORESET Reference Channel | | Config 1, 2 | |  | CR.1.1 FDD | - | | CR.1.1 FDD | | | - | | CR.1.1 FDD | | |  |
| Dedicated CORESET Reference Channel | | Config 1, 2 | |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | | | - | | CCR.1.1 FDD | | | - |
| OCNG Patterns | | | |  | OP.1 | | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | | |
| Time offset with Cell 1 | | Config 1, 2 | | ms | - | | 3 | | - | 3 | | - | | 3 | | |
| SMTC configuration | | Config 1, 2 | |  | SMTC pattern 2 | | | | | | | | | | | |
| SSB configuration | | Config 1, 2 | |  | SSB.1 FR1 | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 | | kHz | 15 | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | | 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 | | | |  |  |  | |  | | |  | |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | |  | | |  | |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | |  | | |  | |  | | |  |
| Note2 | Config 1, 2 | | NR\_FDD\_SAB\_FR1\_A, | dBm/15kHz | -88 | | | -108.5 | | | | | -119.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_B |  |  | | |  | | | | | -119 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_C |  |  | | |  | | | | | -118.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_D |  |  | | |  | | | | | -118 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_E |  |  | | |  | | | | | -117.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_F, |  |  | | |  | | | | | -117 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_G |  |  | | |  | | | | | -116.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_H |  |  | | |  | | | | | -116 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_I |  |  | | |  | | | | | -115.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_J |  |  | | |  | | | | | -115 | | | |
| Note2 | Config 1, 2 | | | dBm/SCS | -88 | | | -108.5 | | | | | Same as Noc for 15kHz | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  |  | | |  |  | | |  | | | | |  | | | |
|  | | | | dB | -1.75 | -1.75 | | 20 | | | 20 | | -4.0 | | | -4.0 |
|  | | | | dB | -1.75 | | | 20 | | | | | -4.0 | | | |
| SS-RSRP Note3 | Config 1, 2 | | NR\_FDD\_SAB\_FR1\_A, | dBm/SCS | -89.75 | | | -88.5 | | | | | -123.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_B |  |  | | |  | | | | | -123 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_C |  |  | | |  | | | | | -122.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_D |  |  | | |  | | | | | -122 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_E |  |  | | |  | | | | | -121.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_F, |  |  | | |  | | | | | -121 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_G |  |  | | |  | | | | | -120.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_H |  |  | | |  | | | | | -120 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_I |  |  | | |  | | | | | -119.5 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_J |  |  | | |  | | | | | -119 | | | |
| SS-SINRNote3 | | | NR\_FDD\_SAB\_FR1\_A, | dB | -1.75 | | | 20 | | | | | -4.0 | | | |
|  | | | NR\_FDD\_SAB\_FR1\_B |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_C |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_D |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_E |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_F, |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_G |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_H |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_I |  |  | | |  | | | | |  | | | |
|  | | | NR\_FDD\_SAB\_FR1\_J |  |  | | |  | | | | |  | | | |
| IoNote3 | Config 1, 2 | | NR\_FDD\_SAB\_FR1\_A, | dBm/  9.36MHz | -57.83 | | | -60.5 | | | | | -90.09 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_B |  |  | | |  | | | | | -89.59 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_C |  |  | | |  | | | | | -89.09 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_D |  |  | | |  | | | | | -88.59 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_E |  |  | | |  | | | | | -88.09 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_F, |  |  | | |  | | | | | -87.59 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_G |  |  | | |  | | | | | -87.09 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_H |  |  | | |  | | | | | -86.59 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_I |  |  | | |  | | | | | -86.09 | | | |
|  |  | | NR\_FDD\_SAB\_FR1\_J |  |  | | |  | | | | | -85.59 | | | |
| Propagation condition | | | | - | AWGN | | | | | | | | | | | |
| Antenna configuration | | | | - | 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: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2. | | | | | | | | | | | | | | | | |

##### A.14.6.3.2.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.14C.1.1 and 10.1.14C.1.2.

### A.14.6.4 L1-RSRP measurement for beam reporting

#### A.14.6.4.1 SSB based L1-RSRP measurement

##### A.14.6.4.1.1 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 clause 9.5C.4 and clause 10.1.19C.1 for L1-RSRP measurements based on SSB with the testing configurations for NR cells in Table A.14.6.4.1.1-1.

