## 6.6 Measurement procedures

### 6.6.1 Intra-frequency measurements

#### 6.6.1.0 Minimum conformance requirements

##### 6.6.1.0.1 Minimum conformance requirements for event-triggered measurement without gap

Same as 4.6.1.0.1

##### 6.6.1.0.2 Minimum conformance requirements for event-triggered measurement with gap

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

The UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra ms

Where:

TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 6.6.1.0.2-1.

TSSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 6.6.1.0.2-2.

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in TS 38.133 [6] section 9.1.5.2.2 for measurement within outside measurement gaps.

Table 6.6.1.0.2-1: Time period for PSS/SSS detection (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max( 600ms, 5 x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max( 600ms, ceil(1.5x 5) x max(MGRP, SMTC period, DRX cycle)) x CSSFintra |
| DRX cycle > 320ms | 5 x max(MGRP, DRX cycle) x CSSFintra |

Table 6.6.1.0.2-2: Measurement period for intra-frequency measurements with gaps (Frequency Range FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_intra |
| No DRX | max( 200ms, 5 x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max( 200ms, ceil(1.5x 5) x max(MGRP, SMTC period, DRX cycle))x CSSFintra |
| DRX cycle>320ms | 5 x max(MGRP, DRX cycle) x CSSFintra |

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,

- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,

- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 are fulfilled for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than Tidentify\_intra\_without\_index defined in TS 38.133 [6] section 9.2.6.2. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.6.2 and 9.2.6.3.

##### 6.6.1.0.3 Void

##### 6.6.1.0.4 Minimum conformance requirements for event-triggered measurement with gap with SSB index reading

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index.

Tidentify\_intra\_with\_index = TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra + TSSB\_time\_index\_intra ms

Where:

TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 6.6.1.0.4-1.

TSSB\_time\_index\_intra: it is the time period used to acquire the index of the SSB being measured given in table 6.6.1.0.4-2.

TSSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 6.6.1.0.4-3.

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap, i in TS 38.133 section 9.1.5.2.2 for measurement conducted within measurement gaps.

When intrafrequency SMTC is fully non overlapping with measurement gaps or intrafrequency SMTC is fully overlapping with MGs, Kp=1

When intrafrequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP.

Table 6.6.1.0.4-1: Time period for PSS/SSS detection (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max( 600ms, 5 x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max( 600ms, ceil(1.5x 5) x max(MGRP, SMTC period, DRX cycle)) x CSSFintra |
| DRX cycle>320ms | [5] x max(MGRP, DRX cycle) x CSSFintra |

Table 6.6.1.0.4-2: Time period for time index detection (Frequency range FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_intra |
| No DRX | max(120ms, ceil( 3 x Kp )x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320ms | max(120ms, ceil (1.5 x 3 x Kp) x max(SMTC period, DRX cycle)) x CSSFintra |
| DRX cycle>320ms | ceil(3 x Kp) x DRX cycle x CSSFintra |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified | |

Table 6.6.1.0.4-3: Measurement period for intra-frequency measurements with gaps (Frequency Range FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_intra |
| No DRX | max( 200ms, 5 x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max( 200ms, ceil(1.5x 5) x max(MGRP, SMTC period, DRX cycle))x CSSFintra |
| DRX cycle>320ms | 5 x max(MGRP, DRX cycle) x CSSFintra |

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,

- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,

- SS-SINR related side conditions given in TS 38.133 [6] sections 10.1.12 are fulfilled for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.2]

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than Tidentify\_intra\_with\_index defined in TS 38.133 [6] section 9.2.6.2. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.6.2 and 9.2.6.3.

##### 6.6.1.0.5 Void

#### 6.6.1.1 NR SA FR1 event-triggered reporting without gap in non-DRX

6.6.1.1.1 Test purpose

To verify the UE’s ability to make a correct reporting of an event within intra-frequency cell search without gap under non-DRX.

6.6.1.1.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.1.

6.6.1.1.4 Test description

6.6.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.1.4.1-1.

Table 6.6.1.1.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in non-DRX

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.1.1-1 | 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.1.1-2 | 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.1.1-3 | 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test requirement and the DUT according to the parameters in Table 6.6.1.1.4.1-2.

Table 6.6.1.1.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2 |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The test parameters for PCell and neighbour cell are given in Table 6.6.1.1.4.1-3 below.

2. Message contents are defined in clause 6.6.1.1.4.3.

3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.1.4.1-3: General test parameters for SA intra-frequency event triggered reporting tests without gap for FR1 under non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
| 2 | SSB.1 FR1 |  |
| 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
| 2 | SMTC.1 |  |
| 3 | SMTC.1 |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 |  |
| 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 serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3 ms later than the timing of Cell 1. |
| 2 | 3 μs | Synchronous cells |
| 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 5 |  |

6.6.1.1.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (NR Cell 1) and a FR1 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.1.4.1-3 and Table 6.6.1.1.5-1, respectively. 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 NR Cell 2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.1.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.1.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),  
Or  
- if the device has been switched off, switcheson the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.1.4.3-1: Common Exception messages SA intra frequency event triggered reporting tests without gap under non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 for configuration 6.6.1.1-1  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.1-2  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.1-3  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition SSB RLM |

6.6.1.1.5 Test requirement

Table 6.6.1.1.4.1-3 and Table 6.6.1.1.5-1 define the primary level settings including test tolerances for NR SA event triggered reporting test without gap under non-DRX.

Table 6.6.1.1.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting tests without gap under non-DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| 2 | SR.1.1 TDD | |
| 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | |
| 2 | CR.1.1 TDD | | CR.1.1 TDD | |
| 3 | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | CCR.1.1 FDD | |
| 2 | CCR.1.1 TDD | | CCR.1.1 TDD | |
| 3 | CCR.2.1 TDD | | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | 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 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| 2 | -98 | | | |
| 3 | -95 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
| 2 |
| 3 |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
| 2 |
| 3 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| 2 |
| 3 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| 2 | -94 | -94 | -Infinity | -94 |
| 3 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| dBm/9.36 MHz | 2 | -64.60 | -62.25 |
| dBm/38.16 MHz | 3 | -58.50 | -56.16 |
| 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. | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

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

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra) ms

TPSS/SSS\_sync\_intr= max [ 600 ms, ceil (5 × Kp) × SMTC period ] × CSSFintra = 600 ms

T SSB\_measurement\_period\_intra= max [ 200 ms, ceil( 5 × Kp) × SMTC period ] × CSSFintra = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.2 NR SA FR1 event-triggered reporting without gap in DRX

6.6.1.2.1 Test purpose

To verify the UE’s ability to make a correct reporting of an event within intra-frequency cell search without gap under DRX.

6.6.1.2.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting 5GS NR SA FR1 and long DRX cycle.

6.6.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.2.

6.6.1.2.4 Test description

6.6.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.2.4.1-1.

Table 6.6.1.2.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in DRX

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.1.2-1 | 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.1.2-2 | 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.1.2-3 | 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.2.4.1-2.

Table 6.6.1.2.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The test parameters for PCell and neighbour cell are given in Table 6.6.1.2.4.1-3 below.

2. Message contents are defined in clause 6.6.1.2.4.3.

3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.2.4.1-3: General test parameters for SA intra-frequency event triggered reporting tests without gap for FR1 under DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| Active cell |  | 1, 2, 3 | Cell 1 | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 | |  |
| SSB configuration |  | 1 | SSB.1 FR1 | |  |
| 2 | SSB.1 FR1 | |  |
| 3 | SSB.2 FR1 | |  |
| SMTC configuration |  | 1 | SMTC.2 | |  |
| 2 | SMTC.1 | |  |
| 3 | SMTC.1 | |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 | |  |
| 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 | ms | 1, 2, 3 | DRX.1 | DRX.7 |  |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1 |
| 2 | 3 us | | Synchronous cells |
| 3 | 3 us | | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 | |  |
| T2 | s | 1, 2, 3 | 5 | 10 |  |

6.6.1.2.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (NR Cell 1) and a FR1 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.2.4.1-3 and Table 6.6.1.2.5-1, respectively. 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 NR Cell 2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.2.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.2.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.1.2.4.1-1 as appropriate.

6.6.1.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.2.4.3-1: Common Exception messages for SA intra frequency event triggered reporting tests without gap under DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ  Table H.3.1-3 with Condition INTRA-FREQ MO SSB.1 FR1, SMTC.2 for configuration 6.6.1.2-1  Table H.3.1-3 with Condition INTRA-FREQ MO SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.2-2  Table H.3.1-3 with Condition INTRA-FREQ MO SSB.2 FR1, SMTC  .1 and synchronous cells for configuration 6.6.1.2-3  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition SSB RLM  Table H.3.7-1 with Condition DRX.1 and Offset for test 1  Table H.3.7-1 with Condition DRX.7 and Offset for test 2 |

6.6.1.2.5 Test requirement

Table 6.6.1.2.4.1-3 and Table 6.6.1.2.5-1 define the primary level settings including test tolerances for NR event triggered reporting in synchronous cells when DRX is used test.

Table 6.6.1.2.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting tests without gap under DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| 2 | SR.1.1 TDD | |
| 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | |
| 2 | CR.1.1 TDD | | CR.1.1 TDD | |
| 3 | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | CCR.1.1 FDD | |
| 2 | CCR.1.1 TDD | | CCR.1.1 TDD | |
| 3 | CCR.2.1 TDD | | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | 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 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| 2 | -98 | | | |
| 3 | -95 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
| 2 |
| 3 |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
| 2 |
| 3 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| 2 |
| 3 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| 2 | -94 | -94 | -Infinity | -94 |
| 3 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| dBm/9.36 MHz | 2 | -64.60 | -62.25 |
| dBm/38.16 MHz | 3 | -58.50 | -56.16 |
| 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. | | | | | | |

In Test 1 when DRX cycle length = 40 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to NR Cell 2 on PUSCH.

For both tests:

The overall delays measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report to NR Cell 2.

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

The overall delay measured when DRX cycle length is 40 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra) ms

TPSS/SSS\_sync\_intra = max[600ms, ceil(1.5 × 5 x Kp) × max(SMTC period, DRX cycle)] × CSSFintra= 600ms

T SSB\_measurement\_period\_intra = max[200ms, ceil(1.5 × 5 × Kp) x max(SMTC period, DRX cycle)] × CSSFintra= 320ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 40 ms shall be less than a total of 922 ms.

The overall delay measured when DRX cycle length is 640 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra) ms

TPSS/SSS\_sync\_intra = ceil(5 × Kp) × DRX cycle × CSSFintra = 3200ms

T SSB\_measurement\_period\_intra = ceil(5 × Kp) × DRX cycle × CSSFintra = 3200ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 640 ms shall be less than a total of 6402 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.3 NR SA FR1 event-triggered reporting with gap in non-DRX

6.6.1.3.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting of an event with gaps under non-DRX within intra-frequency cell search with gaps requirements.

6.6.1.3.2 Test applicability

This test applies to all types of NR UE release 15 onwards supporting 5GS NR SA FR1, CSI-RS-based RLM and BWP operation without bandwidth restriction.

6.6.1.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.3.

6.6.1.3.4 Test description

6.6.1.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.3.4.1-1.

Table 6.6.1.3.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in non-DRX

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.1.3-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.1.3-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.1.3-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.3.4.1-2.

Table 6.6.1.3.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.3.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.1.3.4.1-3.

2. Message contents are defined in clause 6.6.1.3.4.3.

3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.3.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE gaps |  |
| Measurement gap repetition periodicity | ms | 1, 2, 3 | 40 |  |
| Measurement gap length | ms | 1, 2, 3 | 6 |  |
| Measurement gap offset | ms | 1, 2, 3 | 39 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
| 2 | SSB.1 FR1 |  |
| 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
| 2 | SMTC.1 |  |
| 3 | SMTC.1 |  |
| CSI-RS parameters |  | 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 |  |
| 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 | ms | 1, 2, 3 |  | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| 2 | 3 μs | Synchronous cells |
| 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 5 |  |

6.6.1.3.4.2 Test procedure

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 general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.3.4.1-3 and Table 6.6.1.3.5-1, respectively. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.3.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.3.5-1.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.3.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 for Configuration 6.6.1.3-1  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and Synchronous cells for Configuration 6.6.1.3-2  Table H.3.1-3 with ConditionINTRA-FREQ MO, SSB.2 FR1, SMTC.1 and Synchronous cells for Configuration 6.6.1.3-3  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.1.3.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

6.6.1.3.5 Test requirement

Table 6.6.1.3.4.1-3 and Table 6.6.1.3.5-1 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in non-DRX test.

Table 6.6.1.3.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| 2 | SR.1.1 TDD | |
| 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | |
| 2 | CR.1.1 TDD | | CR.1.1 TDD | |
| 3 | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | CCR.1.1 FDD | |
| 2 | CCR.1.2 TDD | | CCR.1.1 TDD | |
| 3 | CCR.2.1 TDD | | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| 2 | -98 | | | |
| 3 | -95 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
| 2 |
| 3 |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
| 2 |
| 3 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| 2 |
| 3 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| 2 | -94 | -94 | -Infinity | -94 |
| 3 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| dBm/9.36 MHz | 2 | -64.60 | -62.25 |
| dBm/38.16 MHz | 3 | -58.50 | -56.16 |
| 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. | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

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

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra

TPSS/SSS\_sync\_intra = 600 ms

TSSB\_measurement\_period\_intra = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 802 ms in this test case (note: this gives a total of 800 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.4 NR SA FR1 event-triggered reporting with gap in DRX

6.6.1.4.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting of an event with gaps under DRX within intra-frequency cell search with gaps requirements.

6.6.1.4.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting 5GS NR SA FR1, CSI-RS-based RLM, BWP operation without bandwidth restriction and long DRX cycle.

6.6.1.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.4.

6.6.1.4.4 Test description

6.6.1.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.4.4.1-1.

Table 6.6.1.4.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in DRX

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.1.4-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.1.4-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.1.4-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.4.4.1-2.

Table 6.6.1.4.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.4.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.1.4.4.1-3.

2. Message contents are defined in clause 6.6.1.4.4.3.

3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.4.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| Active cell |  | 1, 2, 3 | Cell 1 | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 | |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE gaps | |  |
| Measurement gap repetition periodicity | ms | 1, 2, 3 | 40 | |  |
| Measurement gap length | ms | 1, 2, 3 | 6 | |  |
| Measurement gap offset | ms | 1, 2, 3 | 39 | |  |
| SSB configuration |  | 1 | SSB.1 FR1 | |  |
| 2 | SSB.1 FR1 | |  |
| 3 | SSB.2 FR1 | |  |
| SMTC configuration |  | 1 | SMTC.2 | |  |
| 2 | SMTC.1 | |  |
| 3 | SMTC.1 | |  |
| CSI-RS parameters |  | 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 | |  |
| 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 | ms | 1, 2, 3 | DRX.1 | DRX.7 |  |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| 2 | 3 μs | | Synchronous cells |
| 3 | 3 μs | | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 | |  |
| T2 | s | 1, 2, 3 | 5 | 10 |  |

6.6.1.4.4.2 Test procedure

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 general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.4.4.1-3 and Table 6.6.1.4.4.2-1, respectively. 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.

In Test 1 when DRX cycle = 40 ms is used, UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Timer Alignment Timer to keep the UE uplink time alignment. Furthermore, the UE is allocated with PUSCH resource at every DRX cycle. In Test 2 when DRX = 640 ms is used, the uplink time alignment is not maintained and the UE needs to use RACH to obtain uplink allocation for measurement reporting.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.4.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.4.5-1.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms for Test 1 or less than 6402 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.1.4.4.1-3 as appropriate.

6.6.1.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.4.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 for configuration 6.6.1.4-1  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.4-2  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1 and synchronous cells for configuration 6.6.1.4-3  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.7-1 with Condition DRX.1 and Gap for test 1  Table H.3.7-1 with Condition DRX.7 and Gap for test 2  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.1.4.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

6.6.1.4.5 Test requirement

Table 6.6.1.4.4.1-3 and Table 6.6.1.4.5-1 define the primary level settings including test tolerances for NR SA FR1 event-triggered reporting with gap in DRX test.

Table 6.6.1.4.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| 2 | SR.1.1 TDD | |
| 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | |
| 2 | CR.1.1 TDD | | CR.1.1 TDD | |
| 3 | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | CCR.1.1 FDD | |
| 2 | CCR.1.2 TDD | | CCR.1.1 TDD | |
| 3 | CCR.2.1 TDD | | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| 2 | -98 | | | |
| 3 | -95 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
| 2 |
| 3 |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
| 2 |
| 3 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| 2 |
| 3 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| 2 | -94 | -94 | -Infinity | -94 |
| 3 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| dBm/9.36 MHz | 2 | -64.60 | -62.25 |
| dBm/38.16 MHz | 3 | -58.50 | -56.16 |
| 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. | | | | | | |

In Test 1 when DRX cycle length = 40 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report on PUSCH.

In Test 2 when DRX cycle length = 640 ms is used, the overall delay measured is defined as the time from the beginning of time period T2, to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report on PUSCH.

For both tests:

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

NOTE 1: The actual overall delays measured in the test may be up to one DRX cycle higher than the measurement reporting delays above because UE is allowed to delay the initiation of the measurement reporting procedure to the next until the Active Time.

NOTE 2: In order to calculate the rate of correct events the system simulator shall verify that it has received correct Event A3 measurement report.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra

TPSS/SSS\_sync\_intra = 600 ms for Test 1, and TPSS/SSS\_sync\_intra =3200 ms for Test 2

TSSB\_measurement\_period\_intra = 320 ms for Test 1, and TSSB\_measurement\_period\_intra = 3200 ms for Test 2

TTI insertion uncertainty = 2 ms

For Test 1, the overall delays measured shall be less than a total of 922 ms (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For Test 2, the overall delays measured shall be less than a total of 6402 ms (note: this gives a total of 6400 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.5 NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

6.6.1.5.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting of an event within intra-frequency cell search without gaps requirements.

6.6.1.5.2 Test applicability

This test applies to all types of NR UE release 15 onwards.

6.6.1.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.5.

6.6.1.5.4 Test description

6.6.1.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.5.4.1-1.

Table 6.6.1.5.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.1.5-1 | 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.5.4.1-2.

Table 6.6.1.5.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.5.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.1.5.4.1-3.

2. Message contents are defined in clause 6.6.1.5.4.3.

3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.5.4.1-3: General test parameters for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1 | Cell 1 |  |
| Neighbour cell |  | 1 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1 | 1: Cell 1 and Cell 2 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
| A3-Offset | dB | 1 | -4.5 |  |
| CP length |  | 1 | Normal |  |
| Hysteresis | dB | 1 | 0 |  |
| Time To Trigger | s | 1 | 0 |  |
| Filter coefficient |  | 1 | 0 | L3 filtering is not used |
| DRX | ms | 1 |  | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | 1 | 5 |  |
| T2 | s | 1 | 5 |  |

6.6.1.5.4.2 Test procedure

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 general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.5.4.1-3 and Table 6.6.1.5.5-1, respectively. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.5.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.5.5-1.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.5.4.3 Message contents

Message contents are according to TS 38.508-1 clause 4.6 with the following exceptions:

Table 6.6.1.5.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 for Configuration 6.6.1.5-1  Table H.3.1-4 with SSB Index and A3-offset = -4.5 dB  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-7 with Condition INTRA-FREQ and SSB Index  Table H.3.1-8 with Condition SSB RLM |

6.6.1.5.5 Test requirement

Table 6.6.1.5.4.1-3 and Table 6.6.1.5.5-1 define the primary level settings including test tolerances for SA event triggered reporting without gap under non-DRX with SSB index reading test.

Table 6.6.1.5.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting without gap in non-DRX with SSB index reading

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| 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 Patterns |  | 1 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| Propagation Condition |  | 1 | 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. | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

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

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_with\_index

Tidentify\_intra\_with\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra + TSSB\_time\_index\_intra

TPSS/SSS\_sync\_intra = 600 ms

TSSB\_time\_index\_intra = 120 ms

TSSB\_measurement\_period\_intra = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.6 NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

6.6.1.6.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting of an event within intra-frequency cell search with gaps requirements.

6.6.1.6.2 Test applicability

This test applies to all types of NR UE release 15 onwards supporting 5GS NR SA FR1, CSI-RS-based RLM and BWP operation without bandwidth restriction.

6.6.1.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.6.

6.6.1.6.4 Test description

6.6.1.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.6.4.1-1.

Table 6.6.1.6.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.1.6-1 | 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.3.4.1-2.

Table 6.6.1.6.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.6.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.1.6.4.1-3.

2. Message contents are defined in clause 6.6.1.6.4.3.

3. There is one NR carrier and two cells specified in the test. Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.6.4.1-3: General test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1 | Cell 1 |  |
| Neighbour cell |  | 1 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1 | 1: Cell 1 and Cell 2 |  |
| Measurement gap type |  | 1 | Per-UE gaps |  |
| Measurement gap repetition periodicity | ms | 1 | 40 |  |
| Measurement gap length | ms | 1 | 6 |  |
| Measurement gap offset | ms | 1 | 39 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
| CSI-RS parameters |  | 1 | CSI-RS.1.2 FDD resource #0 |  |
| A3-Offset | dB | 1 | -4.5 |  |
| CP length |  | 1 | Normal |  |
| Hysteresis | dB | 1 | 0 |  |
| Time To Trigger | s | 1 | 0 |  |
| Filter coefficient |  | 1 | 0 | L3 filtering is not used |
| DRX | ms | 1 |  | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| T1 | s | 1 | 5 |  |
| T2 | s | 1 | 5 |  |

6.6.1.6.4.2 Test procedure

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 general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.6.4.1-3 and Table 6.6.1.6.5-1, respectively. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.6.5-1.

3. SS shall transmit an RRCReconfiguration message.

4. The UE shall transmit RRCReconfigurationComplete message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.3.5-1.

6. UE shall transmit a MeasurementReport message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.6.4.3 Message contents

Message contents are according to TS 38.508-1 clause 4.6 with the following exceptions:

Table 6.6.1.6.4.3-1: Common Exception messages for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ and GAP NEEDED  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 for Configuration 6.6.1.6-1  Table H.3.1-4 with SSB index and A3-offset = -4.5dB.  Table H.3.1-5 with Condition INTRA-FREQ  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTRA-FREQ and SSB index  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.1.6.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

6.6.1.6.5 Test requirement

Table 6.6.1.6.4.1-3 and Table 6.6.1.6.5-1 define the primary level settings including test tolerances for SA event triggered reporting tests with per-UE gaps under non-DRX with SSB index reading test.

Table 6.6.1.6.5-1: NR Cell specific test parameters for NR SA FR1 event-triggered reporting with gap in non-DRX with SSB index reading

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | CR.1.1 FDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | CCR.1.1 FDD | |
| OCNG Patterns |  | 1 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
| Note 2 | dBm/15 KHz | 1 | -98 | | | |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS KHz | 1 | -94 | -94 | -Infinity | -94 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | Specified in Cell 1 columns | |
| Propagation Condition |  | 1 | 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. | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report.

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

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_with\_index

Tidentify\_intra\_with\_index = TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra + TSSB\_time\_index\_intra

TPSS/SSS\_sync\_intra = 600 ms

TSSB\_time\_index\_intra = 120 ms

TSSB\_measurement\_period\_intra = 200 ms

TTI insertion uncertainty = 2 ms

The overall delays measured shall be less than a total of 922 ms in this test case (note: this gives a total of 920 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.7 NR SA FR1 event-triggered reporting without gap in DRX for UE configured with highSpeedMeasFlag-r16

6.6.1.7.1 Test purpose

To verify the UE’s ability to make a correct reporting of an event within intra-frequency cell search without gap under DRX for UE configured with highSpeedMeasFlag-r16.

6.6.1.7.2 Test applicability

This test applies to all types of NR UE release 15 onwards that supports measurement enhancements in high speed scenario.

6.6.1.7.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.7.

6.6.1.7.4 Test description

6.6.1.7.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.7.4.1-1.

Table 6.6.1.7.4.1-1: Supported test configurations for NR SA FR1 event-triggered reporting without gap in DRX for UE configured with highSpeedMeasFlag-r16

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.1.7-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.1.7-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.1.7-3 | 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. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.7.4.1-2.

Table 6.6.1.7.4.1-2: Initial conditions for NR SA FR1 event-triggered reporting without gap in DRX for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The test parameters for PCell and neighbour cell are given in Table 6.6.1.7.4.1-3 below.

2. Message contents are defined in clause 6.6.1.7.4.3.

3. There is one carrier and two cells specified in the test. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.1.7.4.1-3: General test parameters for SA intra-frequency event triggered reporting tests without gap for FR1 under DRX for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| *highSpeedMeasFlag-r16* |  | 1,2,3 | Present | To enable high speed measurement enhancements |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 |  |
| 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.7 | 640ms DRX cycle |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| 2 | 3 μs | Synchronous cells |
| 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 6 |  |

6.6.1.7.4.2 Test procedure

Two cells are deployed in the test, which are FR1 PCell (NR Cell 1) and a FR1 neighbour cell (NR Cell 2) on the same frequency as the PCell. The general and cell specific test parameters for PCell and neighbour cell are given in Table 6.6.1.7.4.1-3 and Table 6.6.1.7.5-1, respectively. 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 NR Cell 2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.1.7.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.1.7.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 5122 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set NR Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 1008) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.1.7.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.1.7.4.3-1: Common Exception messages for SA intra frequency event triggered reporting tests without gap under DRX for UE configured with highSpeedMeasFlag-r16

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions | Table H.2.1-3 with Condition HighSpeedMeas |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition SSB RLM  Table H.3.7-1 with Condition DRX.7 and Offset |
| Specific message contents exceptions for Test Configuration 6.6.1.7-1 | Table H.3.1-3 with Condition INTRA-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.1 FR1 |
| Specific message contents exceptions for Test Configuration 6.6.1.7-2 | Table H.3.1-3 with Condition INTRA-FREQ MO and synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.1 FR1 |
| Specific message contents exceptions for Test Configuration 6.6.1.7-3 | Table H.3.1-3 with Condition INTRA-FREQ MO and synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.2 FR1 |

6.6.1.7.5 Test requirement

Table 6.6.1.7.4.1-3 and Table 6.6.1.7.5-1 define the primary level settings including test tolerances for NR event triggered reporting in synchronous cells when DRX is used

Table 6.6.1.7.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting tests without gap under DRX for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | |
|  |  |  | T1 | T2 | | T1 | T2 |
| TDD configuration |  | 1 | TN/A | | | TN/A | |
|  | 2 | TDDConf.1.1 | | | TDDConf.1.1 | |
|  | 3 | TDDConf.2.1 | | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | | N/A | |
|  | 2 | SR.1.1 TDD | | |  | |
|  | 3 | SR.2.1 TDD | | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | | CR.1.1 FDD | |
|  | 2 | CR.1.1 TDD | | | CR.1.1 TDD | |
|  | 3 | CR.2.1 TDD | | | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | | CCR.1.1 FDD | |
|  | 2 | CCR.1.1 TDD | | | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | | | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | | N/A | |
|  | 2 | TRS.1.1 TDD | | | N/A | |
|  | 3 | TRS.1.2 TDD | | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | 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 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | SSB | | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | | |
|  | 2 | -98 | | | | |
|  | 3 | -95 | | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | | |
|  | 2 |  | | | | |
|  | 3 |  | | | | |
|  | dB | 1 | 4 | -1.46 | | -Infinity | -1.46 |
|  | 2 |  |  | |  |  |
|  | 3 |  |  | |  |  |
|  | dB | 1 | 4 | 4 | | -Infinity | 4 |
|  | 2 |  |  | |  |  |
|  | 3 |  |  | |  |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94+TT | -94 | | -Infinity | -94 |
|  | 2 | -94 | -94 | | -Infinity | -94 |
|  | 3 | -91 | -91 | | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | | -64.60 | -62.25 |
| dBm/9.36 MHz | 2 | -64.60 | -62.25T | | -64.60 | -62.25 |
| dBm/38.16 MHz | 3 | -58.50 | -56.16 | | -58.50 | -56.16 |
| Propagation Condition |  | 1, 2 | AWGN | | AWGN 1944Hz Note 4 | | |
|  | 3 | AWGN | | AWGN 3334Hz Note 5 | | |
| 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: The AWGN 1944 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 1944Hz.  Note 5: The AWGN 3334 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 3334Hz. | | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2 to the moment the UE send one Event A3 triggered measurement report to NR Cell 2. When DRX cycle length = 640 ms, the overall delay measured is defined as the time from the beginning of time period T2 to the moment the UE starts to send preambles on the PRACH for Scheduling Request (SR) to obtain allocation to send the measurement report to NR Cell 2 on PUSCH.