Table A.14.6.4.1.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.6.4.1.2 Test parameters

In this set of test cases there one cell in the test, PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.14.6.4.1.2-1 below. The absolute and relative accuracy of L1-RSRP measurements are tested by using the parameters in Table A.14.6.4.1.2-1.

There is no measurement gap configured in the test. Before the test, UE is configured one SSB resource set with two SSB resources. UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSB resources 0 and 1.

Table A.14.6.4.1.2-1: FR1 SSB based L1-RSRP test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | Test 2 |
| SSB GSCN | | 1, 2 |  | freq1 | freq1 |
| Duplex mode | | 1, 2 |  | FDD | FDD |
| TDD Configuration | | 1, 2 |  | N/A | N/A |
| BWchannel | | 1, 2 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| PDSCH Reference measurement channel | | 1, 2 |  | SR.1.1 FDD | SR.1.1 FDD |
| RMSI CORESET Reference Channel | | 1, 2 |  | CR.1.1 FDD | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | 1, 2 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| SSB configuration | | 1, 2 |  | SSB.3 FR1 | SSB.3 FR1 |
| 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 |
| TRS configuration | | 1, 2 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| Dedicated BWP configuration | | 1, 2 |  | DLBWP.1.1  ULBWP.1.1 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | | 1, 2 |  | SMTC.1 | SMTC.1 |
| reportConfigType | | 1, 2 |  | periodic | periodic |
| reportQuantity | | 1, 2 |  | ssb-Index-RSRP | ssb-Index-RSRP |
| Number of reported RS | | 1, 2 |  | 2 | 2 |
| L1-RSRP reporting period | | 1, 2 |  | slot80 | slot80 |
| EPRE ratio of PSS to SSS | | 1, 2 | 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\_SAB\_FR1\_A | 1, 2 | dBm/15kHz | -94.65 | -117 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -116.5 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -116 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -115.5 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -115 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -114.5 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -114 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -113.5 |
| Note2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 5 | 1, 2 | dBm/SSB SCS | -94.65 | -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 |
|  | | 1, 2 | dB | 10 | -3 |
| SSB RSRP Note3 | NR\_FDD\_SAB\_FR1\_A | 1, 2 | dBm/SSB SCS | -84.65 | -120 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -119.5 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -119 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -118.5 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -118 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -117.5 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -117 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -116.5 |
| Io Note3 | NR\_FDD\_SAB\_FR1\_A | 1, 2 | dBm/9.36 MHz | -56.28 | -87.28 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -86.78 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -86.28 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -85.78 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -85.28 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -84.78 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -84.28 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -83.78 |
|  | | 1, 2 | dB | 10 | -3 |
| Propagation condition | | 1, 2 |  | AWGN | AWGN |
| Antenna configuration | | 1, 2 |  | 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. | | | | | |

##### A.14.6.4.1.3 Test Requirements

The L1-RSRP measurement accuracy for SSB#0 and SSB#1 of Cell 2 shall fulfil the requirements in clauses 10.1.19C.1.

#### A.14.6.4.2 CSI-RS based L1-RSRP measurement on resource set with repetition off

##### A.14.6.4.2.1 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 clause 9.5C.4 and clause 10.1.19C.2 for L1-RSRP measurements based on CSI-RS with the testing configurations for NR cells in Table A.14.6.4.2.1-1.

Table A.14.6.4.2.1-1: Applicable NR configurations for FR1 CSI-RS based L1-RSRP test

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.14.6.4.2.2 Test parameters

In this set of test cases there are one cell in the test, PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.14.6.4.2.2-1 below. The absolute and relative accuracy of L1-RSRP measurements are tested by using the parameters in Table A.14.6.4.2.2-1.

There is no measurement gap configured in the test. Before the test, UE is configured one CSI-RS resource set with two CSI-RS resources. UE is configured to perform RLM and BFD based on SSB 0 and 1. CSI-RS is not transmitted in the same OFDM symbols as SSB.

Table A.14.6.4.2.2-1: FR1 CSI-RS based L1-RSRP test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | Test 2 |
| SSB GSCN | | 1, 2 |  | freq1 | freq1 |
| Duplex mode | | 1, 2 |  | FDD | FDD |
| TDD Configuration | | 1, 2 |  | N/A | N/A |
| BWchannel | | 1, 2 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| PDSCH Reference measurement channel | | 1, 2 |  | SR.1.1 FDD | SR.1.1 FDD |
| RMSI CORESET Reference Channel | | 1, 2 |  | CR.1.1 FDD | CR.1.1 FDD |
| Dedicated CORESET Reference Channel | | 1, 2 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| SSB configuration | | 1, 2 |  | SSB.3 FR1 | SSB.3 FR1 |
| OCNG Patterns | | 1, 2 |  | OP.1 | OP.1 |
| TRS configuration | | 1, 2 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| Initial BWP Configuration | | 1, 2 |  | DLBWP.0.1  ULBWP.0.1 | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | | 1, 2 |  | DLBWP.1.1  ULBWP.1.1 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | | 1, 2 |  | SMTC.1 | SMTC.1 |
| CSI-RS | | 1, 2 |  | CSI-RS 1.2 FDD | CSI-RS 1.2 FDD |
| reportConfigType | | 1, 2 |  | periodic | periodic |
| reportQuantity | | 1, 2 |  | cri-RSRP | cri-RSRP |
| Number of reported RS | | 1, 2 |  | 2 | 2 |
| L1-RSRP reporting period | | 1, 2 |  | slot80 | slot80 |
| EPRE ratio of PSS to SSS | | 1, 2 | 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\_SAB\_FR1\_A | 1, 2 | dBm/15kHz | -94.65 | -117 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -116.5 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -116 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -115.5 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -115 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -114.5 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -114 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -113.5 |
| Note2 | NR\_FDD\_SAB\_FR1\_A | 1, 2 | dBm/CSI-RS SCS | -94.65 | -117 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -116.5 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -116 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -115.5 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -115 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -114.5 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -114 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -113.5 |
|  | | 1, 2 | dB | 10 | -3 |
| CSI-RS RSRP Note3 | NR\_FDD\_SAB\_FR1\_A | 1, 2 | dBm/CSI-RS SCS | -84.65 | -120 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -119.5 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -119 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -118.5 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -118 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -117.5 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -117 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -116.5 |
| Io Note3 | NR\_FDD\_SAB\_FR1\_A | 1, 2 | dBm/9.36 MHz | -56.28 | -87.28 |
|  | NR\_FDD\_SAB\_FR1\_B |  |  |  | -86.78 |
|  | NR\_FDD\_SAB\_FR1\_C |  |  |  | -86.28 |
|  | NR\_FDD\_SAB\_FR1\_D NR\_FDD\_SAB\_FR1\_E |  |  |  | -85.78 |
|  | NR\_FDD\_SAB\_FR1\_F NR\_FDD\_SAB\_FR1\_G |  |  |  | -85.28 |
|  | NR\_FDD\_SAB\_FR1\_H |  |  |  | -84.78 |
|  | NR\_FDD\_SAB\_FR1\_I |  |  |  | -84.28 |
|  | NR\_FDD\_SAB\_FR1\_J |  |  |  | -83.78 |
|  | | 1, 2 | dB | 10 | -3 |
| Propagation condition | | 1, 2 |  | AWGN | AWGN |
| Antenna configuration | | 1, 2 |  | 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. | | | | | |

##### A.14.6.4.2.3 Test Requirements

The L1-RSRP measurement accuracy for CSI-RS#0 and CSI-RS#1 of Cell 1 shall fulfil the requirements in clause 10.1.19C.2.