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

The overall delay measured when DRX cycle length is 640 ms test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = (TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra) ms

TPSS/SSS\_sync\_intra = ceil(5 × Kp) × DRX cycle × CSSFintra = 3200ms

T SSB\_measurement\_period\_intra = ceil(Y × Kp) × DRX cycle × CSSFintra = 1920ms

TTI insertion uncertainty = 2 ms

The overall delay measured when DRX cycle length is 640 ms shall be less than a total of 5122 ms.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.1.8 NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

6.6.1.8.1 Test purpose

The purpose of this test is to verify TBD

6.6.1.8.2 Test applicability

This test applies to all types of E-UTRA UE release 16 and forward supporting enhanced NR CA measurement requirements in high-speed scenario.

6.6.1.8.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.6.1.0.1

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.1.8.

6.6.1.8.4 Test description

6.6.1.8.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.1.8.4.1-1.

Table 6.6.1.8.4.1-1: Supported test configurations for NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.1.8-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.1.8-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.1.8-3 | 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. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.1.8.4.1-2.

Table 6.6.1.8.4.1-2: Initial conditions for NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.2-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.1.8.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in clause C.2.1. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.1.8.4.1-3.

2. Message contents are defined in clause 6.6.1.8.4.3.

3. There is two carriers and three cells specified in the test. NR Cell 1 is the PCell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test. NR Cell 2 is is a FR1 deactivated SCell and NR Cell 3 is a neighbour cell on the same frequency as the SCell.

Table 6.6.1.8.4.1-3: General test parameters for NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  |  |
| highSpeedMeasCA-Scell-r17 |  | 1,2,3 | Present | To enable high speed measurement enhancements |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1  2: Cell 2 and Cell 3 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| A6-Offset | dB | 1, 2, 3 | -4.5 |  |
| 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.6 |  |
| measCycleSCell |  | 1, 2, 3 | 640ms |  |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | 2 | 3 μs | Synchronous cells |
|  |  | 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 10 |  |

6.6.1.8.4.2 Test procedure

Same test procedure as in 6.6.1.7.4.2 except following step 6:

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 5760 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

6.6.1.8.4.3 Message contents

Table 6.6.1.8.4.3-1: Common Exception messages for NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition SSB RLM  Table H.3.7-1 with Condition DRX.6 |
| Specific message contents exceptions for Test Configuration 6.6.1.8-1 | Table H.3.1-3 with Condition INTRA-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.1 FR1 |
| Specific message contents exceptions for Test Configuration 6.6.1.8-2 | Table H.3.1-3 with Condition INTRA-FREQ MO and synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.1 FR1 |
| Specific message contents exceptions for Test Configuration 6.6.1.8-3 | Table H.3.1-3 with Condition INTRA-FREQ MO and synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1  Table 7.3.1-3a in TS 38.508-1 [14] with condition SSB.2 FR1 |

Table 6.6.1.8.4.3-2: ReportConfigNR-DEFAULT(a6-offset): NR report configuration for event A6

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition EVENT\_A6 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| eventTriggered SEQUENCE { |  |  |  |
| eventId CHOICE { |  |  |  |
| eventA6 SEQUENCE { |  |  |  |
| a6-Offset CHOICE { |  |  |  |
| rsrp | -9 | The actual value is field value \* 0.5 dB. |  |
| } |  |  |  |
| hysteresis | 0 |  |  |
| timeToTrigger | ms0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.6.1.8.4.3-3: ServingCellConfigCommon

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1[14], Table 4.6.3-168 with condition R17 HST FR1 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfigCommon ::= SEQUENCE { |  |  |  |
| HighSpeedConfig-v1700 SEQUENCE { |  |  |  |
| highSpeedMeasCA-Scell-r17 | true |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.6.1.8.4.3-4: MeasObjectNR-DEFAULT: measCycleSCell configuration for SCell intra-frequency measurements

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-76 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectNR::= SEQUENCE { |  |  |  |
| measCycleSCell-v1530 | sf160 |  |  |
| } |  |  |  |

6.6.1.8.5 Test requirement

Table 6.6.1.8.5-1 defines the primary level settings including test tolerances for EN-DC FR1 interruptions at SRS carrier based switching in asynchronous EN-DC.

Table 6.6.1.8.5-1: NR cell specific test parameters for NR SA FR1 event triggered reporting without gap in DRX for UE configured with highSpeedMeasCA-Scell-r17

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  |
| TDD configuration |  | 1 | N/A | | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | CR.1.1 TDD | | N/A | | N/A | |
|  |  | 3 | CR.2.1 TDD | | N/A | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | CCR.1.1 TDD | | N/A | | N/A | |
|  |  | 3 | CCR.2.1 TDD | | N/A | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | | N/A | |
| Initial 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 | | | | | |
|  |  | 2 | -98 | | | | | |
|  |  | 3 | -95 | | | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | | | |
|  |  | 2 |  | | | | | |
|  |  | 3 |  | | | | | |
|  | dB | 1 | 4 | -1.46 | 4 | -1.46 | -Infinity | -1.46 |
|  |  | 2 |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |
|  | dB | 1 | 4 | 4 | 4 | 4 | -Infinity | 4 |
|  |  | 2 |  |  |  |  |  |  |
|  |  | 3 |  |  |  |  |  |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94 | -94 | -94 | -94 | -Infinity | -94 |
|  |  | 2 | -94 | -94 | -94 | -94 | -Infinity | -94 |
|  |  | 3 | -91 | -91 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | -64.60 | -62.25 | -64.60 | -62.25 |
|  | dBm/9.36 MHz | 2 | -64.6 0 | -62.25 | -64.60 | -62.25 | -64.60 | -62.25 |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | -58.50 | -56.16 | -58.50 | -56.16 |
| Propagation Condition |  | 1,2 | AWGN | | | | AWGN 1944Hz Note 4 | |
|  | 3 | AWGN | | | | AWGN 3334Hz Note 5 | |
| 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: The AWGN 1944 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 1944Hz.  Note 5: The AWGN 3334 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 3334Hz. | | | | | | | | |

The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 5760 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% with the confidence level of 95%.

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.

### 6.6.2 Inter-frequency measurements

#### 6.6.2.0 Minimum conformance requirements for Inter-frequency measurements

##### 6.6.2.0.1 Minimum conformance requirements for Inter-frequency measurement with measurement gaps

Same as clause 4.6.2.0 when measurement gaps are provided, or the UE supports capability of conducting such measurements without gaps.

##### 6.6.2.0.2 Minimum conformance requirements for Inter-frequency measurement without measurement gaps

If UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network, UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured). Otherwise UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_with\_index. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within Tidentify\_inter\_without\_index. It is assumed that when UE performs inter-frequency measurements without measurement gaps in a TDD bands on FR1 and FR2, the following condition is met:

- SFN and frame boundary across serving cell and inter-frequency neighbour cells is aligned

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

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

Where:

TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 6.6.2.0-1

TSSB\_time\_index\_inter: it is the time period used to acquire the index of the SSB being measured given in table 6.6.2.0-2.

T SSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 6.6.2.0-3 and table 6.6.2.0-4.

CSSFinter: it is a carrier specific scaling factor and is determined according to CSSFoutside\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gaps, i.e. when inter frequency SMTC is fully non overlapping or partially overlapping with measurement gaps or according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps, i.e. when inter frequency SMTC is fully overlapping with measurement gaps.

Mpss/sss\_sync\_inter: For a UE supporting FR2 power class 1, Mpss/sss\_sync\_inter = 40 samples. For a UE supporting FR2 power class 2, Mpss/sss\_sync\_inter = 24 samples. For a UE supporting FR2 power class 3, Mpss/sss\_sync\_inter = 24 samples. For a UE supporting FR2 power class 4, Mpss/sss\_sync = 24 samples.

Mmeas\_period\_inter: For a UE supporting FR2 power class 1, Mmeas\_period\_inter =40 samples. For a vehicle mounted UE supporting FR2 power class 2, Mmeas\_period\_inter =24 samples. For a UE supporting FR2 power class 3, Mmeas\_period\_inter =24 samples. For a UE supporting FR2 power class 4, Mmeas\_period\_inter = 24 samples.

When inter frequency SMTC is fully non overlapping with measurement gaps or inter frequency SMTC is fully overlapping with MGs, Kp=1.

When inter frequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP.

For FR2,

Klayer1\_measurement=1,

- if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency in the same band outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with any of the SSB symbols and the RSSI symbols, and 1 symbol before each consecutive SSB symbols and the RSSI symbols, and 1 symbol after each consecutive SSB symbols and the RSSI symbols, given that *SSB-ToMeasure* and *SS-RSSI-Measurement* are configured, where SSB symbols are indicated by *SSB-ToMeasure* and RSSI symbols are indicated by *SS-RSSI-Measurement*;

Klayer1\_measurement=1.5, otherwise.

If the above-mentioned reference signal configured for L1-RSRP measurement is aperiodic CSI-RS resource, longer cell identification delay would be expected.

Table 6.6.2.0-1: Time period for PSS/SSS detection, (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_inter |
| No DRX | max( 600ms, ceil( 5 x Kp) x SMTC period )Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max( 600ms, ceil(1.5x 5 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | ceil(5 x Kp) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified. | |

Table 6.6.2.0-2: Time period for time index detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TSSB\_time\_index\_inter |
| No DRX | max(120ms, ceil( 3 x Kp )x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max(120ms, ceil (1.5 x 3 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | Ceil(3 x Kp) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified. | |

The UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in TS 38.133 [6] clauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 6.6.2.0-3 and 6.6.2.0-4, if UE supports inter-frequency measurement without measurement gaps:

Table 6.6.2.0-3: Measurement period for inter-frequency measurements without gaps ((FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_inter |
| No DRX | max(200ms, ceil( 5 x Kp) x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x 5 x Kp) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | ceil( 5 x Kp ) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified. | |

Table 6.6.2.0-4: Measurement period for inter-frequency measurements without gaps (FR2)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_inter |
| No DRX | max(400ms, ceil(Mmeas\_period\_inter x Kp x Klayer1\_measurement) x SMTC period)Note 1 x CSSFinter |
| DRX cycle≤ 320ms | max(400ms, ceil(1.5x Mmeas\_period\_inter x Kp x Klayer1\_measurement) x max(SMTC period,DRX cycle)) x CSSFinter |
| DRX cycle>320ms | ceil(Mmeas\_period\_inter xKp x Klayer1\_measurement) x DRX cycle x CSSFinter |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified. | |

If UE supports *interFrequencyMeas-NoGap-r16* and the flag *interFrequencyConfig-NoGap-r16* is configured by the Network, UE is required to be capable of measuring without measurement gaps when the SSB is completely contained in the active bandwidth part of the UE. When any of the conditions in the following clauses is met, there are restrictions on the scheduling availability; otherwise, there is no scheduling restriction. Note that the SSB symbols to be measured in the following clauses are the SSB symbols indicated by SSB-ToMeasure [2], if it is configured; otherwise, all L SSB symbols within the SMTC window duration defined in clause 4.1 of TS 38.213 [3] are included.

The scheduling availability requirements when UE performs inter-frequency measurements without measurement gaps in a TDD bands on FR1 and FR2 in TS 38.133 [6] clause 9.3.9.3.1~9.3.9.3.3 are valid under the following conditions:

- SFN and frame boundary across serving cell and inter-frequency neighbour cells is aligned, and

When UE performs inter-frequency measurements without measurement gaps in a TDD band, the following restrictions apply due to SS-RSRP or SS-SINR measurement

- UE is not expected to transmit PUCCH/PUSCH/SRS on SSB symbols to be measured, and on 1 data symbol before each consecutive SSB symbols to be measured and 1 data symbol after each consecutive SSB symbols to be measured within SMTC window duration.

When UE performs inter-frequency measurements without measurement gaps in a TDD band, the following restrictions apply due to SS-RSRQ measurement

- UE is not expected to transmit PUCCH/PUSCH/SRS on SSB symbols to be measured, RSSI measurement symbols, and on 1 data symbol before each consecutive SSB to be measured/RSSI symbols and 1 data symbol after each consecutive SSB to be measured/RSSI symbols within SMTC window duration.

When TDD intra-band carrier aggregation is performed, the scheduling restrictions due to one serving cell should also apply to all other serving cells in the same band on the symbols that fully or partially overlap with aforementioned restricted symbols.

For UE which do not support *simultaneousRxDataSSB-DiffNumerology-Inter-r16* [14] the following restrictions apply due to SS-RSRP/RSRQ/SINR measurement

- If UE performs inter-frequency measurements without measurement gaps in a TDD band, UE is not expected to transmit PUCCH/PUSCH/SRS or receive PDCCH/PDSCH/TRS/CSI-RS for CQI on SSB symbols to be measured, and on 1 data symbol before each consecutive SSB symbols to be measured and 1 data symbol after each consecutive SSB symbols to be measured within SMTC window duration.

- If UE performs inter-frequency measurements without measurement gaps in a FDD band, UE is not expected to transmit PUCCH/PUSCH/SRS or receive PDCCH/PDSCH/TRS/CSI-RS for CQI on all symbols within SMTC window duration.

When intra-band carrier aggregation is performed, the scheduling restrictions due to a given serving cell should also apply to all other serving cells in the same band on the symbols that fully or partially overlap with aforementioned restricted symbols.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3.

#### 6.6.2.1 NR SA FR1-FR1 event-triggered reporting in non-DRX

6.6.2.1.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within inter-frequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards. Test 1 is applicable to UEs not supporting per-FR gap (IndependentGapConfig, as defined in TS 38.306 [11]) and Test 2 is applicable only to UEs supporting per-FR gap and Gap Pattern Id 4.

6.6.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.1.

6.6.2.1.4 Test description

6.6.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.1.4.1-2. Test environment parameters are given in Table 6.6.2.1.4.1-3.

Table 6.6.2.1.4.1-1: SA FR1-FR1 event triggered reporting tests in non-DRX supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.2.1-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.2.1-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.2.1-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table 6.6.2.1.4.1-2: SA FR1-FR1 general test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in TS 38.133 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 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1 | 1 |  |

Table 6.6.2.1.4.1-3: Test Environment parameters for SA inter-frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Value** | | **Comment** |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. Message contents are defined in clause 6.6.2.1.4.3.

2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.1.4.2 Test procedure

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.

In test 1 measurement gap pattern configuration # 0 as defined in Table 6.6.2.1.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 6.6.2.1.4.1-2 is provided for UE that supports per-FR gap.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.1.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.1.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 920 ms for Test 1 and 800 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.1.4.1-2 as appropriate.

6.6.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.1.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with Conditions gapUE, Pattern #0 and gap offset = 9 for Test 1  Table H.3.1-6 with Conditions gapFR1, Pattern #4 and gap offset = 9 for Test 2  Table H.3.1-7 with Condition INTER-FREQ |
| Specific message contents exceptions for Test Configuration 6.6.2.1-1 | Table H.3.1-3 with Conditions INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.5 |
| Specific message contents exceptions for Test Configuration 6.6.2.1-2 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |
| Specific message contents exceptions for Test Configuration 6.6.2.1-3 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |

6.6.2.1.5 Test requirement

Table 6.6.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.1.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non-DRX

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | | |
| T1 | T2 | T1 | T2 | |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | |
|  | Config 2,3 | TDD | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | |
|  | Config 2 | TDDConf.1.1 | | | | |
|  | Config 3 | TDDConf.2.1 | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | NA | | |
| Initial UL BWP |  | ULBWP.0.1 | | NA | | |
| Dedicated DL BWP |  | DLBWP.1.1 | | NA | | |
| Dedicated UL BWP |  | ULBWP.1.1 | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | NA | | |
| Config 2 | TRS.1.1 TDD | | NA | | |
| Config 3 | TRS.1.2 TDD | | NA | | |
| OCNG Patterns | |  | Config 1,2,3 | OP.1 | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | - | | |
|  | Config 2 | SR.1.1 TDD | |
|  | Config 3 | SR 2.1 TDD | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | - | | |
|  | Config 2 | CR.1.1 TDD | |
|  | Config 3 | CR 2.1 TDD | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | - | |
|  | Config 2 | CCR.1.1 TDD | |
|  | Config 3 | CCR.2.1 TDD | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | SSB.5 FR1 | | |
|  | Config 2 | SSB.1 FR1 | | SSB.5 FR1 | | |
|  | Config 3 | SSB.2 FR1 | | SSB.6 FR1 | | |
| SMTC configuration | |  | Config 1 | SMTC.2 | | SMTC.5 | | |
|  | Config 2, 3 | SMTC.1 | | SMTC.4 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
| Config 3 | 30 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98 | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | |
| Config 3 | -95 | | -95 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | |
| Config 3 | -91 | -91 | -Infinity | -88 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 | |
|  | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -70.05 | -62.26 | |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 | |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | |

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%. with a confidence level of 95%

In test 2 with per-FR gap, 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 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% with a confidence level of 95%.

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.

#### 6.6.2.2 NR SA FR1-FR1 event-triggered reporting in DRX

6.6.2.2.1 Test purpose

To verify that the UE makes correct reporting of an event in DRX within inter-frequency NR cell search requirements without SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.2.2 Test applicability

This test applies to all types of NR UE Release 15 and forward supporting 5GS NR SA FR1 and long DRX cycle. Test 1 and Test 2 are applicable to UEs not supporting per-FR gap (IndependentGapConfig, as defined in TS 38.306 [11]) and Test 3 and Test 4 are applicable only to UEs supporting per-FR gap and Gap Pattern Id 4.

6.6.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.2.

6.6.2.2.4 Test description

6.6.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.2.4.1-2. Test environment parameters are given in Table 6.6.2.2.4.1-3.

Table 6.6.2.2.4.1-1: SA FR1-FR1 event triggered reporting tests in DRX supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.2.2-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.2.2-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.2.2-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table 6.6.2.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | | | Two FR1 NR carrier frequencies are used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | | | NR Cell 1 is on NR RF channel number 1 |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | | | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in TS 38.133 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.7 | DRX.1 | DRX.7 | As specified in clause A.5 |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | | | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | | | | Synchronous cells |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 1.1 | 11 | 1.1 | 11 |  |

Table 6.6.2.2.4.1-3: Test Environment parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. Message contents are defined in clause 6.6.2.2.4.3.

2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.2.4.2 Test procedure

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.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 6.6.2.2.4.1-2 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 6.6.2.2.4.1-2 is provided for UE that supports per-FR gap.

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 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.2.4.1-2 and 6.6.2.2.5-1.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.2.5-1. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1080 ms for Test 1, 10240 ms for Test 2, 1080 ms for Test 3 and 10240 ms for Test 4 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.2.4.1-2 as appropriate.

6.6.2.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.2.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with Conditions gapUE, Pattern #0 and gap offset = 9 for Test 1 and Test 2  Table H.3.1-6 with Conditions gapFR1, Pattern #4 and gap offset = 9 for Test 3 and Test 4  Table H.3.1-7 with Condition INTER-FREQ  Table H.3.7-1 with Condition DRX.1 and Gap and INTER-FREQ for Test 1 and Test 3  Table H.3.7-1 with Condition DRX.7 and Gap and INTER-FREQ for Test 2 and Test 4 |
| Specific message contents exceptions for Test Configuration 6.6.2.2-1 | Table H.3.1-3 with Conditions INTER-FREQ MO and  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.5 |
| Specific message contents exceptions for Test Configuration 6.6.2.2-2 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |
| Specific message contents exceptions for Test Configuration 6.6.2.2-3 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |

6.6.2.2.5 Test requirement

Table 6.6.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.2.5-1: 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 1,2,3 | 1 | | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | | |
|  | Config 2,3 | TDD | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | |
|  | Config 2 | TDDConf.1.1 | | | | | |
|  | Config 3 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | | |
| Initial UL BWP |  |  | ULBWP.0.1 | | | NA | | |
| Dedicated DL BWP |  |  | DLBWP.1.1 | | | NA | | |
| Dedicated UL BWP |  |  | ULBWP.1.1 | | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | | |
| Config 2 | TRS.1.1 TDD | | | NA | | |
| Config 3 | TRS.1.2 TDD | | | NA | | |
|  |  | | |  | | |
| OCNG Patterns | |  | Config 1,2,3 | OP.1 | | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | - | | |
|  | Config 2 | SR.1.1 TDD | | |
|  | Config 3 | SR 2.1 TDD | | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | - | | |
|  | Config 2 | CR.1.1 TDD | | |
|  | Config 3 | CR 2.1 TDD | | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | - | | |
|  | Config 2 | CCR.1.1 TDD | |
|  | Config 3 | CCR.2.1 TDD | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | | |
| SMTC configuration | |  | Config 1 | SMTC.2 | | | SMTC.5 | | |
|  | Config 2, 3 | SMTC.1 | | | SMTC.4 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | |
| Config 3 | 30 | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz | Config 1,2,3 | -98 | | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | | -98 | | |
| Config 3 | -95 | | | -95 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | -Infinity | -91 | |
| Config 3 | -91 | -91 | | -Infinity | -88 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | | -Infinity | 7 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | -Infinity | 7 | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | -70.05 | -62.2 | |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | | -63.94 | -56.15 | |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | |

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% with a confidence level of 95%.

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% with a confidence level of 95%.

In test 3 with per-FR 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% with a confidence level of 95%.

In test 4 with per-FR 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% with a confidence level of 95%.

In test 1, 2, 3 and 4 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.

#### 6.6.2.3 Void

#### 6.6.2.4 Void

#### 6.6.2.5 NR SA FR1-FR1 event-triggered reporting in non-DRX with SSB time index detection

6.6.2.5.1 Test purpose

To verify that the UE makes correct reporting of an event in non-DRX within inter-frequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.5.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards. Test 1 is applicable to UEs not supporting per-FR gap (IndependentGapConfig, as defined in TS 38.306 [11]) and Test 2 is applicable only to UEs supporting per-FR gap and Gap Pattern Id 4.

6.6.2.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.5.

6.6.2.5.4 Test description

6.6.2.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.5.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.5.4.1-2. Test environment parameters are given in Table 6.6.2.5.4.1-3.

Table 6.6.2.5.4.1-1: SA FR1-FR1 event triggered reporting tests in non-DRX with SSB time index detection supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.2.5-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.2.5-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.2.5-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table 6.6.2.5.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with SSB time index detection in non-DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies are used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1 |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | NR cell 2 is on NR RF channel number 2 |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in TS 38.133 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 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | | Synchronous cells |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.1 | 1 |  |

Table 6.6.2.5.4.1-3: Environment test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Value** | | **Comment** |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.5.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. Message contents are defined in clause 6.6.2.5.4.3.

2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

6.6.2.5.4.2 Test procedure

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.

In test 1 measurement gap pattern configuration # 0 as defined in Table 6.6.2.5.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table 6.6.2.5.4.1-2 is provided for UE that supports per-FR gap.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.5.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.5.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1040 ms for Test 1 and 920 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.5.4.1-2 as appropriate.

6.6.2.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.5.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ  Table H.3.1-4 with A3-offset = -6dB and Condition SSB Index  Table H.3.1-5  Table H.3.1-6 with Conditions gapUE, Pattern #0 and gap offset = 9 for Test 1  Table H.3.1-6 with Conditions gapFR1, Pattern #4 and gap offset = 9 for Test 2  Table H.3.1-7 with Conditions INTER-FREQ and SSB Index |
| Specific message contents exceptions for Test Configuration 6.6.2.5-1 | Table H.3.1-3 with Conditions INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.5 |
| Specific message contents exceptions for Test Configuration 6.6.2.5-2 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |
| Specific message contents exceptions for Test Configuration 6.6.2.5-3 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |

6.6.2.5.5 Test requirement

Table 6.6.2.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.5.1-3: 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 1,2,3 | 1 | | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | | |
|  | Config 2,3 | TDD | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | |
|  | Config 2 | TDDConf.1.1 | | | | | |
|  | Config 3 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | | |
| Initial UL BWP |  | ULBWP.0.1 | | | NA | | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | NA | | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | | |
| Config 2 | TRS.1.1 TDD | | | NA | | |
| Config 3 | TRS.1.2 TDD | | | NA | | |
| OCNG Patterns | |  | Config 1,2,3 | OP.1 | | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | - | | |
|  | Config 2 | SR.1.1 TDD | | |
|  | Config 3 | SR 2.1 TDD | | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | - | | |
|  | Config 2 | CR.1.1 TDD | | |
|  | Config 3 | CR 2.1 TDD | | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | - | | |
|  | Config 2 | CCR.1.1 TDD | |
|  | Config 3 | CCR.2.1 TDD | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | | |
| SMTC configuration | |  | Config 1 | SMTC.2 | | SMTC.5 | | | |
|  | Config 2, 3 | SMTC.1 | | SMTC.4 | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | |
| Config 3 | 30 | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98 | | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | | -98 | | |
| Config 3 | -95 | | | -95 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | -Infinity | -91 | |
| Config 3 | -91 | -91 | | -Infinity | -88 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | -Infinity | 7 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | -Infinity | 7 | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | -70.05 | -62.2 | |
| dBm/38.16MHz | Config 3 | -58.4 | -58.49 | | -63.94 | -56.15 | |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | |

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% with a confidence level of 95%.

In test 2 with per-FR 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% with a confidence level of 95%.

In test 1 and 2 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.

#### 6.6.2.6 NR SA FR1-FR1 event-triggered reporting in DRX with SSB time index detection

6.6.2.6.1 Test purpose

To verify that the UE makes correct reporting of an event in DRX within inter-frequency NR cell search requirements with SSB time index detection in TS 38.133 [6] clause 9.3.4.

6.6.2.6.2 Test applicability

This test applies to all types of NR UE Release 15 and forward supporting 5GS NR SA FR1 and long DRX cycle. Test 1 and Test 2 are applicable to UEs not supporting per-FR gap (IndependentGapConfig, as defined in TS 38.306 [11]) and Test 3 and Test 4 are applicable only to UEs supporting per-FR gap and Gap Pattern Id 4.

6.6.2.6.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.2.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.6.

6.6.2.6.4 Test description

6.6.2.6.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.6.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.2.6.4.1-2. Test environment parameters are given in Table 6.6.2.6.4.1-3.

Table 6.6.2.6.4.1-1: SA FR1-FR1 event triggered reporting tests in DRX with SSB time index detection supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.2.6-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode |
| 6.6.2.64-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode |
| 6.6.2.6-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table 6.6.2.6.4.1-2: 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 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | | | Two FR1 NR carrier frequencies are used |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | | | NR Cell 1 is on NR RF channel number 1 |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | | | NR cell 2 is on NR RF channel number 2 |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in TS 38.133 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.7 | DRX.1 | DRX.7 | As specified in clause A.5 |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | | | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | | | | Synchronous cells |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 1.3 | 13.5 | 1.3 | 13.5 |  |

Table 6.6.2.6.4.1-3: Test Environment parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection in DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.6.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. Message contents are defined in clause 6.6.2.6.4.3.

2. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Table Annex C.1.2.

6.6.2.6.4.2 Test procedure

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.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table 6.6.2.6.4.1-2 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 6.6.2.6.4.1-2 is provided for UE that supports per-FR gap.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.6.4.1-2 and Table 6.6.2.6.5-1.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.6.5-1. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1280 ms for Test 1, 12160 ms for Test 2, 1280 ms for Test 3 and 12160 ms for Test 4, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.6.4.1-2 as appropriate.

6.6.2.6.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.6.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ  Table H.3.1-4 with A3-offset = -6dB and Condition SSB Index  Table H.3.1-5  Table H.3.1-6 with Conditions gapUE, Pattern #0 and gap offset = 9 for Test 1 and Test 2  Table H.3.1-6 with Conditions gapFR1 and Pattern #4 and gap offset = 9 for Test 3 and Test 4  Table H.3.1-7 with Conditions INTER-FREQ and SSB Index  Table H.3.7-1 with Condition DRX.1 and Gap and INTER-FREQ for Test 1 and Test 3  Table H.3.7-1 with Condition DRX.7 and Gap and INTER-FREQ for Test 2 and Test 4 |
| Specific message contents exceptions for Test Configuration 6.6.2.6-1 | Table H.3.1-3 with Conditions INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.5 |
| Specific message contents exceptions for Test Configuration 6.6.2.6-2 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |
| Specific message contents exceptions for Test Configuration 6.6.2.6-3 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |

6.6.2.6.5 Test requirement

Table 6.6.2.6.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.2.6.5-1: 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 1,2,3 | 1 | | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | | |
|  | Config 2,3 | TDD | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | |
|  | Config 2 | TDDConf.1.1 | | | | | |
|  | Config 3 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | | |
| Initial UL BWP |  | ULBWP.0.1 | | | NA | | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | NA | | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | | |
| Config 2 | TRS.1.1 TDD | | | NA | | |
| Config 3 | TRS.1.2 TDD | | | NA | | |
| OCNG Patterns | |  | Config 1,2,3 | OP.1 | | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | - | | |
|  | Config 2 | SR.1.1 TDD | | |
|  | Config 3 | SR 2.1 TDD | | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | - | | |
|  | Config 2 | CR.1.1 TDD | | |
|  | Config 3 | CR 2.1 TDD | | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | - | | |
|  | Config 2 | CCR.1.1 TDD | |
|  | Config 3 | CCR.2.1 TDD | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | | |
| SMTC configuration | |  | Config 1 | SMTC.2 | | | SMTC.5 | | |
|  | Config 2, 3 | SMTC.1 | | | SMTC.4 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | |
| Config 3 | 30 | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98 | | | -98 | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | | -98 | | |
| Config 3 | -95 | | | -95 | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | -Infinity | -91 | |
| Config 3 | -91 | -91 | | -Infinity | -88 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | | -Infinity | 7 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | -Infinity | 7 | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | -70.05 | -62.26 | |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | | -63.94 | -56.15 | |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | |

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 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% with a confidence level of 95%.

In test 2 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 12160 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% with a confidence level of 95%.

In test 3 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 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% with a confidence level of 95%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 12160 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% with a confidence level of 95%.

In test 1, 2, 3 and 4 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.

#### 6.6.2.7 Void

#### 6.6.2.8 Void

#### 6.6.2.9 NR SA FR1-FR1 event triggered reporting tests with additional mandatory gap pattern

Editor's Note: This test case is incomplete in following aspects:

- Message contents are missing.

- TT analysis is missing.

- Test applicability needs to be updated

- Cell mapping is missing in Annex E

6.6.2.9.1 Test purpose

To verify that the UE makes correct reporting of an event when mandatory gap pattern with 3ms MGL is configured within inter-frequency NR cell search requirements in TS 38.133 [6] clause 9.3.4.

6.6.2.9.2 Test applicability

This test applies to all types of NR UE release 16 onwards.

6.6.2.9.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.6.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.9.

6.6.2.9.4 Test description

6.6.2.9.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.9.4.1-1.

Table 6.6.2.9.4.1-1: SA FR1 event triggered reporting tests with additional mandatory gap pattern supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.2.9-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD – TDD duplex mode |
| 6.6.2.9-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD – TDD duplex mode |
| 6.6.2.9-3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD – TDD duplex mode |
| NOTE.1: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.2.9.4.1-2.

Table 6.6.2.9.4.1-2: Test Environment parameters for SA FR1 event triggered reporting tests with additional mandatory gap pattern

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.9.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in clause C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.2.9.4.1-3.

2. Message contents are defined in clause 6.6.2.9.4.3.

3. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

Table 6.6.2.9.4.1-3: General test parameters for SA inter-frequency event triggered reporting with additional mandatory gap pattern

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | NR cell 2 is on NR RF channel number 2. |
| Gap Pattern Id |  | Config 1,2,3 | 3 | 2 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | | As specified in clause A.3.10.1 |
|  | Config 2 | SSB.1 FR1 | | As specified in clause A.3.10.1 |
|  | Config 3 | SSB.2 FR1 | | As specified in clause A.3.10.1 |
| 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 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1 | 1 |  |

6.6.2.9.4.2 Test procedure

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.

In test 1 measurement gap pattern configuration # 3 as defined in Table 6.6.2.9.4.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #2 as defined in Table 6.6.2.9.4.1-2 is provided for UE that supports per-FR gap.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.9.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.9.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1280 ms for Test 1 and 920 ms for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:

- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.9.4.1-2 as appropriate.

6.6.2.9.4.3 Message contents

TBD

6.6.2.9.5 Test requirement

Table 6.6.2.9.5-1 defines the primary level settings including test tolerances for SA inter-frequency event triggered reporting with additional mandatory gap pattern.

Table 6.6.2.9.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting with additional mandatory gap pattern

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
| T1 | T2 | | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | 2 | |
| Duplex mode | |  | Config 1 | FDD | | | | |
|  | Config 2,3 | TDD | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | |
|  | Config 2 | TDDConf.1.1 | | | | |
|  | Config 3 | TDDConf.2.1 | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | |
| Initial UL BWP |  | ULBWP.0.1 | | | NA | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | NA | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | NA | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | |
| Config 2 | TRS.1.1 TDD | | | NA | |
| Config 3 | TRS.1.2 TDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | |  | |
|  | Config 2 | SR.1.1 TDD | | |  | |
|  | Config 3 | SR2.1 TDD | | |  | |
| CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | |  | |
|  | Config 2 | CR.1.1 TDD | | |  | |
|  | Config 3 | CR2.1 TDD | | |  | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.1 | | | SMTC.4 | |
|  | Config 2, 3 | SMTC.1 | | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
| Config 3 | 30 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS (Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98+TT | | -98+TT | | |
| Note2 | | dBm/SCS | Config 1,2 | -98+TT | | -98+TT | | |
| Config 3 | -95+TT | | -95+TT | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94+TT | -94+TT | | -Infinity | -91+TT |
| Config 3 | -91+TT | -91+TT | | -Infinity | -88+TT |
|  | | dB | Config 1,2,3,4,5,6 | 4+TT | 4+TT | | -Infinity | 7+TT |
|  | | dB | Config 1,2,3 | 4+TT | 4+TT | | -Infinity | 7+TT |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59+TT | -64.59+TT | | -70.05+TT | -62.26+TT |
| dBm/38.16MHz | Config 3 | -58.49+TT | -58.49+TT | | -63.94+TT | -56.15+TT |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | |

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1280 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.

In test 2 with per-FR 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.

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

The rate of correct events observed during repeated tests shall be at least 90% with the confidence level of 95%.

#### 6.6.2.10 NR SA FR1-FR1 event triggered reporting tests for FR1 without gap when DRX is used

Editor's Note: This test case is incomplete in following aspects:

- Message contents are missing.

- TT analysis is missing.

- Test applicability needs to be updated

- Cell mapping is missing in Annex E

6.6.2.10.1 Test purpose

To verify that the UE makes correct reporting of an event when no gap is configured and DRX is used within inter-frequency NR cell search requirements in TS 38.133 [6] clause 9.3.9.

6.6.2.10.2 Test applicability

This test applies to all types of NR UE release 16 which supports interFrequencyMeas-Nogap-r16.

6.6.2.10.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.6.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.10.

6.6.2.10.4 Test description

6.6.2.10.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.10.4.1-1.

Table 6.6.2.10.4.1-1: SA event triggered reporting tests for FR1 without gap when DRX is used supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.2.10-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.2.10-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.2.10-3 | 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  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.2.10.4.1-2.

Table 6.6.2.10.4.1-2: Test Environment parameters for SA event triggered reporting tests for FR1 without gap when DRX is used

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.10.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in clause C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.2.10.4.1-3.

2. Message contents are defined in clause 6.6.2.10.4.3.

3. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

Table 6.6.2.10.4.1-3: General test parameters for SA event triggered reporting tests for FR1 without gap when DRX is used

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2. |
| 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 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 |  |
| T2 | s | Config 1,2,3 | 1 |  |

6.6.2.10.4.2 Test procedure

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.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.10.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.10.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1080 ms for Test Configuration 1 and 900 ms for Test Configuration 2 and 3then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:

- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.10.4.1-2 as appropriate.

6.6.2.10.4.3 Message contents

TBD

6.6.2.10.5 Test requirement

Table 6.6.2.10.5-1 defines the primary level settings including test tolerances for SA event triggered reporting tests for FR1 without gap when DRX is used.

Table 6.6.2.10.5-1: Cell specific test parameters for SA event triggered reporting tests for FR1 without gap when DRX is used

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | | Cell 2 | |
| T1 | T2 | | | T1 | T2 | |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | | | |
|  | Config 2,3 | TDD | | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | | |
|  | Config 2 | TDDConf.1.1 | | | | | | |
|  | Config 3 | TDDConf.2.1 | | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | | NA | | |
| Initial UL BWP |  | Config 1, 2, 3 | ULBWP.0.1 | | | | NA | | |
| Dedicated DL BWP |  |  | DLBWP.1.1 | | | | NA | | |
| Dedicated UL BWP |  |  | ULBWP.1.1 | | | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | | NA | | |
| Config 2 | TRS.1.1 TDD | | | | NA | | |
| Config 3 | TRS.1.2 TDD | | | | NA | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | | NA | | |
|  | Config 2 | SR.1.1 TDD | | | | NA | | |
|  | Config 3 | SR2.1 TDD | | | | NA | | |
| CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | | NA | | |
|  | Config 2 | CR.1.1 TDD | | | | NA | | |
|  | Config 3 | CR2.1 TDD | | | | NA | | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | | SSB.5 FR1 | | |
|  | Config 2 | SSB.1 FR1 | | | | SSB.5 FR1 | | |
|  | Config 3 | SSB.2 FR1 | | | | SSB.6 FR1 | | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | | | SMTC.5 | | |
|  | Config 2, 3 | SMTC.1 | | | | SMTC.4 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | | |
| Config 3 | 30 | | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS (Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz | Config 1,2,3 | -98+TT | | -98+TT | | | | |
| Note2 | | dBm/SCS | Config 1,2 | -98+TT | | -98+TT | | | | |
| Config 3 | -95+TT | | -95+TT | | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94+TT | -94+TT | | | -Infinity | -91+TT | |
| Config 3 | -91+TT | -91+TT | | | -Infinity | -88+TT | |
|  | | dB | Config 1,2,3,4,5,6 | 4+TT | 4+TT | | | -Infinity | 7+TT | |
|  | | dB | Config 1,2,3 | 4+TT | 4+TT | | | -Infinity | 7+TT | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59+TT | -64.59+TT | | | -70.05+TT | -62.2+TT | |
| dBm/38.16MHz | Config 3 | -58.49+TT | -58.49+TT | | | -63.94+TT | -56.15+TT | |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | | |

In test config 1, UE is required to report SSB time index. UE is not required to report SSB time index. 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.

In test config 2 and 3, UE is not required to report SSB time index. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 900 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% with the confidence level of 95%.

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.

#### 6.6.2.11 NR SA FR1-FR1 event triggered reporting tests for FR1 without gap when DRX is not used

Editor's Note: This test case is incomplete in following aspects:

- Message contents are missing.

- TT analysis is missing.

- Test Procedure is FFS.

- Test applicability needs to be updated

- Cell mapping is missing in Annex E

6.6.2.11.1 Test purpose

To verify that the UE makes correct reporting of an event when no gap is configured and DRX is not used within inter-frequency NR cell search requirements in TS 38.133 [6] clause 9.3.9.

6.6.2.11.2 Test applicability

This test applies to all types of NR UE release 16 which supports interFrequencyMeas-Nogap-r16.

6.6.2.11.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.6.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.11.

6.6.2.11.4 Test description

6.6.2.11.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.11.4.1-1.

Table 6.6.2.11.4.1-1: SA event triggered reporting tests for FR1 without gap when DRX is not used supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.2.11-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD – TDD duplex mode |
| 6.6.2.11-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD – TDD duplex mode |
| 6.6.2.11-3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD – TDD duplex mode |
| NOTE.1: The UE is only required to be tested in one of the supported test configurations. | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.2.11.4.1-2.

Table 6.6.2.11.4.1-2: Test Environment parameters for SA event triggered reporting tests for FR1 without gap when DRX is not used

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2.. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.11.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in clause C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.2.10.4.1-3.

2. Message contents are defined in clause 6.6.2.10.4.3.

3. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

Table 6.6.2.11.4.1-3: General test parameters for SA event triggered reporting tests for FR1 without gap when DRX is not used

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | NR cell 2 is on NR RF channel number 2. |
| 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 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 |  |
| T2 | s | Config 1,2,3 | 1 |  |

6.6.2.11.4.2 Test procedure

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.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.11.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.11.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 800 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:

- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.11.4.1-2 as appropriate.

6.6.2.11.4.3 Message contents

TBD

6.6.2.11.5 Test requirement

Table 6.6.2.11.5-1 defines the primary level settings including test tolerances for SA event triggered tests for FR1 without gap when DRX is not used.

Table 6.6.2.11.5-1: Cell specific test parameters for SA event triggered reporting tests for FR1 without gap when DRX is not used

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
| T1 | T2 | | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | 2 | |
| Duplex mode | |  | Config 1 | FDD | | | | |
|  | Config 2,3 | TDD | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | |
|  | Config 2 | TDDConf.1.1 | | | | |
|  | Config 3 | TDDConf.2.1 | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | |
| Initial UL BWP |  | ULBWP.0.1 | | | NA | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | NA | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | NA | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | |
| Config 2 | TRS.1.1 TDD | | | NA | |
| Config 3 | TRS.1.2 TDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | |  | |
|  | Config 2 | SR.1.1 TDD | | |  | |
|  | Config 3 | SR2.1 TDD | | |  | |
| CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | |  | |
|  | Config 2 | CR.1.1 TDD | | |  | |
|  | Config 3 | CR2.1 TDD | | |  | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | | SMTC.5 | |
|  | Config 2, 3 | SMTC.1 | | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
| Config 3 | 30 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98+TT | | -98+TT | | |
| Note2 | | dBm/SCS | Config 1,2 | -98+TT | | -98+TT | | |
| Config 3 | -95+TT | | -95+TT | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94+TT | -94+TT | | -Infinity | -91+TT |
| Config 3 | -91+TT | -91+TT | | -Infinity | -88+TT |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | | -Infinity | 7+TT |
|  | | dB | Config 1,2,3 | 4 | 4 | | -Infinity | 7+TT |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59+TT | -64.59+TT | | -70.05+TT | -62.26+TT |
| dBm/38.16MHz | Config 3 | -58.49+TT | -58.49+TT | | -63.94+TT | -56.15+TT |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | |

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

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

The rate of correct events observed during repeated tests shall be at least 90% with the confidence level of 95%.

#### 6.6.2.12 NR SA FR1-FR1 event triggered reporting tests without SSB time index detection in DRX for UE configured with highSpeedMeasInterFreq-r17

6.6.2.12.1 Test purpose

The purpose of this test is to verify TBD

6.6.2.12.2 Test applicability

This test applies to all types of E-UTRA UE release 16 and forward supporting enhanced inter-frequency NR measurement requirements in high-speed scenario

6.6.2.12.3 Minimum conformance requirements

The minimum conformance requirements are defined in clause 6.6.2.0.1

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.2.12

6.6.2.12.4 Test description

6.6.2.12.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.2.12.4.1-1.

Table 6.6.2.12.4.1-1: Supported test configurations for NR SA FR1-FR1 event triggered reporting tests without SSB time index detection in DRX for UE configured with highSpeedMeasInterFreq-r17

|  |  |
| --- | --- |
| Config | Description |
| 6.6.2.12-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.2.12-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.2.12-3 | 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  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.2.12.4.1-2.

Table 6.6.2.12.4.1-2: Initial conditions for NR SA FR1-FR1 event triggered reporting tests without SSB time index detection in DRX for UE configured with highSpeedMeasInterFreq-r17

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.2-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.2.12.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in clause C.2.1. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.1 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.2.12.4.1-3.

2. Message contents are defined in clause 6.6.2.12.4.3.

3. There are two NR cells on two carriers specified in the test. Cell 1 is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings for Cell 2 are set according to Annex C.1.2.

Table 6.6.2.12.4.1-3: General test parameters for NR SA FR1-FR1 event triggered reporting tests without SSB time index detection in DRX for UE configured with highSpeedMeasInterFreq-r17

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | NR cell 2 is on NR RF channel number 2. |
| 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.4 | | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 2.3 | 2.3 |  |

6.6.2.12.4.2 Test procedure

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.2.12.4.1-2.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.2.12.4.1-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 2240 ms Test 1 and Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

11. Repeat step 1-10 for each sub-test in Table 6.6.2.12.4.1-2 as appropriate.

6.6.2.12.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.2.12.4.3-1: Common Exception messages SA inter frequency event triggered reporting without SSB time index detection in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-FREQ  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with Conditions gapUE, Pattern #0 and gap offset = 9 for Test 1  Table H.3.1-6 with Conditions gapFR1, Pattern #4 and gap offset = 9 for Test 2  Table H.3.1-7 with Condition INTER-FREQ |
| Specific message contents exceptions for Test Configuration 6.6.2.1-1 | Table H.3.1-3 with Conditions INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.5 |
| Specific message contents exceptions for Test Configuration 6.6.2.1-2 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |
| Specific message contents exceptions for Test Configuration 6.6.2.1-3 | Table H.3.1-3 with Conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.4 |

Table 6.6.2.12.4.3-2: *SIB4*: NR inter frequency cell re-selection with highSpeedMeasInterFreq-r17

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table H.2.2-2 | | | |
| Information Element | Value/remark | Comment | Condition |
| SIB4 ::= SEQUENCE { |  |  |  |
| InterFreqCarrierFreqInfo-v1700 ::= SEQUENCE { |  |  |  |
| highSpeedMeasInterFreq-r17 | TRUE |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.2.12.5 Test requirement

Table 6.6.2.12.5-1 defines the primary level settings including test tolerances for EN-DC FR1 interruptions at SRS carrier based switching in asynchronous EN-DC.

Table 6.6.2.12.5-1: NR cell specific test parameters for NR SA FR1-FR1 event triggered reporting tests without SSB time index detection in DRX for UE configured with highSpeedMeasInterFreq-r17

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | | Cell 2 | |
|  | |  |  | T1 | T2 | | | T1 | T2 | |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | | 2 | | |
| Duplex mode | |  | Config 1 | FDD | | | | | | |
|  | |  | Config 2,3 | TDD | | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | | |
|  | |  | Config 2 | TDDConf.1.1 | | | | | | |
|  | |  | Config 3 | TDDConf.2.1 | | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | | NA | | |
|  | Initial UL BWP |  | Config 1, 2, 3 | ULBWP.0.1 | | | | NA | | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | | | NA | | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | | | NA | | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | | NA | | |
|  | |  | Config 2 | TRS.1.1 TDD | | | | NA | | |
|  | |  | Config 3 | TRS.1.2 TDD | | | | NA | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | | OP.1 | | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | | | NA | | |
|  | |  | Config 2 | SR.1.1 TDD | | | | NA | | |
|  | |  | Config 3 | SR2.1 TDD | | | | NA | | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | | | | NA | | |
|  | |  | Config 2 | CR.1.1 TDD | | | | NA | | |
|  | |  | Config 3 | CR.2.1 TDD | | | | NA | | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | | | NA | | |
|  | Config 2 | CCR.1.1 TDD | | | | NA | | |
|  | Config 3 | CCR.2.1 TDD | | | | NA | | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | | SSB.5 FR1 | | |
|  | |  | Config 2 | SSB.1 FR1 | | | | SSB.5 FR1 | | |
|  | |  | Config 3 | SSB.2 FR1 | | | | SSB.6 FR1 | | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | | | SMTC.5 | | |
|  | |  | Config 2, 3 | SMTC.1 | | | | SMTC.4 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | | |
|  | |  | Config 3 | 30 | | | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  | | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  | | | |  | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  | | | |  | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  |  | | | |  | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | | |  | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | | |  | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | | |  | | |
| Note2 | | dBm/15kHz | Config 1,2,3 | -98 | | -98 | | | | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | | | |
|  | |  | Config 3 | -95 | | -95 | | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | | | -Infinity | -91 | |
|  | |  | Config 3 | -91 | -91 | | | -Infinity | -88 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | | -Infinity | 7 | |
|  | | dB | Config 1,2,3 | 4 | 4 | | | -Infinity | 7 | |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | | | -70.05 | -62.2 | |
|  | | dBm/38.16MHz | Config 3 | -58.49 | -58.49 | | | -63.94 | -56.15 | |
| Propagation Condition | |  | Config 1,2 | AWGN | | | AWGN 1944Hz Note 5 | | | |
| Config 3 | AWGN | | | AWGN 3334Hz Note 6 | | | |
| 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: The AWGN 1944 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 1944Hz.  Note 6: The AWGN 3334 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 3334Hz. | | | | | | | | | | |

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 2240 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.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 2240 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.

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

The rate of correct events observed during repeated tests shall be at least 90% with the confidence level of 95%.

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.

### 6.6.3 Inter-RAT Measurements

#### 6.6.3.0 Minimum conformance requirements

##### 6.6.3.0.1 Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN FDD

The requirements are applicable for NR−E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN FDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RSRQ related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RS-SINR related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [23].

6.6.3.0.1.1 Requirements when no DRX is used

When the UE requires measurement gaps to identify and measure inter-RAT cells and an appropriate measurement gap pattern is scheduled, the UE shall be able to identify a new detectable FDD cell within TIdentify, E-UTRAN FDD according to the following expression:

,

where:

TBasicIdentify = 480 ms,

TInter1 is defined in TS 38.133 [6] section 9.4.1,

CSSFinterRAT = CSSFwithin\_gap\_i\_ is the scaling factor for the measured inter-RAT E-UTRA carrier i which is calculated as specified in TS 38.133 [6] section 9.1.5.2.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of TMeasure, E-UTRAN FDD defined in Table 6.6.3.0.1.1-1.

Table 6.6.3.0.1.1-1: Measurement period and measurement bandwidth

|  |  |  |
| --- | --- | --- |
| Configuration | Physical Layer Measurement period: TMeasure, E-UTRAN FDD [ms] | Measurement bandwidth [RB] |
| 0 | 480 x CSSFinterRAT | 6 |
| 1 (note 1) | 240 x CSSFinterRAT | 50 |
| NOTE 1: This configuration is optional. | | |

The UE shall be capable of identifying and performing NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements of at least 4 E-UTRAN FDD cells per E-UTRA FDD carrier frequency layer for up to 7 E-UTRA FDD carrier frequency layers.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.5.

6.6.3.0.1.2 Requirements when DRX is used

When DRX is in use and measurement gaps are configured, the UE shall be able to identify a new detectable E-UTRAN FDD cell within TIdentify, E-UTRAN FDD specified in Table 6.6.3.0.1.2-1. When RRM enhancement for high speedis configured the UE shall be able to identify a new detectable E-UTRAN FDD cell within TIdentify, E-UTRAN FDD specified in Table 6.6.3.0.1.2-2.

Table 6.6.3.0.1.2-1: Requirement to identify a newly detectable E-UTRAN FDD cell

|  |  |  |
| --- | --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN FDD (s) (DRX cycles) | |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in Section 6.6.3.0.1.1 apply | Non-DRX requirements in Section 6.6.3.0.1.1 apply |
| 0.256 | 5.12\*K (20\*CSSFinterRAT) | 7.68\*K (30\*CSSFinterRAT) |
| 0.32 | 6.4\*K (20\*CSSFinterRAT) | 7.68\*K (24\*CSSFinterRAT) |
| 0.32< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in Section 6.6.3.0.1.1. | | |

Table 6.6.3.0.1.2-2: Requirement to identify a newly detectable E-UTRAN FDD cell for UE configured with RRM enhancement for high speed

|  |  |  |
| --- | --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN FDD (s) (DRX cycles) | |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.2.2 apply | Non-DRX requirements in clause 9.4.2.2 apply |
| 0.16<DRx cycle<=0.32 | Note 1(15\*CSSFinterRAT) |  |
| 0.32<DRx cycle <= 0.64 | Note 1(10\*CSSFinterRAT) |  |
| DRx cycle = 1.024 | Note 1(10\*CSSFinterRAT) | Note 1(10\*CSSFinterRAT) |
| DRx cycle = 1.28 | Note 1(8\*CSSFinterRAT) | Note 1(8\*CSSFinterRAT) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in clause 9.4.2.2. | | |

When DRX is in use, the UE shall be capable of performing NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN FDD cells per E-UTRA FDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA FDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period Tmeasure, E-UTRAN FDD specified in Table 6.6.3.0.1.2-3.

Table 6.6.3.0.1.2-3: Requirement to measure E-UTRAN FDD cells

|  |  |
| --- | --- |
| DRX cycle length (s) | Tmeasure, E-UTRAN FDD (s) (DRX cycles) |
| ≤0.08 | Non-DRX requirements in Section 6.6.3.0.1.1 apply |
| 0< DRX-cycle ≤10.24 | Note1 (5\* CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in Section 6.6.3.0.1.1. | |

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN FDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.2. The NR – E-UTRAN FDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.3. The NR – E-UTRAN FDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.5.

6.6.3.0.1.3 Measurement reporting requirements for Event-Triggered Reporting

The reported NR – E-UTRAN FDD RSRP, RSRQ, and RS-SINR measurements contained in event-triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.2.2, 10.2.3, and 10.2.5, respectively.

The UE shall not send any event-triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH where TTIDCCH is the duration of subframe or slot or subslot when the measurement report is transmitted on the PUSCH with subframe or slot or subslot duration. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T Identify, E-UTRAN FDD defined in clauses 6.6.3.0.1.1 and 6.6.3.0.1.2 without DRX and with DRX, respectively.When L3 filtering is used, an additional delay can be expected.

If a cell which has been detectable at least for the time period TIdentify, E-UTRAN FDD becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event as per TS 38.331 [13], the event triggered measurement reporting delay shall be less than TMeasure, E-UTRAN FDD provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used.

The normative reference for this requirement is TS 38.133 [6] clause 9.4.2.

##### 6.6.3.0.2 Minimum conformance requirements for inter-RAT event triggered reporting to E-UTRAN TDD

The requirements are applicable for NR−E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN TDD cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RSRQ related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RS-SINR related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [23].

6.6.3.0.2.1 Requirements when no DRX is used

When the UE requires measurement gaps to identify and measure inter-RAT cells and an appropriate measurement gap pattern is scheduled, the UE shall be able to identify a new detectable TDD cell within TIdentify, E-UTRAN TDD according to the following expression:

- When configuration 0 or configuration 1 in Table 6.6.3.0.2-1 is applied,

,

- When configuration 2 or configuration 3 in Table 6.6.3.0.2-1 is applied,

,

where:

TBasicIdentify = 480 ms,

TInter1 is defined in TS 38.133 [6] section 9.4.1,

CSSFinterRAT = CSSFwithin\_gap\_i\_ is the scaling factor for the measured inter-RAT E-UTRA carrier i which is calculated as specified in TS 38.133 [6] section 9.1.5.2.

Identification of a cell shall include detection of the cell and additionally performing a single measurement with measurement period of TMeasure, E-UTRAN TDD defined in Table 6.6.3.0.2.1-1.

Table 6.6.3.0.2.1-1: TMeasure, E-UTRAN TDD for different configurations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Configuration | Measurement bandwidth [RB] | Number of UL/DL sub-frames per half frame (5 ms) | | DwPTS | | TMeasure, E-UTRAN TDD [ms] |
|  | DL | UL | Normal CP | Extended CP |  |
| 0 | 6 | 2 | 2 |  |  | 480 x CSSFinterRAT |
| 1 (note 1) | 50 | 2 | 2 |  |  | 240 x CSSFinterRAT |
| 2 | 6 | 1 | 3 |  |  | 720 x CSSFinterRAT |
| 3 (Note 1) | 50 | 1 | 3 |  |  | 480 x CSSFinterRAT |
| NOTE 1: This configuration is optional.  NOTE 2: Void | | | | | | |

The UE shall be capable of identifying and performing NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements of at least 4 E-UTRAN TDD cells per E-UTRA TDD carrier frequency layer for up to 7 E-UTRA TDD carrier frequency layers.

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.2. The NR – E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.3. The NR – E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] section 10.2.5.

6.6.3.0.2.1 Requirements when DRX is used

When DRX is in use and measurement gaps are configured, the UE shall be able to identify a new detectable E-UTRAN TDD cell within TIdentify, E-UTRAN TDD specified in Table 6.6.3.0.2.1-1. When RRM enhancement for high speedis configured the UE shall be able to identify a new detectable E-UTRAN TDD cell within TIdentify, E-UTRAN TDD specified in Table 6.6.3.0.2.1-2.

Table 6.6.3.0.2.1-1: Requirement to identify a newly detectable E-UTRAN TDD cell

|  |  |  |
| --- | --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) | |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in Section 6.6.3.0.2.1 apply | Non-DRX requirements in Section 6.6.3.0.2.1 apply |
| 0.256 | 5.12\*K (20\*CSSFinterRAT) | 7.68\*K (30\*CSSFinterRAT) |
| 0.32 | 6.4\*K (20\*CSSFinterRAT) | 7.68\*K (24\*CSSFinterRAT) |
| 0.32< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in Section 6.6.3.0.2.1. | | |

Table 6.6.3.0.2.1-2: Requirement to identify a newly detectable E-UTRAN TDD cell for UE configured with RRM enhancement for high speed

|  |  |  |
| --- | --- | --- |
| DRX cycle length (s) | TIdentify, E-UTRAN TDD (s) (DRX cycles) | |
|  | Gap period = 40 ms, 20 ms | Gap period = 80 ms |
| ≤0.16 | Non-DRX requirements in clause 9.4.3.2 apply | Non-DRX requirements in clause 9.4.3.2 apply |
| 0.16<DRx cycle<=0.32 | Note 1(15\*CSSFinterRAT) |  |
| 0.32<DRx cycle <= 0.64 | Note 1(10\*CSSFinterRAT) |  |
| DRx cycle = 1.024 | Note 1(10\*CSSFinterRAT) | Note 1(10\*CSSFinterRAT) |
| DRx cycle = 1.28 | Note 1(8\*CSSFinterRAT) | Note 1(8\*CSSFinterRAT) |
| 1.28< DRX-cycle ≤10.24 | Note1 (20\*CSSFinterRAT) | Note1 (20\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in clause 9.4.3.2. | | |

When DRX is in use, the UE shall be capable of performing NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements of at least 4 identified E-UTRAN TDD cells per E-UTRA TDD frequency layer during each layer 1 measurement period, for up to 7 E-UTRA TDD carrier frequency layers, and the UE physical layer shall be capable of reporting NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements to higher layers with the measurement period Tmeasure, E-UTRAN TDD specified in Table 6.6.3.0.2.1-3.

Table 6.6.3.0.2.1-3: Requirement to measure E-UTRAN TDD cells

|  |  |
| --- | --- |
| DRX cycle length (s) | Tmeasure, E-UTRAN TDD (s) (DRX cycles) |
| ≤0.08 | Non-DRX Requirements in Section 6.6.3.0.2.1 apply |
| 0.128 | For configuration 2, non-DRX requirements in section 6.6.3.0.2.1 apply,  Otherwise: Note1 (5\*CSSFinterRAT) |
| 0.128<DRX-cycle≤10.24 | Note1 (5\*CSSFinterRAT) |
| NOTE 1: The time depends on the DRX cycle length.  NOTE 2: CSSFinterRAT is as defined in Section 6.6.3.0.2.1. | |

If higher layer filtering is used, an additional cell identification delay can be expected.

The NR – E-UTRAN TDD RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.2. The NR – E-UTRAN TDD RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.3. The NR – E-UTRAN TDD RS-SINR measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] Section 10.2.5.

6.6.3.0.2.3 Measurement reporting requirements for Event-Triggered Reporting

The reported NR – E-UTRAN TDD RSRP, RSRQ, and RS-SINR measurements contained in event-triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.2.2, 10.2.3, and 10.2.5, respectively.

The UE shall not send any event-triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH where TTIDCCH is the duration of subframe or slot or subslot when the measurement report is transmitted on the PUSCH with subframe or slot or subslot duration. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than T Identify, E-UTRAN TDD defined in clauses 6.6.3.0.2.1 and 6.6.3.0.2.2 without DRX and with DRX, respectively.When L3 filtering is used, an additional delay can be expected.

If a cell which has been detectable at least for the time period TIdentify, E-UTRAN TDD becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again and triggers an event as per TS 38.331 [13], the event triggered measurement reporting delay shall be less than TMeasure, E-UTRAN TDD provided the timing to that cell has not changed more than ± 50 Ts while measurement gap has not been available and the L3 filter has not been used.

The normative reference for this requirement is TS 38.133 [6] clause 9.4.3.

#### 6.6.3.1 NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX

6.6.3.1.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT E-UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 under the cell search and measurement requirements.

6.6.3.1.2 Test applicability

This test applies to all types of NR UE supporting SA FR1 from Release 15 onwards.

6.6.3.1.3 Minimum conformance requirements

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.3.1.

6.6.3.1.3.1 NR – E-UTRAN FDD requirement

The minimum conformance requirements are specified in clause 6.6.3.0.1.

6.6.3.1.3.2 NR – E-UTRAN TDD requirement

The minimum conformance requirements are specified in clause 6.6.3.0.2.

6.6.3.1.4 Test description

6.6.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.3.1.4.1-1.

Table 6.6.3.1.4.1-1: supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.3.1-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD |
| 6.6.3.1-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.1-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.1-4 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD |
| 6.6.3.1-5 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD |
| 6.6.3.1-6 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD |
| NOTE: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.3.1.4.1-2 and Table 6.6.3.1.4.1-3.

Table 6.6.3.1.4.1-2: Initial conditions for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] sclause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.3.1.5-1 and Table 6.6.3.1.5-2.. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.3 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram | N/A | |  |

Table 6.6.3.1.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number |  | 1 | 1 LTE carrier frequency is used in the test |
| Channel Bandwidth | MHz | As specified in Tables 6.6.3.1.5-1 and 6.6.3.1.5-2. |  |
| Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbour cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Gap Pattern Id |  | 0 | As specified in Clause TS 38.133 [6] Table 9.1.2-1. Per-UE gap pattern. |
| NR measurement quantity |  | SS-RSRP | Measurement quantity for Cell 1 |
| Inter-RAT E-UTRAN measurement quantity |  | RSRP | Measurement quantity for Cell 2 |
| b2-Threshold1 | dBm | Note 1 | SS-RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| b2-Threshold2EUTRA | dBm | -95 | E-UTRAN RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| Hysteresis | dB | 0 |  |
| TimeToTrigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  | OFF | OFF |
| T1 | s | 5 |  |
| T2 | s | 5 |  |
| NOTE 1: Values are defined in Table 6.6.3.1.5-1 | | | |

1. Message contents are defined in clause 6.6.3.1.4.3.

2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.6.3.1.4.2 Test procedure

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Gap pattern configuration is configured before T2 begins to enable inter-frequency monitoring.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.3.1.5-1 and 6.6.3.1.5-2. Propagation conditions are set according to Annex C clause C.2.2.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.3.1.5-1 and 6.6.3.1.5-2.

6. UE shall transmit a MeasurementReport message triggered by Event B2. If the measurement reporting delay from the beginning of time period T2 is less than 3842ms the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED according to TS 38.508-1 [14] clause 4.5.4 (if the paging fails, switches off and on the UE and ensures the UE is in the state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5,  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.3.1.4.3-1: Common Exception messages NR SA FR1 – E-UTRAN event-triggered reporting in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-RAT  Table H.3.1-3A  Table H.3.1-4A  Table H.3.1-5 with Condition INTER-RAT  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTER-RAT |
| Specific message content exceptions for Test Configurations 6.6.3.1-1 and 6.6.3.1-4 | Table H.3.1-3  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message content exceptions for Test Configurations 6.6.3.1-2, 6.6.3.1-3, 6.6.3.1-5 and 6.6.3.1-6 | Table H.3.1-3 with Condition Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

6.6.3.1.5 Test requirement

Table 6.6.3.1.5-1 and Table 6.6.3.1.5-2 define the primary level settings including test tolerances for all tests.

Table 6.6.3.1.5-1: PCell specific test parameters for SA inter-RAT E-UTRA event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 1 | |
|  | T1 | T2 |
| RF channel number | | |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode | | |  | 1, 2, 3 | FDD | |
| 4, 5, 6 | TDD | |
| TDD Configuration | | SCS=15 KHz |  | 2, 5 | TDDConf.1.1 | |
| SCS=30 KHz |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
| 2, 5 | 10: NRB,c = 52 (TDD) | |
| 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | | |  | 1, 4 | SR.1.1 FDD | |
| 2, 5 | SR.1.1 TDD | |
| 3, 6 | SR.2.1 TDD | |
| CORESET reference channel | | |  | 1, 4 | CR.1.1 FDD | |
| 2, 5 | CR.1.1 TDD | |
| 3, 6 | CR.2.1 TDD | |
| Dedicated CORSET reference channel | | |  | 1, 4 | CCR.1.1 FDD | |
| 2, 5 | CCR.1.1 TDD | |
| 3, 6 | CCR.2.1 TDD | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
| Dedicated DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | |
| Initial UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | |
| UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | |
| OCNG pattern note1 | | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| SMTC configuration | | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
| 3, 6 | SSB.2 FR1 | |
| CSI-RS for tracking | | |  | 1, 4 | TRS.1.1 FDD | |
| 2, 5 | TRS.1.1 TDD | |
| 3, 6 | TRS.1.2 TDD | |
| b2-Threshold1 | | | dBm | 1, 2, 4, 5 | -96 | |
| 3, 6 | -93 | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3, 4, 5, 6 | 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 SSS | | |
| EPRE ratio of OCNG to OCNG DMRS | | |
| *Noc* note2 | | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -104 | |
| *Noc* note2 | | | dBm/SCS | 1, 2, 4, 5 | -104 | |
| 3, 6 | -101 | |
| Ês/Noc | | | dB | 1, 2, 3, 4, 5, 6 | 17.55 | -1.55 |
| Ês/Iot note3 | | | dB | 1, 2, 3, 4, 5, 6 | 17.55 | -1.55 |
| SS-RSRP note3 | | | dBm/SCS | 1, 2, 4, 5 | -86.45 | -105.55 |
|  | | | 3, 6 | -83.44 | -102.55 |
| SSB\_RP note3 | | | dBm/SCS | 1, 2, 4, 5 | -86.45 | -105.55 |
|  | | | 3, 6 | -83.44 | -102.55 |
| Io note3 | | | dBm/9.36 MHz | 1, 2, 4, 5 | -58.42 | -73.74 |
| dBm/38.16 MHz | 3, 6 | -52.32 | -67.64 |
| Propagation condition | | |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3, 4, 5, 6 | 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

Table 6.6.3.1.5-2: E-UTRAN neighbour cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 2 | |
| T1 | T2 |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 2 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
| 4, 5, 6 | TDD | |
| TDD special subframe configuration note1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configuration note1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 5MHz: NRB,c = 25  10MHz: NRB,c = 50  20MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement Channel note2 |  | 1, 2, 3 | 5MHz: R.7 FDD  10MHz: R.3 FDD  20MHz: R.6 FDD | |
| 4, 5, 6 | 5MHz: R.4 TDD  10MHz: R.0 TDD  20MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement Channel note2 |  | 1, 2, 3 | 5MHz: R.11 FDD  10MHz: R.6 FDD  20MHz: R.10 FDD | |
| 4, 5, 6 | 5MHz: R.11 TDD  10MHz: R.6 TDD  20MHz: R.10 TDD | |
| OCNG Patterns note2 |  | 1, 2, 3 | 5MHz: OP.20 FDD  10MHz: OP.10 FDD  20MHz: OP.17 FDD | |
| 4, 5, 6 | 5MHz: OP.9 TDD  10MHz: OP.1 TDD  20MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 0 | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RA note3 |
| OCNG\_RB note3 |
| Noc note4 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -104 | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 18.55 |
| Ês/Iot note5 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 18.55 |
| RSRP note5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -85.45 |
| SCH\_RP note5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -85.45 |
| Io note5 | dBm/9MHz | 1, 2, 3, 4, 5, 6 | -73.21 | -54.60 |
| Propagation Condition not 6 |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix note6 |  | 1, 2, 3, 4, 5, 6 | 1x2 | |
| NOTE 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].  NOTE 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 [23] respectively.  NOTE 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27]. | | | | |

The UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 3842ms from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

The overall delays measured test requirement is expressed as:

Tidentify,E-UTRAN FDD = TBasicIdentify \* 480 / TInter1 \* CSSFinterRAT ms

Which:

TBasicIdentify = 480,

TInter1 = 60,

CSSFinterRAT = 1

TTI insertion uncertainty = TTIDCCH = 1 ms; 2xTTIDCCH = 2 ms

The overall delays measured shall be less than a total of 3842 ms in this test case (note: this gives a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The rate of correct events observed during repeated tests shall be at least 90% with confidence level of 95%.

#### 6.6.3.2 NR SA FR1 – E-UTRAN event-triggered reporting in DRX

6.6.3.2.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT E-UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 when DRX is used under the cell search and measurement requirements.

6.6.3.2.2 Test applicability

This test applies to all types of NR UE Release 15 and forward supporting 5GS NR SA FR1, E-UTRAN and long DRX cycle.

6.6.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clauses 6.6.3.0.1 and 6.6.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.3.2.

6.6.3.2.4 Test description

6.6.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.3.2.4.1-1.

Table 6.6.3.2.4.1-1: Supported test configurations in SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.3.2-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD |
| 6.6.3.2-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.2-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.2-4 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD |
| 6.6.3.2-5 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD |
| 6.6.3.2-6 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD |
| NOTE: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.3.2.4.1-2 and Table 6.6.3.2.4.1-3.

Table 6.6.3.2.4.1-2: Initial conditions for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] sclause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.3.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.3 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram | N/A | |  |

Table 6.6.3.2.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | Comment |
| NR RF Channel Number |  | 1 | | | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number |  | 2 | | | 1 LTE carrier frequency is used in the test |
| Channel Bandwidth | MHz | As specified in Tables 6.6.3.2.5-1 and 6.6.3.2.5-2. | | |  |
| Active cell |  | Cell 1 | | | Cell 1 is on RF channel number 1 |
| Neighbour cell |  | Cell 2 | | | Cell 2 is on RF channel number 2 |
| Gap Pattern Id |  | 0 | | | As specified in Clause TS 38.133 [6] Table 9.1.2-1. Per-UE gap pattern. |
| NR measurement quantity |  | SS-RSRP | | | Measurement quantity for Cell 1 |
| Inter-RAT E-UTRAN measurement quantity |  | RSRP | | | Measurement quantity for Cell 2 |
| b2-Threshold1 | dBm | note 1 | | | SS-RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| b2-Threshold2EUTRA | dBm | -95 | | | E-UTRAN RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| Hysteresis | dB | 0 | | |  |
| TimeToTrigger | s | 0 | | |  |
| Filter coefficient |  | 0 | | | L3 filtering is not used |
| DRX |  | DRX.1 | | DRX.7 | DRX cycle configurations DRX.1 and DRX.7 are defined in Table A.3.3.1-1 and Table A.3.3.2-1 respectively. |
| T1 | s | 5 | | |  |
| T2 | s | 5 | 15 | |  |
| NOTE 1: Values are defined in Table 6.6.3.2.5-1 | | | | | |

1. Message contents are defined in clause 6.6.3.2.4.3.

2. There are two cells: Cell 1 and Cell 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 [26] Annex C.1.0 and C.1.1.

6.6.3.2.4.2 Test procedure

In each test there are two cells: Cell 1 and Cell 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. In the measurement control information from the PCell it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) is to be used. Each test consists of two consecutive time periods, with durations T1 and T2, respectively. Prior to the start of time duration T1, the UE shall be fully synchronized to Cell 1. During T1, the UE shall not have any information on Cell 2.

In each test the UE shall 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 the UE shall be allocated with PUSCH resource at every DRX cycle.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.3.2.5-1 and 6.6.3.2.5-2.

3. SS shall transmit an RRCReconfiguration message.

4. The UE shall transmit RRCReconfigurationComplete message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 6.6.3.2.5-1 and 6.6.3.2.5-2. T2 starts.

6. UE shall transmit a MeasurementReport message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than 3.48 s for Test 1 or less than 12.8 s for Test 2 then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off .

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14+2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.3.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.3.2.4.3-1: Common Exception messages NR SA FR1 – E-UTRAN event-triggered reporting in DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-RAT  Table H.3.1-3A  Table H.3.1-4A  Table H.3.1-5 with Condition INTER-RAT  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTER-RAT  Table H.3.7-1 with Condition DRX.1 and Gap for Test 1  Table H.3.7-1 with Condition DRX.7 and OFFSET for Test 2 |
| Specific message content exceptions for Test Configurations 6.6.3.2-1 and 6.6.3.2-4 | Table H.3.1-3  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message content exceptions for Test Configurations 6.6.3.2-2, 6.6.3.2-3, 6.6.3.2-5 and 6.6.3.2-6 | Table H.3.1-3 with Condition Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

6.6.3.2.5 Test requirement

Table 6.6.3.2.5-1 and Table 6.6.3.2.5-2 defines the primary level settings including test tolerances for all tests.

Table 6.6.3.2.5-1: PCell specific test parameters for SA inter-RAT E-UTRA event triggered reporting in DRX with PCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 1 | |
|  | T1 | T2 |
| RF channel number | | |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode | | |  | 1, 2, 3 | FDD | |
| 4, 5, 6 | TDD | |
| TDD Configuration | | SCS=15 KHz |  | 2, 5 | TDDConf.1.1 | |
| SCS=30 KHz |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
| 2, 5 | 10: NRB,c = 52 (TDD) | |
| 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | | |  | 1, 4 | SR.1.1 FDD | |
| 2, 5 | SR.1.1 TDD | |
| 3, 6 | SR.2.1 TDD | |
| RMSI CORESET reference channel | | |  | 1, 4 | CR.1.1 FDD | |
| 2, 5 | CR.1.1 TDD | |
| 3, 6 | CR.2.1 TDD | |
| Dedicated CORSET reference channel | | |  | 1, 4 | CCR.1.1 FDD | |
| 2, 5 | CCR.1.1 TDD | |
| 3, 6 | CCR.2.1 TDD | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
| Dedicated DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | |
| Initial UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | |
| Dedicated UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | |
| OCNG patternNote1 | | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| SMTC configuration | | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
| 3, 6 | SSB.2 FR1 | |
| CSI-RS for tracking | | |  | 1, 4 | TRS.1.1 FDD | |
| 2, 5 | TRS.1.1 TDD | |
| 3, 6 | TRS.1.2 TDD | |
| b2-Threshold1 | | | dBm | 1, 2, 4, 5 | -96 | |
| 3, 6 | -93 | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3, 4, 5, 6 | 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 SSS | | |
| EPRE ratio of OCNG to OCNG DMRS | | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -104 | |
| *Noc*Note2 | | | dBm/SCS | 1, 2, 4, 5 | -104 | |
| 3, 6 | -101 | |
| Ês/Noc | | | dB | 1, 2, 3, 4, 5, 6 | 17.55 | -1.55 |
| Ês/IotNote3 | | | dB | 1, 2, 3, 4, 5, 6 | 17.55 | -1.55 |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -86.45 | -105.55 |
|  | | | 3, 6 | -83.44 | -102.55 |
| SSB\_RPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -86.45 | -105.55 |
|  | | | 3, 6 | -83.44 | -102.55 |
| IoNote3 | | | dBm/9.36 MHz | 1, 2, 4, 5 | -58.42 | -73.74 |
| dBm/38.16 MHz | 3, 6 | -52.32 | -67.64 |
| Propagation condition | | |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3, 4, 5, 6 | 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

Table 6.6.3.2.5-2: E-UTRAN neighbour cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Configuration** | **Cell 2** | |
| **T1** | **T2** |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 2 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
| 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 5MHz: NRB,c = 25  10MHz: NRB,c = 50  20MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5MHz: R.7 FDD  10MHz: R.3 FDD  20MHz: R.6 FDD | |
| 4, 5, 6 | 5MHz: R.4 TDD  10MHz: R.0 TDD  20MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5MHz: R.11 FDD  10MHz: R.6 FDD  20MHz: R.10 FDD | |
| 4, 5, 6 | 5MHz: R.11 TDD  10MHz: R.6 TDD  20MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1, 2, 3 | 5MHz: OP.20 FDD  10MHz: OP.10 FDD  20MHz: OP.17 FDD | |
| 4, 5, 6 | 5MHz: OP.9 TDD  10MHz: OP.1 TDD  20MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 0 | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RANote3 |
| OCNG\_RBNote3 |
| NocNote4 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -104 | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 18.55 |
| Ês/IotNote5 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 18.55 |
| RSRPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -85.45 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -85.45 |
| IoNote5 | dBm/9MHz | 1, 2, 3, 4, 5, 6 | -73.21 | -54.60 |
| Propagation Condition Note6 |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2, 3, 4, 5, 6 | 1x2 | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211.  Note 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27]. | | | | |

In test 1, the UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 3.84s from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

In test 2, the UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 12.8s from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

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

#### 6.6.3.3 NR SA FR1 – E-UTRAN event-triggered reporting in DRX for UE configured with highSpeedMeasFlag-r16

6.6.3.3.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT E-UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 when DRX is used under the cell search and measurement requirements for UE configured with RRM enhancement for high speed.

6.6.3.3.2 Test applicability

This test applies to all types of NR UE supporting SA FR1 configured with RRM enhancement for high speed from Release 15 onwards.

6.6.3.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clauses 6.6.3.0.1 and 6.6.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.3.3.

6.6.3.3.4 Test description

6.6.3.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.3.3.4.1-1.

Table 6.6.3.3.4.1-1: Supported test configurations in SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1 for UE configured with highSpeedMeasFlag-r16

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.3.3-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE FDD |
| 6.6.3.3-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.3-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.3.3-4 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, LTE TDD |
| 6.6.3.3-5 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, LTE TDD |
| 6.6.3.3-6 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, LTE TDD |
| NOTE: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.3.3.4.1-2 and Table 6.6.3.3.4.1-3.

Table 6.6.3.3.4.1-2: Initial conditions for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1 for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.3.3.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.3 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram | N/A | |  |

Table 6.6.3.3.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1 for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number |  | 2 | 1 LTE carrier frequency is used in the test |
| Channel Bandwidth | MHz | As specified in Tables A.6.6.3.3.1-2 and A.6.6.3.3.1-3. |  |
| Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbour cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Gap Pattern Id |  | 0 | As specified in Clause Table 9.1.2-1. Per-UE gap pattern. |
| NR measurement quantity |  | SS-RSRP | Measurement quantity for Cell 1 |
| Inter-RAT E-UTRAN measurement quantity |  | RSRP | Measurement quantity for Cell 2 |
| b2-Threshold1 | dBm | Note 1 | SS-RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| b2-Threshold2EUTRA | dBm | -97 | E-UTRAN RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| Hysteresis | dB | 0 |  |
| TimeToTrigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  | DRX.6 | DRX cycle configurations DRX.6 is defined in Table A.3.3.1-6. |
| T1 | s | 5 |  |
| T2 | s | 5 |  |
| Note 1: Values are defined in TS 38.133 Table 6.6.3.3.5-1 | | | |

1. Message contents are defined in clause 6.6.3.3.4.3.

2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

3. UE is configured with highSpeedMeasFlag-r16

6.6.3.3.4.2 Test procedure

In each test there are two cells: Cell 1 and Cell 2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN inter-RAT neighbour cell. In the measurement control information from the PCell it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) is to be used. Each test consists of two consecutive time periods, with durations T1 and T2, respectively. Prior to the start of time duration T1, the UE shall be fully synchronized to Cell 1. During T1, the UE shall not have any information on Cell 2.

In each test the UE shall 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 the UE shall be allocated with PUSCH resource at every DRX cycle.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.3.3.5-1 and 6.6.3.3.5-2.

3. SS shall transmit an RRCReconfiguration message.

4. The UE shall transmit RRCReconfigurationComplete message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 6.6.3.3.5-1 and 6.6.3.3.5-2. T2 starts.

6. UE shall transmit a MeasurementReport message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than 4.8s then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6) or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off .

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14+2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.3.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.3.3.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks on condition of HighSpeedMeas with exceptions | Table H.2.1-3 with Condition HighSpeedMeas |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Conditions GAP NEEDED and INTER-RAT  Table H.3.1-3 with Condition SSB.1 FR1 for configuration 6.6.3.3-1, 6.6.3.3-2, 6.6.3.3-4, 6.6.3.3-5  Table H.3.1-3 with Condition SSB.2 FR1 for configuration 6.6.3.3-3, 6.6.3.3-6  Table H.3.1-3A  Table H.3.1-4A  Table H.3.1-5 with Condition INTER-RAT  Table H.3.1-6 with Condition Pattern #0  Table H.3.1-7 with Condition INTER-RAT  Table H.3.7-1 with Condition DRX.6 and Gap |

6.6.3.3.5 Test requirement

Table 6.6.3.3.5-1 and Table 6.6.3.3.5-2 defines the primary level settings including test tolerances for all tests.

Table 6.6.3.3.5-1: PCell specific test parameters for SA inter-RAT E-UTRA event triggered reporting in DRX with PCell in FR1 for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 1 | |
|  | | |  |  | T1 | T2 |
| RF channel number | | |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode | | |  | 1, 2, 3 | FDD | |
|  | | |  | 4, 5, 6 | TDD | |
| TDD Configuration | | SCS=15 KHz |  | 2, 5 | TDDConf.1.1 | |
| SCS=30 KHz |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
|  | | |  | 2, 5 | 10: NRB,c = 52 (TDD) | |
|  | | |  | 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | | |  | 1, 4 | SR.1.1 FDD | |
|  | | |  | 2, 5 | SR.1.1 TDD | |
|  | | |  | 3, 6 | SR.2.1 TDD | |
| CORSET reference channel | | |  | 1, 4 | CR.1.1 FDD | |
|  | | |  | 2, 5 | CR.1.1 TDD | |
|  | | |  | 3, 6 | CR.2.1 TDD | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
| Dedicated DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | |
|  | Initial UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | |
| Dedicated UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | |
| OCNG patternNote1 | | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| SMTC configuration | | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
|  | | | 3, 6 | SSB.2 FR1 | |
| b2-Threshold1 | | | dBm | 1, 2, 4, 5 | -98 | |
|  | | | 3, 6 | -95 | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3, 4, 5, 6 | 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 SSS | | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS | | |  |  |  | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -106 | |
| *Noc*Note2 | | | dBm/SCS | 1, 2, 4, 5 | -106 | |
|  | | |  | 3, 6 | -103 | |
| Ês/Noc | | | dB | 1, 2, 3, 4, 5, 6 | 18 | -2 |
| Ês/IotNote3 | | | dB | 1, 2, 3, 4, 5, 6 | 18 | -2 |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88 | -108 |
|  | | |  | 3, 6 | -85 | -105 |
| SSB\_RPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88 | -108 |
|  | | |  | 3, 6 | -85 | -105 |
| IoNote3 | | | dBm/9.36 MHz | 1, 2, 4, 5 | -59.98 | -75.92 |
|  | | | dBm/38.16 MHz | 3, 6 | -53.88 | -69.82 |
| Propagation condition | | |  | 1, 2, 3, 4, 5, 6 | AWGN | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

Table 6.6.3.3.5-2: E-UTRAN neighbour cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in DRX with PCell in FR1 for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 2 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 2 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
|  |  | 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1, 2, 3 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 4, 5, 6 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -106 | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 19 |
| Ês/IotNote5 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 19 |
| RSRPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -87 |
| IoNote5 | dBm/9MHz | 1, 2, 3, 4, 5, 6 | -78.22+10log (NRB,c /50) | -59.16+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2, 3, 4, 5, 6 | AWGN1944 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

The UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 4.8s from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

### 6.6.4 L1-RSRP measurement for beam reporting

#### 6.6.4.0 Minimum conformance requirements

##### 6.6.4.0.1 Minimum conformance requirements for SSB-based L1-RSRP measurement for beam reporting

Same as clause 4.6.4.0.1

The normative reference for this requirement is TS 38.133 [6] clause 9.5.3.1, 9.5.4.1 and 9.5.5.1.

##### 6.6.4.0.2 Minimum conformance requirements for CSI-RS-based L1-RSRP measurement for beam reporting

Same as clause 4.6.4.0.2

The normative reference for this requirement is TS 38.133 [6] clauses 9.5.3.1, 9.5.4.2 and 9.5.5.2.

#### 6.6.4.1 NR SA FR1 SSB-based L1-RSRP measurement in non-DRX

6.6.4.1.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.1.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.1.

6.6.4.1.4 Test description

6.6.4.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.1.4.1-2. Test environment parameters are given in Table 6.6.4.1.4.1-3.

Table 6.6.4.1.4.1-1: NR SA SSB based L1-RSRP measurement supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.4.1-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.4.1-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.4.1-3 | 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 6.6.4.1.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| OCNG Patterns | 1~3 |  | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| DRX configuration | 1~3 |  | Off |
| reportConfigType | 1~3 |  | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 |
| T1 | 1~3 | s | 5 |
| T2 | 1~3 | s | 1 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.4.1.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 4.6.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part | |  |

1. Message contents are defined in clause 6.6.4.1.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.1.4.1-2 and 6.6.4.1.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.6.4.1.4.1-2. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.6.4.1.4.1-2.

2. Set the parameters according to T1 in Table 6.6.4.1.5-1. T1 starts.

3. The UE shall be transmitting CSI on PUCCH with a periodicity of 80 slots.

4. When T1 expires, the SS shall set the parameters according to T2 in 6.6.4.1.5-1. T2 starts.

5. The UE shall start sending valid L1-RSRP reports. The SS shall check following requirements:

- R1: the UE shall start to transmit valid reports no later than 720 ms for configuration 1, 2, 4 and 5 and no later than 680 ms for configuration 3 and 6 from the beginning of time period T2. A valid report shall meet the absolute L1-RSRP requirement for SSB#1 (Table 6.6.4.1.5-2 for test configurations 1, 2, 4 and 5 and Table 6.6.4.1.5-3 for test configurations 3 and 6) and the relative L1-RSRP requirement for SSB#0 in Table 6.6.4.1.5-4. If the first valid report is received earlier than the specified time, the number of passed iterations for R1 is increased by one. Otherwise, the number of failed iterations for R1 is increased by one.

- R2: the UE shall transmit reports every 80 slots until the end of time period T2. If the reports are received accordingly, the number of passed iterations for R2 is increased by one. Otherwise, the number of failed iterations for R2 is increased by one.

- R3: The L1-RSRP value of SSB#1 reported by the UE is compared to the expected L1-RSRP value for SSB#1. In all consecutive reports after the first valid value is received, if the resulting value is outside the limits in Table 6.6.4.1.5-2 for test configurations 1, 2, 4 and 5 and in Table 6.6.4.1.5-3 for test configurations 3 and 6 or the UE fails to report the measurement value for SSB#1, the number of failed iterations for R3 is increased by one. Otherwise, the number of passed iterations for R3 is increased by one.

-R4: The DIFF RSRP value of SSB#0 reported by the UE is compared to the expected DIFF RSRP value. In all consecutive reports after the first valid value is received, if the resulting value is outside the limits in Table 6.6.4.1.5-4 or the UE fails to report the measurement value for SSB#0, the number of failed iterations for R4 is increased by one. Otherwise, the number of passed iterations for R4 is increased by one.

6. The SS waits until T2 expires.

7. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

9. Repeat steps 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.4.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.1.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6-2 with conditions PERIODIC and SS-RSRP  Table H.3.6-3 with condition SSB |

Table 6.6.4.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.4.1.5 Test requirement

Table 6.6.4.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.1.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
| T1 | T2 | T1 | T2 |
| Note2 | 1~3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | | | |
| 3 | -91.65 | | | |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.5 |
| SSB RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.15 |
| 3 | -91.65 | -91.65 | -Infinity | -88.14 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.59 |
| 3 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.49 |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.5 |
| 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. | | | | | | |

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. Each L1-RSRP measurement report shall meet the corresponding absolute accuracy requirements in Table 4.6.4.1.5-2 for for test configurations 1, 2, 4 and 5 and the corresponding absolute accuracy requirements in Table 4.6.4.1.5-3 for test configurations 3 and 6 and the corresponding relative accuracy requirements in Table 4.6.4.1.5-4 for all test configurations.

Table 6.6.4.1.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 55 |
| Highest reported value (SSB#1) | - | 75 |

Table 6.6.4.1.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configurations 3

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 58 |
| Highest reported value (SSB#1) | - | 78 |

Table 6.6.4.1.5-4: L1-RSRP relative accuracy requirements for the reported values for all test configurations

|  |  |  |
| --- | --- | --- |
|  | T1 | T2 |
| Lowest DIFF RSRP reported (SSB#0) | - | 0 |
| Highest DIFF RSRP reported (SSB#0) | - | 3 |

For the test to pass, the ratio of successful reported values for each requirement (R1 to R4) shall be more than 90% with a confidence level of 95%. Each requirement is evaluated independently of the others.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.

#### 6.6.4.2 NR SA FR1 SSB-based L1-RSRP measurement in DRX

6.6.4.2.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.2.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting 5GS NR SA FR1 and long DRX cycle.

6.6.4.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.2.

6.6.4.2.4 Test description

6.6.4.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.2.4.1-2. Test environment parameters are given in Table 6.6.4.2.4.1-3.

Table 6.6.4.2.4.1-1: SA SSB based L1-RSRP measurement supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.4.2-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.4.2-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.4.2-3 | 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 6.6.4.2.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| OCNG Patterns | 1~3 |  | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 |
| T1 | 1~3 | s | 5 |
| T2 | 1~3 | s | 1 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.4.2.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 4.6.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part | |  |

1. Message contents are defined in clause 6.6.4.2.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.2.4.1-2 and 6.6.4.2.5-1. UE is configured to perform RLM and BFD based on the SSBs. DRX is configured as specified in Table 6.6.4.2.4.1-2.

6.6.4.2.4.2 Test procedure

Same test procedure as in subclause 6.6.4.1.4.2 with tables 6.6.4.1.4.1-2 and 6.6.4.1.5-1 replaced by tables 6.6.4.2.4.1-2 and 6.6.4.2.5-1.

6.6.4.2.4.3 Message contents

Same message content as in subclause 6.6.4.1.4.3 with the following exception:

Table 6.6.4.2.4.3-1: Common Exception messages EN-DC SSB based L1-RSRP measurement in DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.7-1 with condition DRX.3 |

6.6.4.2.5 Test requirement

Table 6.6.4.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.2.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
| T1 | T2 | T1 | T2 |
| Note2 | 1~3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | | | |
| 3 | -91.65 | | | |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.5 |
| SSB RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.15 |
| 3 | -91.65 | -91.65 | -Infinity | -88.14 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.59 |
| 3 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.49 |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.5 |
| 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. | | | | | | |

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. Each L1-RSRP measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.4.2.5-2 for for test configurations 1, 2, 4 and 5 and the corresponding absolute accuracy requirements in Table 6.6.4.2.5-3 for test configurations 3 and 6 and the corresponding relative accuracy requirements in Table 6.6.4.2.5-4 for all test configurations.

Table 6.6.4.2.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 55 |
| Highest reported value (SSB#1) | - | 75 |

Table 6.6.4.2.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configurations 3

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 58 |
| Highest reported value (SSB#1) | - | 78 |

Table 6.6.4.2.5-4: L1-RSRP relative accuracy requirements for the reported values for all test configurations

|  |  |  |
| --- | --- | --- |
|  | T1 | T2 |
| Lowest DIFF RSRP reported (SSB#0) | - | 0 |
| Highest DIFF RSRP reported (SSB#0) | - | 3 |

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

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.

#### 6.6.4.3 NR SA FR1 CSI-RS-based L1-RSRP measurement in non-DRX

6.6.4.3.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in non-DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.3.2 Test applicability

This test applies to all types of NR UE release 15 and forward.

6.6.4.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.4.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.3.

6.6.4.3.4 Test description

6.6.4.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.3.4.1-2. Test environment parameters are given in Table 6.6.4.3.4.1-3.

Table 6.6.4.3.4.1-1:NR SA SSB based L1-RSRP measurement supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.4.3-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.4.3-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.4.3-3 | 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 6.6.4.3.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
| 2 | CSI-RS 1.3 TDD |
| 3 | CSI-RS 2.3 TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| DRX configuration | 1~3 |  | Off |
| reportConfigType | 1~3 |  | aperiodic |
| reportQuantity | 1~3 |  | cri-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| qcl-Info | 1~3 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~3 | slots | 8 |
| T1 | 1~3 | s | 5 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.4.3.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 4.6.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part | |  |

1. Message contents are defined in clause 6.6.4.3.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.3.4.1-2 and 6.6.4.3.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.3.4.2 Test procedure

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. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. UE is also configured to measure L1-RSRP based on SSB. Upon receiving the DCI trigger, UE provides the report back based on the reporting configuration as defined in table 6.6.4.3.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.4.3.5-1. T1 starts.

3. After 80ms from the start of the test the SS transmits the DCI trigger in slot 0 for configuration 1,2 and slot 8 for configuration 3. The corresponding CSI-RS set is transmitted with the offset of 0 slots after the DCI trigger.

4. The SS shall check following requirements:

- R1: the UE shall send L1-RSRP report at slot 8 from the reception of DCI trigger. If the report is received at slot 8 from the reception of DCI trigger, the number of passed iterations for R1 is increased by one. Otherwise, the number of failed iterations for R1 is increased by one.

- R2: The L1-RSRP value of CSI-RS#1 reported by the UE is compared to the expected L1-RSRP value for CSI-RS #1. If the resulting value is outside the limits in Table 6.6.4.3.5-2 for test configurations 1, 2, 4 and 5 and in Table 6.6.4.3.5-3 for test configurations 3 and 6 or the UE fails to report the measurement value for CSI-RS #1, the number of failed iterations for R2 is increased by one. Otherwise, the number of passed iterations for R2 is increased by one.

-R3: The DIFF RSRP value of CSI-RS #0 reported by the UE is compared to the expected DIFF RSRP value. If the resulting value is outside the limits in Table 6.6.4.3.5-4 or the UE fails to report the measurement value for CSI-RS #0, the number of failed iterations for R3 is increased by one. Otherwise, the number of passed iterations for R3 is increased by one.

5. Void.

6. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

7. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

8. Repeat steps 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.4.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.3.4.3-1: Common Exception messages NR SA CSI-RS-based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6-2 with conditions APERIODIC and CSI-RSRP  Table H.3.6-3 with conditions CSI-RS  TS 38.508-1 [14] Table 7.3.1-21 with condition APERIODIC |

Table 6.6.4.3.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| } |  |  |  |
| } |  |  |  |

6.6.4.3.5 Test requirement

Table 6.6.4.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.3.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **CSI-RS#0** | **CSI-RS#1** |
| Note1 | 1~3 | dBm/15kHz | -94.65 | |
| Note1 | 1,2 | dBm/SSB SCS | -94.65 | |
| 3 | -91.65 | |
|  | 1~3 | dB | 0 | 3.5 |
| CSI-RS RSRP Note2 | 1,2 | dBm/SSB SCS | -94.65 | -91.15 |
| 3 | -91.65 | -88.14 |
| Io Note2 | 1,2 | dBm/9.36 MHz | -63.69 | -61.59 |
| 3 | dBm/38.16 MHz | -57.59 | -55.49 |
|  | 1~3 | dB | 0 | 3.5 |
| Note 1: Void  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. | | | | |

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.

Each L1-RSRP measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.4.3.5-2 for for test configurations 1, 2, 4 and 5 and the corresponding absolute accuracy requirements in Table 6.6.4.3.5-3 for test configurations 3 and 6 and the corresponding relative accuracy requirements in Table 6.6.4.3.5-4 for all test configurations.

Table 6.6.4.3.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 55 |
| Highest reported value (CSI-RS#1) | 75 |

Table 6.6.4.3.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configurations 3

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 58 |
| Highest reported value (CSI-RS#1) | 78 |

Table 6.6.4.3.5-4: L1-RSRP relative accuracy requirements for the reported values for all test configurations

|  |  |
| --- | --- |
|  | T1 |
| Lowest DIFF RSRP reported (CSI-RS#0) | 0 |
| Highest DIFF RSRP reported (CSI-RS#0) | 3 |

For the test to pass, the ratio of successful reported values for each requirement (R1 to R3) shall be more than 90% with a confidence level of 95%. Each requirement is evaluated independently of the others.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.

#### 6.6.4.4 NR SA FR1 CSI-RS-based L1-RSRP measurement in DRX

6.6.4.4.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in DRX within L1-RSRP measurement requirements in TS 38.133 [6] clause 9.5.4.1.

6.6.4.4.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting 5GS NR SA FR1 and long DRX cycle.

6.6.4.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.4.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.4.

6.6.4.4.4 Test description

6.6.4.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.4.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.4.4.1-2. Test environment parameters are given in Table 6.6.4.4.4.1-3.

Table 6.6.4.4.4.1-1: NR SA SSB based L1-RSRP measurement supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.4.4-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.4.4-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.4.4-3 | 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 6.6.4.4.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
| 2 | CSI-RS 1.3 TDD |
| 3 | CSI-RS 2.3 TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | aperiodic |
| reportQuantity | 1~3 |  | cri-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| qcl-Info | 1~3 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~3 | slots | 8 |
| T1 | 1~3 | s | 5 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.4.4.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 4.6.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE Part | |  |

1. Message contents are defined in clause 6.6.4.4.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.4.4.4.1-2 and 6.6.4.4.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.4.4.4.2 Test procedure

Same test procedure as in subclause 6.6.4.3.4.2 with tables 6.6.4.3.4.1-2 and 6.6.4.3.5-1 replaced by tables 6.6.4.4.4.1-2 and 6.6.4.4.5-1.

6.6.4.4.4.3 Message contents

Same message content as in subclause 6.6.4.3.4.3 with the following exception:

Table 6.6.4.4.4.3-1: Common Exception messages NR SA CSI-RS-based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.7-1 with condition DRX.3 and Offset |

6.6.4.4.5 Test requirement

Table 6.6.4.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.4.4.5-1: SSB specific test parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **CSI-RS#0** | **CSI-RS#1** |
| Note1 | 1~3 | dBm/15kHz | -94.65 | |
| Note1 | 1,2 | dBm/SSB SCS | -94.65 | |
| 3 | -91.65 | |
|  | 1~3 | dB | 0 | 3.5 |
| CSI-RS RSRP Note2 | 1,2 | dBm/SSB SCS | -94.65 | -91.15 |
| 3 | -91.65 | -88.14 |
| Io Note2 | 1,2 | dBm/9.36 MHz | -63.69 | -61.59 |
| 3 | dBm/38.16 MHz | -57.59 | -55.49 |
|  | 1~3 | dB | 0 | 3.5 |
| Note 1: Void  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. | | | | |

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.

Each L1-RSRP measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.4.4.5-2 for for test configurations 1, 2, 4 and 5 and the corresponding absolute accuracy requirements in Table 6.6.4.4.5-3 for test configurations 3 and 6 and the corresponding relative accuracy requirements in Table 6.6.4.4.5-4 for all test configurations.

Table 6.6.4.4.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 55 |
| Highest reported value (CSI-RS#1) | 75 |

Table 6.6.4.4.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configurations 3

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 58 |
| Highest reported value (CSI-RS#1) | 78 |

Table 6.6.4.4.5-4: L1-RSRP relative accuracy requirements for the reported values for all test configurations

|  |  |
| --- | --- |
|  | T1 |
| Lowest DIFF RSRP reported (CSI-RS#0) | 0 |
| Highest DIFF RSRP reported (CSI-RS#0) | 3 |

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

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.

#### 6.6.4.5 NR SA FR1 SSB-based L1-RSRP measurement in DRX for UE configured with highSpeedMeasFlag-r16

Editor's note: This test case is incomplete. The following aspects are either missing or not yet determined:

- The feasibility of configuring different channel models to different SSBs needs further study.

- The TT analysis may need to be redone after concluding if the new test configuration is testable.

6.6.4.5.1 Test purpose

To verify that the UE makes correct reporting of L1-RSRP measurement in DRX within L1-RSRP measurement requirements for UE configured with highSpeedMeasFlag-r16 in TS 38.133 clause 9.5.4.1

6.6.4.5.2 Test applicability

This test applies to all types of NR UE release 15 and forward supporting 5GS NR SA FR1, measurement enhancements in high speed scenario and long DRX cycle

6.6.4.5.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.4.5.

6.6.4.5.4 Test description

6.6.4.5.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.4.5.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.4.5.4.1-2. Test environment parameters are given in Table 6.6.4.5.4.1-3.

Table 6.6.4.5.4.1-1: SA SSB based L1-RSRP measurement supported test configurations for UE configured with highSpeedMeasFlag-r16

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.4.5-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.4.5-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.4.5-3 | 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 6.6.4.5.4.1-2: General test parameters for NR SA SSB based L1-RSRP measurement for UE configured with highSpeedMeasFlag-r16

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  | 2 |  | TDD |
|  | 3 |  | TDD |
| TDD Configuration | 1 |  | N/A |
|  | 2 |  | TDDConf.1.1 |
|  | 3 |  | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  | 2 |  | 10: NRB,c = 52 |
|  | 3 |  | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 |  | SR.1.1 TDD |
| 3 |  | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 |  | CR.1.1 TDD |
| 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 |  | CCR.1.1 TDD |
| 3 |  | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  | 2 |  | SSB.3 FR1 |
|  | 3 |  | SSB.4 FR1 |
| OCNG Patterns | 1~3 |  | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  | 2 |  | TRS.1.1 TDD |
|  | 3 |  | TRS.1.2 TDD |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 |
| T1 | 1~3 | s | 5 |
| T2 | 1~3 | s | 2 |
| EPRE ratio of PSS to SSS | 1~3 | 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 |
| 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 6.6.4.5.4.1-3: Test Environment parameters for NR SA SSB based L1-RSRP measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.4.5.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 with n=1 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 with n=1 for TE Part | |  |

1. Message contents are defined in clause 6.6.4.5.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in Table 6.6.4.5.4.1-2 and 6.6.4.5.5-1. UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs. DRX is configured as specified in Table 6.6.4.5.4.1-2.

6.6.4.5.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.6.4.5.4.1-2. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.6.4.1.4.1-2.

2. Set the parameters according to T1 in Table 6.6.4.1.5-1. T1 starts.

3. The UE shall be transmitting CSI on PUCCH with a periodicity of 80 slots.

4. When T1 expires, the SS shall set the parameters according to T2 in 6.6.4.1.5-1. T2 starts.

5. If the UE sends L1-RSRP reports meeting the corresponding absolute accuracy requirements in Table 6.6.4.5.5-2 for test configurations 1 and 2 the corresponding absolute accuracy requirements in Table 6.6.4.5.5-3 for test configurations 3 and the corresponding relative accuracy requirements in Table 6.6.4.5.5-4 for all test configurations every 80 slots from no later than 640 ms plus 80 slots for all configurations from the beginning of time period T2 until the end of time period T2, the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

6. The SS waits until T2 expires.

7. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

9. Repeat steps 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.4.5.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.4.5.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions | Table H.2.1-3 with Condition HighSpeedMeas |
| Default RRC messages and information elements contents exceptions | Table H.3.6-2 with conditions PERIODIC and SS-RSRP  Table H.3.6-3 with conditions SSB  Table H.3.7-1 with condition DRX.3 |

Table 6.6.4.5.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.4.5.5 Test requirement

Table 6.6.4.5.5-1: SSB specific test parameters for UE configured with *highSpeedMeasFlag-r16*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Note2 | 1~3 | dBm/15kHz | -94.6 | | | |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | | | |
|  | 3 |  | -91.65 | | | |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.53 |
| SSB RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.15 |
|  | 3 |  | -91.65 | -91.65 | -Infinity | -88.14 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.59 |
|  | 3 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.49 |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3.5 |
| Propagation conditions | 1,2 |  | AWGN | | AWGN 1944 HzNote4 | |
| 3 | AWGN | | AWGN 3334 Hz Note5 | |
| 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: The AWGN 1944 Hz condition is a non-fading propagation channel with one tap. Doppler shift is a constant 1944 Hz.  Note 5: The AWGN 3334 Hz condition is a non-fading propagation channel with one tap. Doppler shift is a constant 3334 Hz. | | | | | | |

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. Each L1-RSRP measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.4.5.5-2 for for test configurations 1 and 2 and the corresponding absolute accuracy requirements in Table 6.6.4.5.5-3 for test configurations 3 and the corresponding relative accuracy requirements in Table 6.6.4.5.5-4 for all test configurations.

Table 6.6.4.5.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 55 |
| Highest reported value (SSB#1) | - | 75 |

Table 6.6.4.5.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configurations 3

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 58 |
| Highest reported value (SSB#1) | - | 78 |

Table 6.6.4.5.5-4: L1-RSRP relative accuracy requirements for the reported values for all test configurations

|  |  |  |
| --- | --- | --- |
|  | T1 | T2 |
| Lowest DIFF RSRP reported (SSB#0) | - | 0 |
| Highest DIFF RSRP reported (SSB#0) | - | 3 |

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

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.

### 6.6.5 UTRAN inter-RAT measurement

#### 6.6.5.1 NR SA FR1 – UTRAN event-triggered reporting in non-DRX

6.6.5.1.1 Test purpose

This test is to verify that the UE makes correct event-triggered reporting of inter-RAT UTRAN measurements when operating in standalone (SA) operation with PCell in FR1 under the cell search and measurement requirements.

6.6.5.1.2 Test applicability

This test applies to all types of NR UE supporting SA FR1 from Release 16 onwards and support UTRA FDD.

6.6.5.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.3.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.5.1.

6.6.5.1.4 Test description

6.6.5.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.5.1.4.1-1.

Table 6.6.5.1.4.1-1: supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.5.1-1 | NR 15 kHz SSB SCS, 10MHz bandwidth, FDD duplex mode, UTRAN FDD |
| 6.6.5.1-2 | NR 15 kHz SSB SCS, 10MHz bandwidth, TDD duplex mode, UTRAN FDD |
| 6.6.5.1-3 | NR 30 kHz SSB SCS, 40MHz bandwidth, TDD duplex mode, UTRAN FDD |
| NOTE: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.5.1.4.1-2 and Table 6.6.5.1.4.1-3.

Table 6.6.5.1.4.1-2: Initial conditions for SA inter-RAT UTRAN event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-3 and TS 38.508-1 [14] sclause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.5.1.5-1 and Table 6.6.5.1.5-2. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| UE Part | A.3.2.3.2 |
| Exceptions to connection diagram | SS LTE in Figure A.3.1.8.2 is replaced by SS UTRA  LTE TX/RX in Figure A.3.2.3.2 is replaced by UTRA TX/RX | |  |

Table 6.6.5.1.4.1-3: General test parameters for SA inter-RAT UTRAN FDD event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | 1 NR carrier frequency is used in the test |
| UTRA RF Channel Number |  | 2 | 1 UTRA carrier frequency is used in the test |
| Channel Bandwidth | MHz | As specified in Table 6.6.5.1.5-1 and Table 6.6.5.1.5-2 |  |
| Active cell |  | Cell 1 | Cell 1 is on RF channel number 1 |
| Neighbour cell |  | Cell 2 | Cell 2 is on RF channel number 2 |
| Gap Pattern Id |  | 0 | As specified in Clause Table FFS Per-UE gap pattern. |
| Inter-RAT UTRA measurement quantity |  | CPICH Ec/Io | Measurement quantity for Cell 2 |
| b1-ThresholdUTRA-FDD | dB | -16.5 | CPICH Ec/Io threshold for SS-RSRP measurement on cell1 for event B1 |
| Hysteresis | dB | 0 |  |
| TimeToTrigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  | OFF | OFF |
| T1 | s | 5 |  |
| T2 | s | 5 |  |
| Note 1: Values are defined in Table A.6.6.5.1.1-3 | | | |

1. Message contents are defined in clause 6.6.5.1.4.3.

2. Cell 1 is the NR PCell and Cell 2 is an inter-RAT UTRAN inter-RAT neighbour cell. Cell 1 is configured according to Annex C.1.1 and C.1.2, Cell 2 is configured according to TS 36.521-3 Annex C.0 and C.1.

6.6.5.1.4.2 Test procedure

The test consists of two successive time periods, with time durations of T1 and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 2. Gap pattern configuration is configured before T2 begins to enable inter-frequency monitoring.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.5.1.5-1 and 6.6.5.1.5-2. Propagation conditions are set according to Annex C clause C.2.2.T1 starts.

3. SS shall transmit an *RRCReconfiguration* message to confogure Event B1 measurement reporting.

4. The UE shall transmit an *RRCReconfigurationComplete* message.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.5.1.5-1 and 6.6.5.1.5-2.

6. UE shall transmit a *MeasurementReport* message triggered by Event B1. If the measurement reporting delay from the beginning of time period T2 is less than 3842ms the number of successful tests is increased by one. If the UE fails to report the event within the measurement reporting delay requirement then the number of failure tests is increased by one.

7. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 primary scrambling code = ((current cell 2 primary scrambling code - 50) mod 200 + 100) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED according to TS 38.508-1 [14] clause 4.5.4 (if the paging fails, switches off and on the UE and ensures the UE is in the state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5,  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

10.Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.5.1.4.3 Message contents

Table 6.6.5.1.4.3-1: RRCReconfiguration (Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14] Table 4.6.1-13 with condition NR\_MEAS | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCReconfiguration ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcReconfiguration SEQUENCE { | |  |  |  |
| measConfig | | MeasConfig | Table 6.6.5.1.4.3-2 |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.5.1.4.3-2: MeasConfig (Table 6.6.5.1.4.3-1)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table H.3.1-2 with condition INTER-RAT and GAP NEEDED | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasConfig ::= SEQUENCE { |  |  |  |
| measObjectToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasObjectToAddMod { | 2 entries |  |  |
| MeasObjectToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measObjectId | 1 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectNR | MeasObjectNR-DEFAULT specified in Table H.3.1-3 with condition INTRA-FREQ MO |  |  |
| } |  |  |  |
| } |  |  |  |
| MeasObjectToAddMod[2] SEQUENCE { |  | entry 2 |  |
| measObjectId | 2 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectUTRA-FDD-r16 | MeasObjectUTRA-FDD | Table 6.6.5.1.4.3-3 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportConfigToAddModList SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod { | 1 entry |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigInterRAT(*16*) specified in 38.508-1 [14] Table 4.6.3-141 with condition EVENT\_B1\_UTRA | Actual value of UTRA threshold = (16-49)/2 = -16.5dB |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| measGapConfig | MeasGapConfig specified in Table H.3.1-6 with condition gapUE and Pattern #0 |  |  |
| } |  |  |  |

Table 6.6.5.1.4.3-3: MeasObjectUTRA-FDD (Table 6.6.5.1.4.3-2)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-77A | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectUTRA-FDD-r16 ::= SEQUENCE { |  |  |  |
| carrierFreq-r16 | ARFCN-ValueUTRA-FDD-r16 for UTRA Cell 2 |  |  |
| } |  |  |  |

Table 6.6.5.1.4.3-4: MeasurementReport (Step 6)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-5A | | | |
| Information Element | | Value/remark | Comment | Condition |
| MeasurementReport ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| measurementReport SEQUENCE { | |  |  |  |
| measResults | | MeasResults | Table 6.6.5.1.4.3-5 |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.5.1.4.3-5: MeasResults (Table 6.6.5.1.4.3-4)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14] Table 4.6.3-79 with condition B1\_UTRA | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasResults ::= SEQUENCE { |  |  |  |
| measResultNeighCells CHOICE { |  |  |  |
| measResultListUTRA-FDD-r16 SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultUTRA-FDD-r16 { | 1 entry |  |  |
| MeasResultUTRA-FDD-r16[1] SEQUENCE { |  | entry 1 |  |
| physCellId-r16 | PhysCellIdUTRA-FDD-r16 of UTRA Cell 2 |  |  |
| measResult-r16 SEQUENCE { |  |  |  |
| utra-FDD-EcN0-r16 | INTEGER (0..49) |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.5.1.5 Test requirement

Table 6.6.5.1.5-1 and Table 6.6.5.1.5-2 define the primary level settings including test tolerances for all tests.

Table 6.6.5.1.5-1: PCell specific test parameters for SA inter-RAT UTRA FDD event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 1 | |
|  | | |  |  | T1 | T2 |
| RF channel number | | |  | 1, 2, 3 | 1 | |
| Duplex mode | | |  | 1, 2, 3 | FDD | |
| TDD Configuration | | SCS=15 KHz |  | 2 | TDDConf.1.1 | |
|  | | SCS=30 KHz |  | 3 | TDDConf.1.2 | |
| BWchannel | | | MHz | 1 | 10: NRB,c = 52 (FDD) | |
|  | | |  | 2 | 10: NRB,c = 52 (TDD) | |
|  | | |  | 3 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | | |  | 1 | SR.1.1 FDD | |
|  | | |  | 2 | SR.1.1 TDD | |
|  | | |  | 3 | SR.2.1 TDD | |
| CORSET reference channel | | |  | 1 | CR.1.1 FDD | |
|  | | |  | 2 | CR.1.1 TDD | |
|  | | |  | 3 | CR.2.1 TDD | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3 | DLBWP.0.1 | |
|  | Dedicated DL BWP | |  | 1, 2, 3 | DLBWP.1.1 | |
|  | Initial UL BWP | |  | 1, 2, 3 | ULBWP.0.1 | |
|  | Dedicated UL BWP | |  | 1, 2, 3 | ULBWP.1.1 | |
| OCNG patternNote1 | | |  | 1, 2, 3 | OP.1 | |
| SMTC configuration | | |  | 1, 2, 3 | SMTC.1 | |
| SSB configuration | | |  | 1, 2 | SSB.1 FR1 | |
|  | | |  | 3 | SSB.2 FR1 | |
| CSI-RS for tracking | | |  | 1 | TRS.1.1 FDD | |
| 2 | TRS.1.1 TDD | |
| 3 | TRS.1.2 TDD | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3 | 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 SSS | | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS | | |  |  |  | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2, 3 | -106 | |
| *Noc*Note2 | | | dBm/SCS | 1, 2 | -106 | |
|  | | |  | 3 | -103 | |
| Ês/Noc | | | dB | 1, 2, 3 | 18 | -2 |
| Ês/IotNote3 | | | dB | 1, 2, 3 | 18 | -2 |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2 | -88 | -108 |
|  | | |  | 3 | -85 | -105 |
| SSB\_RPNote3 | | | dBm/SCS | 1, 2 | -88 | -108 |
|  | | |  | 3 | -85 | -105 |
| IoNote3 | | | dBm/9.36 MHz | 1, 2 | -59.98 | -75.92 |
|  | | | dBm/38.16 MHz | 3 | -53.88 | -69.82 |
| Propagation condition | | |  | 1, 2, 3 | ETDLA30 | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3 | 1x2 Low | |
| 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

Table 6.6.5.1.5-2: UTRAN neighbour cell specific test parameters for SA inter-RAT UTRAN FDD event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | |
|  |  | T1 | T2 |
| UTRA RF Channel Number |  | 2 | |
| CPICH\_Ec/Ior | dB | -10 | |
| PCCPCH\_Ec/Ior | dB | -12 | |
| SCH\_Ec/Ior | dB | -12 | |
| PICH\_Ec/Ior | dB | -15 | |
| DPCH\_Ec/Ior | dB | N/A | |
| OCNS |  | -0.941 | |
|  | dB | -Infinity | -1.8 |
|  | dBm/3.84 MHz | -70 | |
| CPICH\_Ec/Io | dB | -Infinity | -14 |
| Propagation Condition |  | AWGN | |
| Note 1: The DPCH level is controlled by the power control loop.  Note 2: The power of the OCNS channel that is added shall make the total power from the cell to be equal to Ior. | | | |

The UE shall send one Event B1 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 2.4s from the start of period T2, i.e. when Cell 2 becomes detectable. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

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

### 6.6.6 CLI Measurements

#### 6.6.6.0 Minimum conformance requirements

##### 6.6.6.0.1 Minimum conformance requirements for SRS-RSRP measurement

Same as in clause 4.6.5.0.1.

##### 6.6.6.0.2 Minimum conformance requirements for CLI-RSSI measurement with non-DRX

Same as in clause 4.6.5.0.2.

### 6.6.6.1 NR SA FR1 SRS-RSRP measurement in non-DRX

6.6.6.1.1 Test purpose

To verify that the UE makes correct reporting of SRS-RSRP measurement. This test will verify the SRS-RSRP measurement requirements in clause 6.6.6.0.

6.6.6.1.2 Test applicability

This test applies to all types of NR UE release 16 and forward, supporting standalone NR and CLI-based SRS-RSRP measurements.

6.6.6.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.6.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.6.1.

6.6.6.1.4 Test description

The test scenario comprises of one serving NR FR1 PCell (Cell 1) and one virtual intra-frequency UE transmitting SRS periodically, which are the target of the CLI measurement report evaluated in the test. The test parameters for PCell are given in Table 6.6.6.1.4.1-3 and Table 6.6.6.1.5-1 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 I1 is used. No gap pattern is configured in the test.

During the test, the test system transmits SRS resource for measurement in the DL slot according to the SRS configuration in Table 6.6.6.1.5-3 and the test parameters for the (virtual) neighbour cell UE in Table 6.6.6.1.5-2. During the test, the test system does not transmit PDCCH/PDSCH/OCNG on SRS symbol to be transmitted and on 1 data symbol before SRS to be transmitted.

6.6.6.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.6.1.4.1-1.

Table 6.6.6.1.4.1-1: Supported test configurations for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.6.1-1 | NR 15 kHz SRS SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.6.1-2 | NR 30 kHz SRS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.6.1.4.1-2.

2Initial conditions NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | |  |
|  |  | |  |
|  | 4 | | |
|  | 6.6.6.14.1 | | |
|  |  | |  |
|  |  |  |  |
|  |  |
|  |  | |  |

1. Message contents are defined in clause 6.6.6.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex C.1.2 and C.1.3. Virtual UE 1 is the target for SRS-RSRP measurements.

3. The test parameters are given in Table 6.6.6.1.4.1-3.

Table 6.6.6.1.4.1-3: General test parameters for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2 | Cell 1 |  |
| RF Channel Number |  | 1, 2 | 1: Cell 1 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.1 |  |
|  |  | 2 | SMTC.1 |  |
| SRS configuration |  | 1 | SRSConf.1 | Table 6.6.6.1.5-3 |
|  |  | 2 | SRSConf.2 |  |
| CP length |  | 1, 2 | Normal |  |
| i1-Threshold | dBm | 1 | -97 |  |
|  |  | 2 | -95 |  |
| 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.7 |  |
| Time offset between DL from serving cell and SRS from test system | μs | 1,2 | 17.67 |  |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |



6.6.6.1.4.2 Test procedure

The test consists of two successive time periods, with time duration of T1 and T2, respectively. During T1 only the serving NR PCell is powered on, but at the start of T2 the virtual UE is powered on and starts transmitting on SRS resources, in addition to the serving NR cell which is kept powered on. The purpose of the test is to evaluate the event i1 reporting delay upon a newly powered up virtual UE, from the start of T2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.6.1.4.1-3, Table 6.6.6.1.5-1 and Table 6.6.6.1.5-2.

3. The SS shall transmit an *RRCReconfiguration* message configuring a CLI measurement object with a CLI event I1 trigger, as specified in section 6.6.6.1.4.3.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.6.1.4.1-3, Table 6.6.6.1.5-1 and Table 6.6.6.1.5-2. T2 Starts.

6. UE shall transmit a *MeasurementReport* message triggered by event I1, as specified in section 6.6.6.1.4.3. If the overall delay measured from the beginning of time period T2 is less than 1922 ms then the number of successful tests is increased by one. If the UE fails to report the event within the overall requirement delay, then the number of failure tests is increased by one.

7. After the SS receives the *MeasurementReport* message in step 6 or when T2 expires, the SS shall power off the virtual UE and then transmit an *RRCRelease* message to release the RRC connection.

8. The SS shall:

- switch off and then on the UE and go to step 9, or

- transmit *Paging* message (including *PagingRecord* with *ue-Identity*) for the UE and go to step 9.

9. Repeat steps 1-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.6.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clauses 4.6.1 and 7.3 with the following exceptions:

Table 6.6.6.1.4.3-1: Common Exception messages for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5 |

Table 6.6.6.1.4.3-2: *MeasObjectToAddModList* for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-77 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectToAddModList::= SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasObjectToAddMod { | 1 entry |  |  |
| MeasObjectToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measObjectId | 1 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectCLI-r16 | MeasObjectCLI-r16 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.6.6.1.4.3-3: *MeasObjectCLI-r16* for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-76 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectCLI-r16 ::= SEQUENCE { |  |  |  |
| cli-ResourceConfig-r16 SEQUENCE { |  |  |  |
| srs-ResourceConfig-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| SRS-ResourceListConfigCLI-r16 SEQUENCE { | 1 entry |  |  |
| srs-Resource-r16 | SRSConf.1 | entry 1 | Config 1 |
|  | SRSConf.2 | entry 1 | Config 2 |
| srs-SCS-r16 | kHz15 |  | Config 1 |
|  | kHz30 |  | Config 2 |
| refServCellIndex-r16 | 0 | PCell |  |
| refBWP-r16 | 0 | BWP-0 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.6.6.1.4.3-4: *ReportConfigNR* for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-142 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR ::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| cli-EventTriggered-r16 SEQUENCE { |  |  |  |
| eventId-r16 CHOICE { |  |  |  |
| eventI1-r16 SEQUENCE { |  | Event I1 |  |
| i1-ThresholdCHOICE { |  |  |  |
| srs-RSRP-r16 | 43 | 43 = -97-(-140) | Config 1 |
| srs-RSRP-r16 | 45 | 45 = -95-(-140) | Config 2 |
| } |  |  |  |
| reportOnLeave-r16 | False |  |  |
| hysteresis-16 | 0 |  |  |
| timeToTrigger-r16 | ms0 |  |  |
| } |  |  |  |
| } |  |  |  |
| reportInterval-r16 | ms120 | Not critical to the test |  |
| reportAmount-r16 | r2 | Similar to other measurement tests |  |
| maxReportCLI-r16 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.6.6.1.4.3-5: *MeasResultCLI-r16* for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-79 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasResultCLI-r16 ::= SEQUENCE { |  |  |  |
| measResultsListSRS-r16 CHOICE { |  |  |  |
| srs-ResourceId-r16 | SRS-ResourceId |  |  |
| srs-RSRP-Result-r16 | SRS-RSRP-Range-r16 | INTEGER (0..98) |  |
| } |  |  |  |
| } |  |  |  |

6.6.6.1.5 Test requirement

Table 6.6.6.1.5-1 and Table 6.6.6.1.5-2 define the primary level settings including test tolerances for NR SA FR1 SRS-RSRP measurement in non-DRX. Table 6.6.6.1.5-3 defines the SRS resource configurations.

Table 6.6.6.1.5-1: NR Cell specific test parameters for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| TDD configuration |  | 1 | TDDConf.1.1 | |
|  |  | 2 | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 TDD | |
|  |  | 2 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 TDD | |
|  |  | 2 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 TDD | |
|  |  | 2 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2 | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 TDD | |
|  |  | 2 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2 | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.1 | |
| Note 2 | dBm/15 kHz | 1 | -98 | |
|  |  | 2 |
| Note 2 | dBm/SCS | 1 | -98 | |
|  |  | 2 | -95 | |
| 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. | | | | |

Table 6.6.6.1.5-2: Neighbor UE specific test parameters for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Neighbour cell UE | |
|  |  |  | T1 | T2 |
| Note 2 | dBm/15 kHz | 1 | -98 | |
|  |  | 2 |  | |
| Note 2 | dBm/SCS | 1 | -98 | |
|  |  | 2 | -95 | |
|  | dB | 1 | -infinity | 9.25  8.75 |
|  |  | 2 |
|  | dB | 1 | -infinity | 9.25  8.75 |
|  |  | 2 |
| SRS-RSRP Note 3 | dBm/SCS kHz | 1 | -infinity | -88.75 |
|  |  | 2 | -infinity | -86.25 |
| Io | dBm/9.36 MHz | 1 | -70.05 | -60.62 |
|  | dBm/38.16 MHz | 2 | -63.96 | -57.51 |
| 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: SRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

Table 6.6.6.1.5-3: SRS configurations for NR SA FR1 SRS-RSRP measurement in non-DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Field | SRSConf.1 | SRSConf.2 | Comments |
| SRS-ResourceSet | srs-ResourceSetId | 0 | 0 |  |
|  | 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 | 12 | 12 |  |
|  | freqHopping  b-SRS | 0 | 0 |  |
|  | freqHopping  b-hop | 0 | 0 |  |
|  | groupOrSequenceHopping | Neither | Neither |  |
|  | resourceType | Periodic | Periodic |  |
|  | periodicityAndOffset | sl640, 4 | sl640, 9 |  |
|  | sequenceId | 0 | 0 | Any 10 bit number |

The UE shall send one Event I1 triggered measurement report, with a measurement reporting delay less than 1920 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%.

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.

### 6.6.7

### 6.6.8 L1-SINR measurement for beam reporting

#### 6.6.8.0 Minimum conformance requirements

##### 6.6.8.0.1 L1-SINR reporting with CSI-RS based CMR and no dedicated IMR configured

Same as clause 4.6.7.0.1

The normative reference for this requirement is TS 38.133 [6] clause 9.8.3, 9.8.4.1 and 9.8.5.2.

##### 6.6.8.0.2 L1-SINR reporting with SSB based CMR and dedicated IMR configured

Same as clause 4.6.7.0.2

The normative reference for this requirement is TS 38.133 [6] clause 9.8.3, 9.8.4.2 and 9.8.5.

##### 6.6.8.0.3 L1-SINR reporting with CSI-RS based CMR and dedicated IMR configured

Same as clause 4.6.7.0.3

The normative reference for this requirement is TS 38.133 [6] clause 9.8.3, 9.8.4.3 and 9.8.5.

#### 6.6.8.1 NR SA FR1 CSI-RS based CMR and no dedicated IMR L1-SINR measurement in DRX

6.6.8.1.1 Test purpose

To verify that the UE makes correct reporting of L1-SINR measurement in DRX within L1-SINR measurement requirements in TS 38.133 [6] clause 9.8.4.1.

6.6.8.1.2 Test applicability

This test applies to all types of NR UE release 16 and forward, supporting L1-SINR measurement and long DRX cycle.

6.6.8.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.8.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.8.1.

6.6.8.1.4 Test description

6.6.8.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.8.1.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.8.1.4.1-2. Test environment parameters are given in Table 6.6.8.1.4.1-3.

Table 6.6.8.1.4.1-1: NR SA CSI-RS based CMR and no dedicated IMR L1-SINR measurement supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 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 6.6.8.1.4.1-2: General test parameters for NR SA CSI-RS based CMR and no dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
| 2 | CSI-RS 1.3 TDD |
| 3 | CSI-RS 2.3 TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | aperiodic |
| reportQuantity-r16 | 1~3 |  | cri-SINR-r16 |
| Number of reported RS | 1~3 |  | 2 |
| qcl-Info | 1~3 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~3 | slots | 26 |
| T1 | 1~3 | s | 5 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.8.1.4.1-3: Test Environment parameters for NR SA CSI-RS based CMR and no dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.8.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.5 for TE Part | |  |

1. Message contents are defined in clause 6.6.8.1.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.8.1.4.1-2 and 6.6.8.1.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.8.1.4.2 Test procedure

The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-SINR on aperiodic CSI-RS resources. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. UE is also configured to measure L1-SINR based on SSB. Upon receiving the DCI trigger, UE provides the report back based on the reporting configuration as defined in Table 6.6.8.1.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.8.1.5-1. T1 starts.

3. After 80ms from the start of the test the SS transmits the DCI trigger in slot 1 for configuration 1, 2 and slot 8 for configuration 3. The corresponding CSI-RS set is transmitted with the offset of 4 slots after the DCI trigger.

4. The SS shall check following requirements:

- R1: the UE shall send L1-SINR report at slot 26 from the reception of DCI trigger. If the report is received at slot 26 from the reception of DCI trigger, the number of passed iterations for R1 is increased by one. Otherwise, the number of failed iterations for R1 is increased by one.

- R2: The L1-SINR value of CSI-RS#1 reported by the UE is compared to the expected L1-SINR value for CSI-RS#1. If the resulting value is outside the limits in Table 6.6.8.1.5-2 for all test configurations or the UE fails to report the measurement value for CSI-RS #1, the number of failed iterations for R2 is increased by one. Otherwise, the number of passed iterations for R2 is increased by one.

- R3: The DIFF SINR value of CSI-RS #0 reported by the UE is compared to the expected DIFF SINR value. If the resulting value is outside the limits in Table 6.6.8.1.5-4 or the UE fails to report the measurement value for CSI-RS#0, the number of failed iterations for R3 is increased by one. Otherwise, the number of passed iterations for R3 is increased by one..

5. If after T1 expiry no report is received or received report did not contain L1-SINR of both CSI-RS#0 and CSI-RS#1 or UE sent the L1-SINR report at different slot than 26 from the reception of DCI trigger, the number of ‘failed’ iterations is increased by one, otherwise, the number of ‘passed’ iterations is increased by one.

6. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

7. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

8. Repeat steps 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.8.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.8.1.4.3-1: Common Exception messages NR SA CSI-RS based CMR and no dedicated IMR L1-SINR measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions APERIODIC and CSI-SINR  Table H.3.6A-2 with conditions CSI-RS and APERIODIC  Table H.3.7-1 with condition DRX.3 |

Table 6.6.8.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| } |  |  |  |
| } |  |  |  |

6.6.8.1.5 Test requirement

Table 6.6.8.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.8.1.5-1: CSI-RS specific test parameters for NR SA CSI-RS based CMR and no dedicated IMR L1-SINR measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | CSI-RS#0 | CSI-RS#1 |
| Note1 | 1~3 | dBm/15kHz | -94.65 | |
| Note1 | 1,2 | dBm/SSB SCS | -94.65 | |
| 3 | -91.65 | |
|  | 1~3 | dB | 0 | 3 |
| CSI-RS RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -91.65 |
| 3 | -91.65 | -88.65 |
| Io Note2 | 1,2 | dBm/9.36 MHz | -63.69 | -61.93 |
| 3 | dBm/38.16 MHz | -57.59 | -55.84 |
|  | 1~3 | 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. | | | | |

After 80ms from the beginning of the test, the UE shall send L1-SINR report at slot 26 from the reception of DCI triggering the L1-SINR measurement. The L1-SINR report shall include the results for both CSI-RS#0 and CSI-RS#1.

Each L1-SINR measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.8.1.5-2 for all test configurations and the corresponding relative accuracy requirements in Table 6.6.8.1.5-4 for all test configurations.

Table 6.6.8.1.5-2: L1-SINR absolute accuracy requirements for the reported values for all test configurations

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 41 |
| Highest reported value (CSI-RS#1) | 64 |

Table 6.6.8.1.5-3: Void

Table 6.6.8.1.5-4: L1-SINR relative accuracy requirements for the reported values for all test configurations

|  |  |
| --- | --- |
|  | T1 |
| Lowest DIFF SINR reported (CSI-RS#0) | 0 |
| Highest DIFF SINR reported (CSI-RS#0) | 7 |

For the test to pass, the ratio of successful reported values for each requirement (R1 to R3) shall be more than 90% with a confidence level of 95%. Each requirement is evaluated independently of the others..

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.

#### 6.6.8.2 NR SA FR1 SSB based CMR and dedicated IMR L1-SINR measurement in non-DRX

6.6.8.2.1 Test purpose

To verify that the UE makes correct reporting of L1-SINR measurement in non-DRX within L1-SINR measurement requirements in TS 38.133 [6] clause 9.8.4.2.

6.6.8.2.2 Test applicability

This test applies to all types of NR UE release 16 and forward, supporting L1-SINR measurement.

6.6.8.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.8.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.8.2.

6.6.8.2.4 Test description

6.6.8.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.8.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.8.2.4.1-2. Test environment parameters are given in Table 6.6.8.2.4.1-3.

Table 6.6.8.2.4.1-1: NR SA SSB based CMR and dedicated IMR L1-SINR measurement supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 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 6.6.8.2.4.1-2: General test parameters for NR SA SSB based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | c |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS 1.1A FDD |
| 2 | CSI-RS 1.1A TDD |
| 3 | CSI-RS 2.1A TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| DRX configuration | 1~3 |  | off |
| reportConfigType | 1~3 |  | periodic |
| reportQuantity-r16 | 1~3 |  | ssb-Index-SINR-r16 |
| Number of reported RS | 1~3 |  | 2 |
| L1-SINR reporting period | 1~3 | slot | 80 |
| T1 | 1~3 | s | 5 |
| T2 | 1~3 | s | 1 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.8.2.4.1-3: Test Environment parameters for NR SA SSB based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.8.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 with n = 1TBD | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4TBD |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.5 for TE Part | |  |

1. Message contents are defined in clause 6.6.8.2.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.8.2.4.1-2, 6.6.8.2.5-1 and 6.6.8.2.5-2. UE is configured to perform RLM and BFD based on the SSBs.

6.6.8.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above Table 6.6.8.2.4.1-2. Before the test, UE is configured to perform RLM, BFD and L1-SINR measurement based on the SSBs.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.6.8.2.4.1-2.

2. Set the parameters according to T1 in Table 6.6.8.2.5-1 and Table 6.6.8.2.5-2. T1 starts. SS transmits CSI-RS as IMR with a periodicity of 20 slots.

3. The UE shall be transmitting CSI on PUCCH with a periodicity of 80 slots.

4. When T1 expires, the SS shall set the parameters according to T2 in Table 6.6.8.2.5-1 and Table 6.6.8.2.5-2. T2 starts. SS transmits CSI-RS as IMR with a periodicity of 20 slots.

5. If the UE sends L1-SINR reports meeting the corresponding absolute accuracy requirements in Table 6.6.8.2.5-3 for test configurations 1 and 2 the corresponding absolute accuracy requirements in Table 6.6.8.2.5-4 for test configurations 3 and the corresponding relative accuracy requirements in Table 6.6.8.2.5-5 for all test configurations every 80 slots from no later than 720 ms for configuration 1 and 2 and no later than 680 ms for configuration 3 from the beginning of time period T2 until the end of time period T2, the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one. The UE shall start sending valid L1-SINR reports. The SS shall check following requirements:

- R1: the UE shall start to transmit valid reports no later than 720 ms for configuration 1,2 and no later than 680 ms for configuration 3 from the beginning of time period T2. A valid report shall meet the absolute L1-SINR requirement for SSB#1 (Table 6.6.8.2.5-3 for all configurations) and the relative L1-SINR requirement for SSB#0 in Table 6.6.8.2.5-5. If the first valid report is received earlier than the specified time, the number of passed iterations for R1 is increased by one. Otherwise, the number of failed iterations for R1 is increased by one.

- R2: the UE shall transmit reports every 80 slots until the end of time period T2. If the reports are received accordingly, the number of passed iterations for R2 is increased by one. Otherwise, the number of failed iterations for R2 is increased by one.

- R3: The L1-SINR value of SSB#1 reported by the UE is compared to the expected L1-SINR value for SSB#1. In all consecutive reports after the first valid value is received, if the resulting value is outside the limits in Table 6.6.8.2.5-3 for all configurations or the UE fails to report the measurement value for SSB#1, the number of failed iterations for R3 is increased by one. Otherwise, the number of passed iterations for R3 is increased by one.

-R4: The DIFF SINR value of SSB#0 reported by the UE is compared to the expected DIFF SINR value. In all consecutive reports after the first valid value is received, if the resulting value is outside the limits in Table6.6.8.2.5-5 for all configurations or the UE fails to report the measurement value for SSB#0, the number of failed iterations for R4 is increased by one. Otherwise, the number of passed iterations for R4 is increased by one.

6. The SS waits until T2 expires.

7. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

8. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

9. Repeat steps 2-8 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.8.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.8.2.4.3-1: Common Exception messages NR SA SSB based CMR and dedicated IMR L1-SINR measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions PERIODIC and SS-SINR and CSI-RS\_IMR  Table H.3.6A-2 with conditions SSB and PERIODIC  Table H.3.6A-3 with condition PERIODIC |

Table 6.6.8.2.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.8.2.5 Test requirement

Table 6.6.8.2.5-1 and Table 6.6.8.2.5-2 define the primary level settings including test tolerances for all tests.

Table 6.6.8.2.5-1: SSB specific test parameters for NR SA SSB based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
| T1 | T2 | T1 | T2 |
| Note2 | 1~3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | | | |
| 3 | -91.65 | | | |
|  | 1~3 | dB | 0.5 | 0.5 | -Infinity | 3 |
| SSB RSRP Note3 | 1,2 | dBm/SSB SCS | -94.15 | -94.15 | -Infinity | -91.65 |
| 3 | -91.14 | -91.14 | -Infinity | -88.65 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.43 | -63.43 | -66.70 | -61.93 |
| 3 | dBm/38.16 MHz | -57.33 | -57.33 | -60.61 | -55.84 |
|  | 1~3 | dB | 0.5 | 0.5 | -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. | | | | | | |

Table 6.6.8.2.5-2: CSI-RS specific test parameters for NR SA SSB based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | CSI-RS#0 | | **CSI-RS#1** | |
| T1 | T2 | T1 | T2 |
| Note2 | 1~3 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2 | dBm/CSI-RS SCS | -94.65 | | | |
| 3 | -91.65 | | | |
|  | 1~3 | dB | 0.5 | 0.5 | -Infinity | 3 |
| CSI-RS RSRP Note3 | 1,2 | dBm/CSI-RS SCS | -94.15 | -94.15 | -Infinity | -91.65 |
| 3 | -91.14 | -91.14 | -Infinity | -88.65 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.43 | -63.43 | -66.70 | -61.93 |
| 3 | dBm/38.16 MHz | -57.33 | -57.33 | -60.61 | -55.84 |
|  | 1~3 | dB | 0.5 | 0.5 | -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. | | | | | | |

The UE shall send L1-SINR report every 80 slots. No later than 640ms plus 80 slots from the beginning of time period T2, UE shall send L1-SINR report including results of both SSB#0+CSI-RS#0 and SSB#1+CSI-RS#1. Each L1-SINR measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.8.2.5-3 for all test configurations and the corresponding relative accuracy requirements in Table 6.6.8.2.5-4 for all test configurations.

Table 6.6.8.2.5-3: L1-SINR absolute accuracy requirements for the reported values for all test configurations

|  |  |  |
| --- | --- | --- |
| Normal Conditions | T1 | T2 |
| Lowest reported value (SSB#1) | - | 44 |
| Highest reported value (SSB#1) | - | 61 |

Table 6.6.8.2.5-4: Void

Table 6.6.8.2.5-5: L1-SINR relative accuracy requirements for the reported values for all test configurations

|  |  |  |
| --- | --- | --- |
|  | T1 | T2 |
| Lowest DIFF SINR reported (SSB#0) | - | 0 |
| Highest DIFF SINR reported (SSB#0) | - | 5 |

For the test to pass, the ratio of successful reported values for each requirement (R1 to R4) shall be more than 90% with a confidence level of 95%. Each requirement is evaluated independently of the others..

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.

#### 6.6.8.3 NR SA FR1 CSI-RS based CMR and dedicated IMR L1-SINR measurement in non-DRX

6.6.8.3.1 Test purpose

To verify that the UE makes correct reporting of L1-SINR measurement in non-DRX within L1-SINR measurement requirements in TS 38.133 [6] clause 9.8.4.3.

6.6.8.3.2 Test applicability

This test applies to all types of NR UE release 16 and forward, supporting L1-SINR measurement.

6.6.8.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.8.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.8.3.

6.6.8.3.4 Test description

6.6.8.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.8.3.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.6.8.3.4.1-2. Test environment parameters are given in Table 6.6.8.3.4.1-3.

Table 6.6.8.3.4.1-1: NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 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 6.6.8.3.4.1-2: General test parameters for NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS 1.3 FDD |
| 2 | CSI-RS 1.3 TDD |
| 3 | CSI-RS 2.3 TDD |
| CSI-IM configuration | 1 |  | CSI-IM.1.2 FDD |
| 2 |  | CSI-IM.1.2 TDD |
| 3 |  | CSI-IM.2.2 TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| DRX configuration | 1~3 |  | Off |
| reportConfigType | 1~3 |  | aperiodic |
| reportQuantity-r16 | 1~3 |  | cri-SINR-r16 |
| Number of reported RS | 1~3 |  | 2 |
| qcl-Info | 1~3 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~3 | slots | 26 |
| T1 | 1~3 | s | 5 |
| EPRE ratio of PSS to SSS | 1~3 | 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 6.6.8.3.4.1-3: Test Environment parameters for NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.2-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.8.3.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | For 4Rx capable UEs without any 2 Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.5 for TE Part | |  |

1. Message contents are defined in clause 6.6.8.3.4.3.

2. Single Cell is used, which is NR FR1 Pcell. The connection setup is done according to the settings in Annex C.1.2 and C.1.3. The test parameters are given in tables 6.6.8.3.4.1-2 and 6.6.8.3.5-1. UE is configured to perform RLM and BFD based on the SSBs.

6.6.8.3.4.2 Test procedure

The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-SINR on aperiodic CSI-RS resources. Prior to the start of the time duration T1, the UE shall be fully synchronized to PCell. UE is also configured to measure L1-SINR based on SSB. Upon receiving the DCI trigger, UE provides the report back based on the reporting configuration as defined in table 6.6.8.3.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.8.3.5-1. T1 starts.

3. After 80ms from the start of the test the SS transmits the DCI trigger in slot 1 for configuration 1, 2 and slot 8 for configuration 3. The corresponding CSI-RS set is transmitted with the offset of 4 slots after the DCI trigger.

4. The SS shall check following requirements:

- R1: the UE shall send L1-SINR report at slot 26 from the reception of DCI trigger. If the report is received at slot 26 from the reception of DCI trigger, the number of passed iterations for R1 is increased by one. Otherwise, the number of failed iterations for R1 is increased by one.

- R2: The L1-SINR value of CSI-RS#1 reported by the UE is compared to the expected L1-SINR value for CSI-RS#1. If the resulting value is outside the limits in Table 6.6.8.3.5-2 for all test configurations or the UE fails to report the measurement value for CSI-RS #1, the number of failed iterations for R2 is increased by one. Otherwise, the number of passed iterations for R2 is increased by one.

- R3: The DIFF SINR value of CSI-RS #0 reported by the UE is compared to the expected DIFF SINR value. If the resulting value is outside the limits in Table 6.6.8.3.5-4 or the UE fails to report the measurement value for CSI-RS#0, the number of failed iterations for R3 is increased by one. Otherwise, the number of passed iterations for R3 is increased by one.5. If after T1 expiry no report is received or received report did not contain L1-SINR of both CSI-RS#0 as CMR + CSI-IM#0 as IMR and CSI-RS#1 as CMR + CSI-IM#1 as IMR or UE sent the L1-SINR report at different slot than 26 from the reception of DCI trigger, the number of ‘failed’ iterations is increased by one, otherwise, the number of ‘passed’ iterations is increased by one.

6. The SS shall transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources.

7. After the RRC connection release, the SS:

- transmits in Cell 1 a *Paging* message (including PagingRecord with ue-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.),  
or:  
- switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

8. Repeat steps 2-7 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.8.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.8.3.4.3-1: Common Exception messages NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions APERIODIC and CSI-SINR and CSI-IM\_IMR  Table H.3.6A-2 with conditions CSI-RS and APERIODIC  Table H.3.6A-4 with condition APERIODIC |

Table 6.6.8.3.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| } |  |  |  |
| } |  |  |  |

6.6.8.3.5 Test requirement

Table 6.6.8.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.8.3.5-1: CSI-RS specific test parameters for NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | CSI-RS#0 | CSI-RS#1 |
| Note1 | 1~3 | dBm/15kHz | -94.65 | |
| Note1 | 1,2 | dBm/SSB SCS | -94.65 | |
| 3 | -91.65 | |
|  | 1~3 | dB | 0 | 3 |
| CSI-RS RSRP Note2 | 1,2 | dBm/SSB SCS | -94.65 | -91.65 |
| 3 | -91.65 | -88.65 |
| Io Note2 | 1,2 | dBm/9.36 MHz | -63.69 | -61.93 |
| 3 | dBm/38.16 MHz | -57.59 | -55.84 |
|  | 1~3 | dB | 0 | 3 |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

After 80ms from the beginning of the test, the UE shall send L1-SINR report at slot 26 from the reception of DCI triggering the L1-SINR measurement. The L1-SINR report shall include the results for both CSI-RS#0 as CMR + CSI-IM#0 as IMR and CSI-RS#1 as CMR + CSI-IM#1 as IMR.

Each L1-SINR measurement report shall meet the corresponding absolute accuracy requirements in Table 6.6.8.3.5-2 for all test configurations and the corresponding relative accuracy requirements in Table 6.6.8.3.5-4 for all test configurations.

Table 6.6.8.3.5-2: L1-SINR absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |
| --- | --- |
| Normal Conditions | T1 |
| Lowest reported value (CSI-RS#1) | 43 |
| Highest reported value (CSI-RS#1) | 62 |

Table 6.6.8.3.5-3: Void

Table 6.6.8.3.5-4: L1-SINR relative accuracy requirements for the reported values for all test configurations

|  |  |
| --- | --- |
|  | T1 |
| Lowest DIFF SINR reported (CSI-RS#0) | 0 |
| Highest DIFF SINR reported (CSI-RS#0) | 6 |

For the test to pass, the ratio of successful reported values for each requirement (R1 to R3) shall be more than 90% with a confidence level of 95%. Each requirement is evaluated independently of the others.

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.

### 6.6.9 Idle Mode CA/DC Measurements

#### 6.6.9.0 Minimum conformance requirements

For a UE which supports *idleInactiveNR-MeasReport-r16* or *idleInactiveEUTRA-MeasReport-r16* the UE shall support the idle mode CA measurements on the serving cell, and carriers configured for idle mode CA/DC measurement reporting provided T331 has not expired, the serving cell is supporting idle mode CA/DC measurement reporting and the serving cell is in the validity area.

This subclause defines the requirements for the detected cell status for the idle mode CA/DC measurement when UE transitions from RRC Connected mode to Idle mode and after UE has entered Idle mode. The requirements are applicable to an NE-DC and NR carrier aggregation capable UE which has been configured with one or more of following, one or more SCells, one E-UTRAN PSCell or one or more downlink E-UTRAN SCells during the Connected mode and which supports *idleInactiveNR-MeasReport-r16* or *idleInactiveEUTRA-MeasReport-r16.* The requirements are applicable for SCell(s) and E-UTRAN FDD and TDD PSCell and SCells.

Upon releasing the connection and if the UE has been configured with idle mode CA measurement reporting, following requirements apply concerning the detected cells in Connected mode upon state transitioning to Idle mode and during Idle mode:

- A cell which is detected cell in Connected mode prior to connection release, shall remain detected after UE has entered Idle mode and during Idle mode, provided that the following conditions are met:

- The UE has been provided with a list of cells and/or carrier frequencies for early measurement reporting by dedicated RRC signalling and

- The detected cell is among the list of cells or on a carrier frequency provided for early measurement reporting, and

- The UE is provided with a valid timer T331 by dedicated RRC signalling, and

- The detected cell and SSBs remains detectable until UE reconnect to the network and transmits the early measurement report, and

- The carrier frequency of the detected cell and the carrier frequency of the serving cell are among the supported band combination of the UE.

An inter-RAT E-UTRAN cell is considered detectable according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot defined in TS 36.133 [23] Annex B.1.1 and Annex B.1.2 for a corresponding Band. An inter-frequency cell is considered detectable according to the conditions in TS 38.133 [6] Annex B.1.2 and B.1.3 for a corresponding band. An SSB of an inter-frequency cell is considered detectable according to SSB\_RP and SSB Ês/Iot defined in TS 38.133 [6] Annex B.1.2 and B.1.3 for a corresponding Band.

While T331 is running, the UE shall perform measurement on the configured inter-frequency carriers for idle mode CA/DC measurement reporting according to the UE measurement capability.

A UE which supports *idleInactiveNR-MeasReport-r16* shall support idle mode CA/DC measurements of:

- at least 7 inter-frequency carriers which are also configured for inter-frequency mobility measurements, and

- at least 7 inter-frequency carriers which are not configured for inter-frequency mobility measurements.

The UE shall be capable of monitoring a total of at least 7 inter-frequency carriers for idle mode CA/DC measurements comprising of carriers configured for inter-frequency mobility measurements and carriers not configured for inter-frequency mobility measurements.

For inter-frequency carriers configured for idle mode CA/DC measurements, if Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ the inter-frequency measurement requirements in TS 38.133 [6] clause 4.2.2.4 shall apply, where UE shall search for and measure inter-frequency layers configured for idle mode CA/DC measurements in preparation for possible reporting. If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ the UE shall search for inter-frequency layers configured for idle mode CA/DC measurements at least every Thigher\_priority\_search where Thigher\_priority\_search is described in TS 38.133 [6] clause 4.2.2.7, where UE shall search for and measure inter-frequency layers configured for idle mode CA/DC measurements in preparation for possible reporting.

For UE supporting *idleInactiveNR-MeasBeamReport-r16*, if the UE is configured with *beamMeasConfigIdle-r16* for idle mode CA/DC measurement, the UE shall be capable of performing SS-RSRP, SS-RSRQ for at least

- 7 SSBs with different SSB index and/or PCI on an inter-frequency layer in FR1,

- 10 SSBs with different SSB index and/or PCI on an inter-frequency layer in FR2.

For UE supporting *idleInactiveNR-MeasBeamReport-r16*, if the UE is configured with *beamMeasConfigIdle-r16* for idle mode CA/DC measurement, the UE shall be able to acquire the SSB index for a newly detectable inter-RAT NR cell and perform RSRP/RSRQ measurement within the requirements defined in TS 38.133 [6] clause 4.2.2.4 plus TSSB\_index,NR, where TSSB\_index,NR is the additional time period used to acquire the index of the SSB being measured as defined in table 4.4.2.2-1.

Table 6.6.9.0-1: TSSB\_index,NR\_Inter

|  |  |  |  |
| --- | --- | --- | --- |
| DRX cycle length [s] | Scaling Factor (N1) | | TSSB\_index,NR\_Inter [s] (number of DRX cycles) |
|  | FR1 | FR2Note1 |  |
| 0.32 | 1 | 8 | N2 x 1.28 x N1 x 1.5 (N2 x 4 x N1 x 1.5) |
| 0.64 |  | 5 | N2 x 1.28 x N1 (N2 x 2 x N1) |
| 1.28 |  | 4 | N2 x 1.28 x N1 (N2 x 1 x N1) |
| 2.56 |  | 3 | N2 x 2.56 x N1 (N2 x 1 x N1) |
| Note 1: Applies for UE supporting power class 2&3&4. For UE supporting power class 1, N1 = 8 for all DRX cycle length.  NOTE 2: N2 = 3 if the NR inter-frequency carrier for idle mode CA/DC measurement reporting is in FR1, and N2 = 5 if the NR inter-frequency carrier for idle mode CA/DC measurement reporting is in FR2. | | | |

In the absence or expiration of T331, it is up to UE implementation to perform the idle mode CA/DC measurement.

For inter-frequency carriers configured for idle mode CA/DC measurements, the UE shall be capable of performing SS-RSRP and SS-RSRQ measurements of the carriers, and the UE physical layer shall be capable of reporting SS-RSRP and SS-RSRQ measurements of the carriers configured for idle mode CA/DC measurements to higher layers, with measurement accuracy as specified in clauses [38.133] and [38.133], respectively.

The UE shall be able to report idle mode CA/DC measurements when idle mode CA/DC measurement reporting is requested by the network.

The UE shall measure the RSRP and RSRQ level of the serving cell and evaluate the cell selection criterion S defined in clause 4.2.2.2 and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements of the serving cell to higher layers, with measurement accuracy as specified in TS 38.133 [6] clauses 10.1.2B, 10.1.3B, 10.1.7B and 10.1.8B.

#### 6.6.9.1 NR SA FR1 Idle mode CA/DC measurement for FR1

6.6.9.1.1 Test purpose

The purpose of this test is to verify that the UE performs the required measurements on the serving cell and the configured inter-frequency carrier for idle mode measurement reporting after the UE has entered Idle mode. This test will partly verify the Idle mode CA/DC measurements requirements in TS 38.133 [6] clause 4.4.

6.6.9.1.2 Test applicability

This test applies to all types of NR UE release 16 onwards, supporting 2DL CA and *idleInactiveNR-MeasReport-r16.*

6.6.9.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.9.0.

The normative reference for this requirement is TS 38.133 [6] clause 4.4and A.6.6.9.1

6.6.9.1.4 Test description

6.6.9.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.9.1.4.1-1.

Table 6.6.9.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| **Test Case ID** | **Description** |
| 6.6.9.1-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.9.1-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.9.1-3 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: Target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Test environment parameters are given in Table 6.6.9.1.4.1-2.

Table 6.6.9.1.4.1-2: Initial conditions for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.9.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2 |
| Connection Diagram | TE Part | A.3.1.8.3 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram |  | |  |

1. The general test parameter settings are set up according to Table 6.6.9.1.4.1-3.

2. Message contents are defined in clause 6.6.9.1.4.3.

3. The test scenario comprises of two NR Cells. NR Cell 1 is the cell used for connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.9.1.4.1-3: General test parameters for SA Idle mode CA/DC measurement for FR1

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

6.6.9.1.4.2 Test procedure

Two cells are deployed in the test, one FR1 NR PCell (Cell 1) on RF channel 1 and an FR1 NR neighbour cell (Cell 2) on RF channel 2. The test consists of 3 successive time periods, with time duration of T1, T2, and T3 respectively. During T1, UE is connected to Cell 1 and has not any timing information about Cell 2. UE is configured with early measurement reporting with channel 2. Beam level reporting for early measurements is not configured.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.9.1.5-1. T1 starts.

3. When T1 expires, the SS shall transmit an *RRCRelease* message including *measIdleCarrierListNR-r16* (Table 6.6.9.1.4.3-3) and switch the parameters according to T2 in Table 6.6.9.1.5-2. T2 starts.

4. Ensure the UE is in state RRC\_IDLE until T2 expires. T3 starts.

6. The SS transmits in Cell a Paging message (including PagingRecord with ue-Identity) for the UE and ensures the UE is in State RRC\_CONNECTED according to TS 38.508-1 [14]clause 4.5.

7. During the connection setup the UE is reports *idleMeasAvailable-r16* in the *RRCSetupComplete* message.

8. TE shall send the *UEInformationRequest* message, requesting UE to provide ide mode measurements results (Table 6.6.9.1.4.3-5).

9. If UE responds with *UEInformationResponse* messagecontaining the idle mode measurement results with SS-RSRP values within the limits in Table 6.6.9.1.5-3 for configuration 1 and 2 and Table 6.6.9.1.5-4 for configuration 3, and SS-RSRQ values within the limits in Table 6.6.9.1.5-5 for configuration 1, 2 and 3, the number of passed iterations is increased by one. Otherwise, the number of failed iterations is increased by one.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.9.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.9.1.4.3-1: Common Exception messages for SA Idle mode CA/DC measurement for FR1

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |

Table 6.6.9.1.4.3-2: *SIB1* for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-28 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SIB1 ::= SEQUENCE { | |  |  |  |
| nonCriticalExtension SEQUENCE { | |  |  |  |
| idleModeMeasurementsNR-r16 | | TRUE | This field indicates that a UE that is configured for NR idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform NR idle/inactive measurements. |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.9.1.4.3-3: *RRCRelease* for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-16 | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCRelease ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcRelease SEQUENCE { | |  |  |  |
| MeasIdleConfigDedicated-r16 ::= SEQUENCE { | |  |  |  |
| measIdleCarrierListNR-r16 ::= SEQUENCE { | |  | Serving cell not included |  |
| MeasIdleCarrierNR-r161 ::= SEQUENCE { | |  |  |  |
| carrierFreq-r16 | | ARFCN value of NR channel 2 |  |  |
| ssbSubcarrierSpacing-r16 | | kHz15 | Config 1,2 |  |
|  | | kHz30 | Config 3 |  |
| frequencyBandList | | Not present |  |  |
| measCellListNR-r16 | | Not present |  |  |
| reportQuantities-r16 | | both |  |  |
| qualityThreshold-r16 | | Not present |  |  |
| ssb-MeasConfig-r16 SEQUENCE { | |  |  |  |
| nrofSS-BlocksToAverage-r16 | | Not present |  |  |
| absThreshSS-BlocksConsolidation-r16 | | Not present |  |  |
| smtc-r16 | | SSB-MTC | TS 38.508-1 [14], Table 7.3.1-3 |  |
| ssb-ToMeasure-r16 | | SSB-ToMeasure | TS 38.508-1 [14], Table 7.3.1-31 |  |
| deriveSSB-IndexFromCell-r16 | | false |  |  |
|  | | true |  | FR1\_TDD, FR2\_TDD |
| ss-RSSI-Measurement-r16 | | Not present |  |  |
| } | |  |  |  |
| beamMeasConfigIdle-r16 | | Not present |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| measIdleCarrierListEUTRA-r16 | | Not present |  |  |
| measIdleDuration-r16 | | sec300 |  |  |
| validityAreaList-r16 ::= SEQUENCE { | |  |  |  |
| ValidityArea-r16 ::= SEQUENCE { | |  |  |  |
| carrierFreq-r16 | | ARFCN value of NR channel 1 |  |  |
| validityCellList-r16 ::= SEQUENCE { | |  |  |  |
| *PCI-Range* | | PhysCellId of Cell 1 |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.9.1.4.3-4: *RRCSetupComplete* for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-22: | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCSetupComplete ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcSetupComplete SEQUENCE { | |  |  |  |
| idleMeasAvailable-r16 | | TRUE | Indication that the UE has idle/inactive measurement report available. |  |
|  | |  |  |  |
|  | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.9.1.4.3-5: *UEInformationRequest*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 14, Table 4.6.1-32A | | | |
| Information Element | | Value/remark | Comment | Condition |
| UEInformationRequest-r16 ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| ueInformationRequest-r16 SEQUENCE { | |  |  |  |
| idleModeMeasurementReq-r16 | | TRUE | UE shall report the idle/inactive measurement information, if available, to the network in the *UEInformationResponse* message. |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.9.1.4.3-6: *UEInformationResponse*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 14, Table 4.6.1-32B | | | |
| Information Element | | Value/remark | Comment | Condition |
| UEInformationResponse-r16 ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| ueInformationResponse-r16 SEQUENCE { | |  |  |  |
| measResultIdleNR-r16 ::= SEQUENCE { | |  |  |  |
| rsrp-Result-r16 | | INTEGER(0..127) | Integer value for RSRP measurements is according to Table 10.1.6.1-1 in TS 38.133 14 |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

6.6.9.1.5 Test requirements

Tables 6.6.9.1.5-1 and 6.6.9.1.5-2 define the primary level settings including test tolerances and tables 6.6.9.1.5-3, 6.6.9.1.5-4, 6.6.9.1.5-5 and 6.6.9.1.5-6 define accuracy requirements define for SA Idle mode CA/DC measurement for FR1.

Table 6.6.9.1.5-1: Cell specific test parameters for connected mode for SA Idle mode CA/DC measurement for FR1

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

Table 6.6.9.1.5-2: Cell specific test parameters for idle mode for SA Idle mode CA/DC measurement for FR1

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

Table 6.6.9.1.5-3: Absolute accuracy requirements for Cell 1 and Cell 2 SS-RSRP reported values for test configurations 1 and 2

|  |  |
| --- | --- |
| Normal Conditions | T3 |
| Lowest reported value (Cell 1) | 54 |
| Highest reported value (Cell 1) | 77 |
| Lowest reported value (Cell 2) | 47 |
| Highest reported value (Cell 2) | 70 |

Table 6.6.9.1.5-4: Absolute accuracy requirements for Cell 1 and Cell 2 SS-RSRP reported values for test configurations 3

|  |  |
| --- | --- |
| Normal Conditions | T3 |
| Lowest reported value (Cell 1) | 57 |
| Highest reported value (Cell 1) | 80 |
| Lowest reported value (Cell 2) | 50 |
| Highest reported value (Cell 2) | 73 |

Table 6.6.9.1.5-5: Absolute accuracy requirements for Cell 1 and Cell 2 SS-RSRQ reported values for test configurations 1, 2 and 3

|  |  |
| --- | --- |
| Normal Conditions | T3 |
| Lowest reported value (Cell 1) | 55 |
| Highest reported value (Cell 1) | 72 |
| Lowest reported value (Cell 2) | 51 |
| Highest reported value (Cell 2) | 67 |

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

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

After receiving the requested early measurement report, the test equipment verifies the accuracy of measurement reported for Cell 2 meets the requirements in Section 10.1.4B for SS-RSRP and 10.1.8B for SS-RSRQ and test ends.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

### 6.6.10 to 6.6.14

### 6.6.15 Idle Mode inter-RAT CA/DC Measurements

#### 6.6.15.0 Minimum conformance requirements

For a UE which supports *idleInactiveNR-MeasReport-r16* or *idleInactiveEUTRA-MeasReport-r16* the UE shall support the idle mode CA measurements on the serving cell, and carriers configured for idle mode CA/DC measurement reporting provided T331 has not expired, the serving cell is supporting idle mode CA/DC measurement reporting and the serving cell is in the validity area.

This subclause defines the requirements for the detected cell status for the idle mode CA/DC measurement when UE transitions from RRC Connected mode to Idle mode and after UE has entered Idle mode. The requirements are applicable to an NE-DC and NR carrier aggregation capable UE which has been configured with one or more of following, one or more SCells, one E-UTRAN PSCell or one or more downlink E-UTRAN SCells during the Connected mode and which supports *idleInactiveNR-MeasReport-r16* or *idleInactiveEUTRA-MeasReport-r16.* The requirements are applicable for SCell(s) and E-UTRAN FDD and TDD PSCell and SCells.

Upon releasing the connection and if the UE has been configured with idle mode CA measurement reporting, following requirements apply concerning the detected cells in Connected mode upon state transitioning to Idle mode and during Idle mode:

- A cell which is detected cell in Connected mode prior to connection release, shall remain detected after UE has entered Idle mode and during Idle mode, provided that the following conditions are met:

- The UE has been provided with a list of cells and/or carrier frequencies for early measurement reporting by dedicated RRC signalling and

- The detected cell is among the list of cells or on a carrier frequency provided for early measurement reporting, and

- The UE is provided with a valid timer T331 by dedicated RRC signalling, and

- The detected cell and SSBs remains detectable until UE reconnect to the network and transmits the early measurement report, and

- The carrier frequency of the detected cell and the carrier frequency of the serving cell are among the supported band combination of the UE.

An inter-RAT E-UTRAN cell is considered detectable according to RSRP, RSRP Ês/Iot, SCH\_RP and SCH Ês/Iot defined in TS 36.133 [23] Annex B.1.1 and Annex B.1.2 for a corresponding Band. An inter-frequency cell is considered detectable according to the conditions in TS 38.133 [6] Annex B.1.2 and B.1.3 for a corresponding band. An SSB of an inter-frequency cell is considered detectable according to SSB\_RP and SSB Ês/Iot defined in TS 38.133 [6] Annex B.1.2 and B.1.3 for a corresponding Band.

The UE shall measure the RSRP and RSRQ level of the serving cell and evaluate the cell selection criterion S defined in clause 4.2.2.2 and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements of the serving cell to higher layers, with measurement accuracy as specified in TS 38.133 [6] clauses 10.1.2B, 10.1.3B, 10.1.7B and 10.1.8B.

While T331 is running, the UE shall perform measurement on the configured inter-RAT carriers for idle mode CA/DC measurement reporting according to the UE measurement capability.

A UE which supports *idleInactiveEUTRA-MeasReport-r16* shall support idle mode DC measurements of:

- at least 7 E-UTRAN inter-RAT carriers which are also configured for E-UTRAN inter-RATmobility measurements, and

- at least 1 E-UTRAN inter-RAT carrier which is not configured for E-UTRAN inter-RAT mobility measurements.

The UE shall be capable of monitoring a total of at least 7 inter-RAT carriers for idle mode CA/DC measurements comprising of carriers configured for inter-RAT mobility measurements and carriers not configured for inter-RAT mobility measurements.

For inter-RAT carriers configured for idle mode CA/DC measurements, if Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ the inter-RAT measurement requirements in TS 38.133 [6] clause 4.2.2.5 shall apply, where UE shall search for and measure inter-RAT layers configured for idle mode CA/DC measurements in preparation for possible reporting. If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ the UE shall search for inter-RAT layers configured for idle mode CA/DC measurements at least every Thigher\_priority\_search where Thigher\_priority\_search is described in TS 38.133 [6] clause 4.2.2, where UE shall search for and measure inter-RAT layers configured for idle mode CA/DC measurements in preparation for possible reporting.

For overlapping inter-RAT carriers configured for idle mode CA/DC measurements, the UE shall be capable of performing RSRP and RSRQ measurements of the carriers, and the UE physical layer shall be capable of reporting RSRP and RSRQ measurements of the carriers configured for idle mode CA/DC measurements to higher layers, with measurement accuracy as specified in TS 36.133 [23] clauses in 9.1.3B.3 and 9.1.6B.2, respectively.

The UE shall be able to report idle mode CA measurements when idle mode CA measurement reporting is requested by the network.

#### 6.6.15.1 NR SA FR1 Idle Mode measurements of inter-RAT CA candidate cells for early reporting

6.6.15.1.1 Test purpose

The purpose of this test is to verify that the UE properly retains the detected cell status for the idle mode CA/DC measurement when UE transitions from RRC Connected mode to Idle mode, when the UE has entered Idle mode. Additionally, test that the UE performs the required measurements on the serving cell and the configured inter-RAT carrier for idle mode measurement reporting. This test will partly verify the Idle mode CA measurements in TS 38.133 [6] clause 4.4. In the test, connected mode DRX configuration is not configured in either PCell or PSCell.

Additionally, the purpose of this test is to verify that the SS-RSRP, SS-RSRQ, RSRP and RSRQ measurement accuracy is within the specified limits. This test will verify the accuracy requirements in TS 38.133 [6] clauses 10.1.2B and 10.1.7B for intra-frequency measurements and clause 10.2.4 and 10.2.5 for the inter-RAT measurements.

6.6.15.1.2 Test applicability

This test applies to all types of NR UE release 16, supporting NE-DC and *idleInactiveEUTRA-MeasReport-r16.*

6.6.15.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.5.15.0.

The normative reference for this requirement is TS 38.133 [6] clauses 4.4, 10.1.2B, 10.1.7B, 10.2.4 and 10.2.5 and A.6.6.15

6.6.15.1.4 Test description

6.6.15.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.15.1.4.1-1.

Table 6.6.15.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.6.15.1-1 | FR1 FDD SSB SCS 15kHz BW 10MHz – LTE FDD 10MHz |
| 6.6.15.1-2 | FR1 FDD SSB SCS 15kHz BW 10MHz – LTE TDD 10MHz |
| 6.6.15.1-3 | FR1 TDD SSB SCS 30kHz BW 40MHz – LTE FDD 10MHz |
| 6.6.15.1-4 | FR1 TDD SSB SCS 30kHz BW 40MHz – LTE TDD 10MHz |
| Note 1: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.6.15.1.4.1-2.

Table 6.6.15.1.4.1-2: Initial conditions for Idle Mode measurements of inter-RAT DC candidate cells for early reporting

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.15.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2 |
| Connection Diagram | TE Part | A.3.1.8.3 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram |  | |  |

1. The general test parameter settings are set up according to Table 6.6.15.1.4.1-3 and Table 6.6.15.1.4.1-4.

2. Message contents are defined in clause 6.6.15.1.4.3.

3. The test scenario comprises of two NR Cells. (Cell 1 and Cell 2). Cell 1 is configured according to Annex C.1.2 and C.1.3.

Table 6.6.15.1.4.1-3: General test parameters for Idle Mode measurements of inter-RAT DC candidate cells for early reporting

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2 | Two radio channels are used for this test |
| Active PCell |  | Cell 1 | PCell on RF channel number 1 in FR1 |
| PSCell |  | Cell 2 | PSCell on RF channel number 2 in LTE. Cell 2 is of higher priority. |
| DRX |  | OFF | For both PCell and PSCell once configured |
| PRACH configuration in Cell 2 |  | PRACH\_2CE | PRACH configuration as specified in Clause A.3.16 in TS 36.133 |
| T331 | s | 300 |  |
| CSI reporting periodicity and offset configuration for Cell 2 | ms | 2 |  |
| T1 | s | 0.5 | During this time the PCell is known and PSCell is configured. |
| T2 | s | 0.5 | PSCell access. |
| T3 + T4 | s | 66 | During this time the UE is configured to perform inter-RAT measurements in idle mode on the PSCell carrier. |
| T5 | s | 0.5 | UE is paged and connection is setup. Network requests measurement report from the UE. |

Table 6.6.15.1.4.1-4: General idle mode test parameters for Idle Mode measurements of inter-RAT DC candidate cells for early reporting

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Serving cell |  | 1, 2, 3, 4 | Cell1 | The UE camps on cell 1 which is the former PCell. |
| Neighbour cell |  | 1, 2, 3, 4 | Cell2 | The UE shall perform inter-RAT measurements on cell 2 which is the former PSCell. |
| RF Channel Number |  | 1, 2, 3, 4 | 1, 2 |  |
| Time offset between cells |  | 1, 2, 3, 4 | 3 μs | Synchronous cells |
| Access Barring Information | - | 1, 2, 3,4 | Not Sent | No additional delays in random access procedure. |
| SSB configuration |  | 1, 2 | SSB.1 FR1 | Serving cell |
| 3, 4 | SSB.2 FR1 | Serving cell |
| SMTC configuration Serving cell |  | 1, 2, 3, 4 | SMTC.2 |  |
| DRX cycle length | s | 1, 2, 3, 4 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index |  | 1, 2, 3, 4 | 190 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell |  | 1, 2, 3, 4 | Not configured |  |
| T3 | s | 1, 2, 3, 4 | 0.5 | T3 needs to be defined so that cell measurement time is taken into account. |
| T4 | s | 1, 2, 3, 4 | 65 | T4 needs to be defined so that cell measurement time is taken into account. |

6.6.15.1.4.2 Test procedure

Two cells are deployed in the test, cell 1, which is the PCell in connected, and serving cell in idle mode, on radio channel 1 in FR1, and cell 2, which is the PSCell in connected, and measured LTE inter-RAT cell in idle mode, on radio channel 2 in LTE. The test consists of 5 successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. During T1 cell 2, the PSCell, shall be configured.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.
2. The SS shall set the parameters according to Table 6.6.15.1.5-1 and Table 6.6.15.1.5-2 as appropriate. T1 starts.
3. The SS then shall transmit RRCReconfiguration message with condition NE-DC according to TS 38.508-1 [6] Table 4.6.1-13 to add E-UTRA cell (PSCell).
4. The UE shall transmit an RRCReconfigurationComplete message.
5. The UE shall send a PRACH to PSCell during T1.
6. After the UE has transmitted the random-access preamble on the PSCell, the SS shall set T2 parameters according to Table 6.6.15.1.5-1 and Table 6.6.15.1.5-2 as appropriate. T2 starts.
7. After T2, the SS shall set T3 parameters according to Table 6.6.15.1.5-1 and Table 6.6.15.1.5-2 as appropriate and send the RRCRelease. T3 starts.
8. During the time periods T3 and T4 the UE is in Idle mode configured to perform inter-RAT idle mode CA/DC measurements on Cell 2. The UE shall not perform reselection.
9. After T3 is expired, the SS shall set T4 parameters according to Table 6.6.15.1.5-1 and Table 6.6.15.1.5-2 as appropriate. T4 starts.
10. After T4 expires the SS shall set T5 parameters according to Table 6.6.15.1.5-1 and Table 6.6.15.1.5-2 as appropriate, T5 starts.
11. The SS transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity). During the connection setup the UE is reports *idleMeasAvailable-r16* in the *RRCSetupComplete* message.
12. The SS shall send the *UEInformationRequest* message, requesting UE to report idle mode CA/DC measurements.
13. If UE responds with *UEInformationResponse* messagecontaining the idle mode measurement results with SS-RSRP values within the limits in Table 6.6.15.1.5-3 for configuration 1 and 2 and Table 6.6.15.1.5-4 for configuration 3, and SS-RSRQ values within the limits in Table 6.6.15.1.5-5 for configuration 1, 2 and 3, the number of passed iterations is increased by one. Otherwise, the number of failed iterations is increased by one.
14. If paging in step 11 succeeds, go to step 15, otherwise switch off the UE.
15. Switch on the UE and ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR with Connected without release On according to TS 38.508-1 [14] clause 4.5.
16. Repeat step 2-15 until a test verdict has been achieved.

6.6.15.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.6.15.1.4.3-1: Common Exception messages for

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |

Table 6.6.15.1.4.3-2: *SIB1* for NR SA FR1 Idle mode CA/DC measurement of inter-RAT DC candidate cells for early reporting

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-28 | | | |
| Information Element | | Value/remark | Comment | Condition |
| SIB1 ::= SEQUENCE { | |  |  |  |
| nonCriticalExtension SEQUENCE { | |  |  |  |
| idleModeMeasurementsEUTRA-r16 | | TRUE | This field indicates that a UE that is configured for EUTRA idle/inactive measurements shall perform the measurements while camping in this cell and report availability of these measurements when establishing or resuming a connection in this cell. If absent, a UE is not required to perform EUTRA idle/inactive measurements. |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.15.1.4.3-3: *RRCRelease* for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-16 | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCRelease ::= SEQUENCE { | |  |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcRelease SEQUENCE { | |  |  |  |
| MeasIdleConfigDedicated-r16 ::= SEQUENCE { | |  |  |  |
| measIdleCarrierListNR-r16 ::= SEQUENCE { | | Not present |  |  |
| measIdleCarrierListEUTRA-r16 ::= SEQUENCE { | |  |  |  |
| MeasIdleCarrierEUTRA-r16 ::= SEQUENCE { | |  |  |  |
| carrierFreqEUTRA-r16 | | ARFCN value of Cell 2 |  |  |
| EUTRA-AllowedMeasBandwidth | | mbw6 |  |  |
| measCellListEUTRA-r16 | | Not present |  |  |
| reportQuantitiesEUTRA-r16 | | both |  |  |
| qualityThresholdEUTRA-r16 | | Not present |  |  |
| } | |  |  |  |
| } | |  |  |  |
| measIdleDuration-r16 | | sec300 |  |  |
| validityAreaList-r16 ::= SEQUENCE { | |  |  |  |
| ValidityArea-r16 ::= SEQUENCE { | |  |  |  |
| carrierFreq-r16 | | ARFCN value of NR channel 1 |  |  |
| validityCellList-r16 ::= SEQUENCE { | |  |  |  |
| PCI-Range | | PhysCellId of Cell 1 |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.15.1.4.3-4: *RRCSetupComplete* for SA Idle mode CA/DC measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.1-22: | | | |
| Information Element | | Value/remark | Comment | Condition |
| RRCSetupComplete ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| rrcSetupComplete SEQUENCE { | |  |  |  |
| idleMeasAvailable-r16 | | TRUE | Indication that the UE has idle/inactive measurement report available. |  |
|  | |  |  |  |
|  | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.15.1.4.3-5: *UEInformationRequest*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 14, Table 4.6.1-32A | | | |
| Information Element | | Value/remark | Comment | Condition |
| UEInformationRequest-r16 ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| ueInformationRequest-r16 SEQUENCE { | |  |  |  |
| idleModeMeasurementReq-r16 | | TRUE | UE shall report the idle/inactive measurement information, if available, to the network in the *UEInformationResponse* message. |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

Table 6.6.15.1.4.3-6: *UEInformationResponse*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 14, Table 4.6.1-32B | | | |
| Information Element | | Value/remark | Comment | Condition |
| UEInformationResponse-r16 ::= SEQUENCE { | |  |  |  |
| rrc-TransactionIdentifier | | RRC-TransactionIdentifier |  |  |
| criticalExtensions CHOICE { | |  |  |  |
| ueInformationResponse-r16 SEQUENCE { | |  |  |  |
| measResultIdleEUTRA-r16 ::= SEQUENCE { | |  |  |  |
| measResultsPerCarrierListIdleEUTRA-r16 SEQUENCE | |  |  |  |
| carrierFreqEUTRA-r16 | | ARFCN of Cell 2 |  |  |
| measResultsPerCellListIdleEUTRA-r16 SEQUENCE | |  |  |  |
| rsrp-ResultEUTRA-r16 | | INTEGER (0..97) |  |  |
| rsrq-ResultEUTRA-r16 | | INTEGER (-30..46) |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |
| } | |  |  |  |

6.6.15.1.5 Test requirements

Tables 6.6.15.1.5-1 and 6.6.15.1.5-2 define the primary level settings including test tolerances and tables 6.6.15.1.5-3, 6.6. 15.1.5-4, 6.6. 15.1.5-5 and 6.6.15.1.5-6 define accuracy requirements define for Idle mode CA/DC measurement.

Table 6.6.15.1.5-1: Cell specific test parameters for NR cell for Idle Mode measurements of inter-RAT DC candidate cells for early reporting

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Test 1 | | | | | | | | | | |
| Cell 1 | | | | | | | | | | |
| T1 | T2 | T3 | | | | T4 | | | | T5 |
| AoA setup |  | 1,2,3,4 | N/A | | | | | | | | | | |
| Assumption for UE beams Note 5  R: Rough |  | 1,2,3,4 | N/A | N/A | R | | | | R | | | | N/A |
| Frequency Range |  | 1,2,3,4 | FR1 | | | | | | | | | | |
| Duplex mode |  | 1, 2 | FDD | | | | | | | | | | |
| 3, 4 | TDD | | | | | | | | | | |
| TDD Configuration  1: TDDConf.1.1  2: TDDConf.2.1 |  | 1,2 | - | | | | | | | | | | |
|  | 3,4 | 1 | 1 | 2 | | | | 2 | | | | 1 |
| BWchannel  1: 10: NRB,c = 52  2: 40: NRB,c = 106 | MHz | 1, 2 | 1 | 1 | - | | | | - | | | | 1 |
| 3, 4 | 2 | 2 | - | | | | - | | | | 2 |
| Initial Downlink BWP configuration |  | 1,2,3,4 | DLBWP.0.1 | | | | | | | | | | |
| Initial Uplink BWP configuration |  | 1,2,3,4 | ULBWP.0.1 | | | | | | | | | | |
| Dedicated Downlink BWP configuration  1: DLBWP.1.1 |  | 1,2,3,4 | 1 | 1 | - | | | - | | | | | 1 |
| Dedicated Uplink BWP configuration  1: ULBWP.1.1 |  | 1,2,3,4 | 1 | 1 | - | | | - | | | | | 1 |
| PDSCH Reference Measurement Channel  1: SR.1.1 FDD  2: SR.2.1 TDD | FDD | 1,2 | 1 | 1 | 1 | | | 1 | | | | | 1 |
| TDD | 3,4 | 2 | 2 | 2 | | | 2 | | | | | 2 |
| TRS configuration |  | 1,2,3,4 | - | | | | | | | | | | |
| TCI state |  | 1,2,3,4 | - | | | | | | | | | | |
| RMSI CORESET parameters | FDD | 1,2 | CR.1.1 FDD | | | | | | | | | | |
| TDD | 3,4 | CR.2.1 TDD | | | | | | | | | | |
| Dedicated CORESET parameters | FDD | 1,2 | CCR.1.1 FDD | | | | | | | | | | |
| TDD | 3,4 | CCR.2.1 TDD | | | | | | | | | | |
| OCNG PatternsNote1 |  | 1,2,3,4 | OP.1 defined in A.3.2.1 | | | | | | | | | | |
| SSB configuration  1: SSB.1 FR1  2: SSB.2 FR1 |  | 1,2 | 1 | | | | | | | | | | |
|  | 3,4 | 2 | | | | | | | | | | |
| SMTC configuration |  | 1,2,3,4 | SMTC.2 | | | | | | | | | | |
| Correlation Matrix and Antenna config |  | 1,2,3,4 | 1x2 Low | | | | | | | | | | |
| EPRE ratio of PSS to SSS | dB | 1,2,3,4 | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PBCH to PBCH DMRS | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PDCCH DMRS to SSS | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PDCCH to PDCCH DMRS | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PDSCH DMRS to SSS | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of PDSCH to PDSCH | 0 | 0 | - | | | - | | | | | 0 |
| EPRE ratio of OCNG DMRS to SSS | 0 | 0 | - | | | - | | | | | 0 |
| Noc Note2 | dBm/ 15kHz | 1,2 | -98 | -98 | -98 | | | -98 | | | | | -98 |
| 3,4 |  | | |  | | | | |
| Noc Note2 | dBm/SCS | 1,2 | -98 | -98 | -98 | | -98 | | | | | -98 | |
| 3,4 | -95 | -95 | -95 | | -95 | | | | | -95 | |
| Ês/Iot | dB | 1,2,3,4 | 5 | 5 | 5 | | 5 | | | | | 5 | |
| Ês/Noc | dB | 1,2,3,4 | 5 | 5 | 5 | | 5 | | | | | 5 | |
| SS-RSRPNote3,4 | dBm/SCS | 1,2 | -93 | -93 | -93 | | -93 | | | | | -93 | |
| 3,4 | -90 | -90 | -90 | | -90 | | | | | -90 | |
| IoNote3,4 | dBm/ 9.36 MHz | 1,2 | -63.85 | -63.85 | -63.85 | -63.85 | | | | | -63.85 | | |
| dBm/ 38.16 MHz | 3,4 | -57.76 | -57.76 | -57.76 | -57.76 | | | | | -57.76 | | |
| Qrxlevmin | dBm/SCS | 1, 2 | - | - | -140 | | | | | - | | | |
| dBm/SCS | 3, 4 | - | - | -137 | | | | | - | | | |
| Pcompensation | dB | 1,2,3,4 | - | - | 0 | 0 | | | | - | | | |
| Qhysts | dB | 1,2,3,4 | - | - | 0 | 0 | | | | - | | | |
| Qoffsets, n | dB | 1,2,3,4 | - | - | 0 | 0 | | | | - | | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1,2,3,4 | SS-RSRP | | | | | | | | | | |
| Treselection | s | 1,2,3,4 | - | | 0 | | | | | - | | | |
| SnonintrasearchP | dB | 1,2,3,4 | - | | Not sent | | | | | - | | | |
| SnonintrasearchQ | dB | 1,2,3,4 | - | | Not sent | | | | | - | | | |
| Threshx, high | dB | 1,2,3,4 | - | | 52 | | | | | - | | | |
| Propagation Condition | dB | 1,2,3,4 | - | | AWGN | | | | | - | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SSB\_RP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | | | | | |

Table 6.6.15.1.5-2: Cell specific test parameters for LTE cell for Idle Mode measurements of inter-RAT DC candidate cells for early reporting

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Test 1 | | | | |
| Cell 2 | | | | |
| T1 | T2 | T3 | T4 | T5 |
| Frequency Range |  | 1,2,3,4 | LTE | | | | |
| Duplex mode |  | 1, 3 | FDD | | | | |
| 2, 4 | TDD | | | | |
| BWchannel | MHz | 1,2,3,4 | 10 | 10 | - | - | 10 |
| Measurement bandwidth |  | 1,2,3,4 | - | - | 22-27 | 22-27 | - |
| PDSCH Reference Measurement Channel  1: R.1 FDD  2: R.1 TDD | FDD | 1,3 | 1 | 1 | - | - | 1 |
| TDD | 2,4 | 2 | 2 | - | - | 2 |
| PDCCH/PCFICH/PHICH Reference measurement channel defined in A.3.1.2.1 and A.3.1.2.2 in 36.133  1: R.6 FDD  2: R.6 TDD |  | 1,3 | 1 | 1 | - | - | 1 |
| 2,4 | 2 | 2 | - | - | 2 |
| OCNG Patterns defined in A.3.2.1.1 (OP.2 FDD) and A.3.2.1.2 (OP.2 TDD) in 36.133  1: OP.2 FDD  2: OP.2 TDD |  | 1,3 | 1 | | | | |
| 2,4 | 2 | | | | |
| Correlation Matrix and Antenna config |  | 1,2,3,4 | 1x2 Low | | | | |
| PBCH\_RA | dB | 1,2,3,4 | N/A | N/A | 0 | 0 | N/A |
| PBCH\_RB | N/A | N/A | 0 | 0 | N/A |
| PSS\_RA | N/A | N/A | 0 | 0 | N/A |
| SSS\_RA | N/A | N/A | 0 | 0 | N/A |
| PCFICH\_RB | N/A | N/A | 0 | 0 | N/A |
| PHICH\_RA | N/A | N/A | 0 | 0 | N/A |
| PHICH\_RB | N/A | N/A | 0 | 0 | N/A |
| PDCCH\_RA | N/A | N/A | 0 | 0 | N/A |
| PDCCH\_RB | N/A | N/A | 0 | 0 | N/A |
| PDSCH\_RA | N/A | N/A | 0 | 0 | N/A |
| PDSCH\_RB | N/A | N/A | 0 | 0 | N/A |
| OCNG\_RANote 1 | N/A | N/A | 0 | 0 | N/A |
| OCNG\_RBNote 1 | N/A | N/A | 0 | 0 | N/A |
| Noc Note2 | dBm/ 15kHz | 1,2 | -98 | -98 | -98 | -98 | -98 |
| 3,4 |  |  |
| Ês/Iot | dB | 1,2,3,4 | 5 | 5 | -3 | 8 | 5 |
| Ês/Noc | dB | 1,2,3,4 | 5 | 5 | -3 | 8 | 5 |
| RSRPNote3,4 | dBm/SCS | 1,2,3,4 | -93 | -93 | -101 | -90 | -93 |
|  |  |  |  |  |  |
| IoNote3,4 | dBm/ 9.36 MHz | 1,2, 3, 4 | -61.01 | -61.01 | -65.44 | -58.57 | -61.01 |
| Qrxlevmin | dBm/SCS | 1,2,3,4 | - | - | -140 | | - |
| Pcompensation | dB | 1,2,3,4 | - | - | 0 | 0 | - |
| Qhysts | dB | 1,2,3,4 | - | - | 0 | 0 | - |
| Qoffsets, n | dB | 1,2,3,4 | - | - | 0 | 0 | - |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1,2,3,4 | RSRP and RSRQ | | | | |
| Treselection | s | 1,2,3,4 | - | | 0 | | - |
| SnonintrasearchP | dB | 1,2,3,4 | - | | Not sent | | - |
| SnonintrasearchQ | dB | 1,2,3,4 | - | | Not sent | | - |
| Propagation Condition | dB | 1,2,3,4 | - | | AWGN | | - |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SSB\_RP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | |

Table 6.6.15.1.5-3: Absolute accuracy requirements for the Cell 1 and Cell 2 RSRP reported values for test configurations 1 and 2

|  |  |
| --- | --- |
| Normal Conditions | T5 |
| Lowest reported value (Cell 1) | 52 |
| Highest reported value (Cell 1) | 75 |
| Lowest reported value (Cell 2) | 39 |
| Highest reported value (Cell 2) | 62 |

Table 6.6.15.1.5-4: Absolute accuracy requirements for the Cell 1 and Cell 2 RSRP reported values for test configurations 3

|  |  |
| --- | --- |
| Normal Conditions | T5 |
| Lowest reported value (Cell 1) | 55 |
| Highest reported value (Cell 1) | 78 |
| Lowest reported value (Cell 2) | 39 |
| Highest reported value (Cell 2) | 62 |

Table 6.6.15.1.5-5: Absolute accuracy requirements for the Cell 1 and Cell 2 RSRQ reported values for test configurations 1, 2 and 3.

|  |  |
| --- | --- |
| Normal Conditions | T5 |
| Lowest reported value (Cell 1) | 54 |
| Highest reported value (Cell 1) | 71 |
| Lowest reported value (Cell 2) | 6 |
| Highest reported value (Cell 2) | 27 |

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

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

At the start of T5 the UE is paged for connection setup. During the connection setup the UE is requested to transmit early measurement report. The UE shall send early measurement report to the PCell including idle mode CA/DC measurement from cell 2.

After receiving the requested early measurement report, the test equipment verifies that the accuracy of measurement reported for serving Cell 1 and Cell 2 meets the requirements in Sections 10.1.2B and 10.1.7B and Sections 10.2.4 and 10.2.5, respectively and test ends.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

### 6.6.16

### 6.6.17 NR SA FR1 event triggered reporting tests with Pre-MG

6.6.17.0 Minimum conformance requirements

6.6.17.0.1 Minimum conformance requirements for event-triggered measurement with gap

[TS 38.133 [6], clause 9.2.6.2, 9.2.6.3]

When a measurement gap is provided or an activated Pre-MG is provided without any pre-MG status changed during the measurement period, the UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index. if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2 with SCS smaller or equal to 480 kHz.

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra ms

Where:

TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 6.6.17.0.1-1.

T SSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 6.6.17.0.1-2.

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in TS38.133[6] clause 9.1.5.2 for measurement conducted within measurement gaps.

Kgap is the scaling factor for a SSB frequency layer to be measured within an associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps or not supporting [concurrent measurement gaps]. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gap and per-FR measurement gap within the same FR as the SSB frequency layer, and starting from the beginning of any SMTC occasion:

-- Ntotal is the total number of SMTC occasions that are covered by instances of the associated measurement gap within the window W, including those overlapped with other measurement gap occasions within the window, and

Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W after accounting for measurement gap collisions by applying the measurement gap collision rule in section 9.1.8.3.

When concurrent measurement gaps are configured, requirements in this clause do not apply if Navailable =0.

The UE shall be able to identify a new detectable intra-frequency cell within the time period specified in TS 38.133 [6].

For a UE that supports Pre-MG, an SMTC occasion is only considered to be overlapped by Pre-MG if the Pre-MG is activated.

The normative reference for this Intra-frequency measurements with measurement gaps requirement is in TS 38.133 [6] clauses 9.2.2, 9.2.4.3 and 9.2.6.

Table 6.6.17.0.1-1: Time period for PSS/SSS detection (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600ms, 5 x Kgap x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(600ms, ceil(M2Note 1x 5 x Kgap) x max(MGRP, SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | Ceil( 5 x Kgap ) x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *intraNR-MeasurementEnhancement-r16* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell.  NOTE 3: For a UE supporting concurrent measurement gaps, if multiple concurrent gaps are configured, the MGRP is the periodicity of the MG pattern associated to the intra-frequency layer.  NOTE 4: When highSpeedMeasCA-Scell-r17 is configured, the requirements apply to UE on measurements of secondary component carrier with active SCell. | |

Table 6.6.17.0.1-2: Measurement period for intra-frequency measurements with gaps(FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_intra |
| No DRX | max(200ms, ceil(5 x Kgap )x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x 5 x Kgap) x max(MGRP, SMTC period,DRX cycle))x CSSFintra |
| DRX cycle>320ms | Ceil(5 x Kgap ) x max(MGRP, DRX cycle) x CSSFintra |
| NOTE 1: For a UE supporting concurrent gaps, if multiple concurrent gaps are configured, the MGRP is the periodicity of the MG pattern associated to the intra-frequency layer. | |

[TS 38.133 [6], clause 9.2.2]

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,

- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,

- SS-SINR related side conditions given in TS 38.133 [6] Sections 10.1.12 are fulfilled for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

[TS 38.133 [6], clause 9.2.4.3]

Reported RSRP, RSRQ, and RS-SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1 (RSRP for FR1), 10.1.7.1 (RSRQ for FR1), 10.1.12.1 (RS-SINR for FR1) and 10.1.13.1 (RS-SINR for FR2).

The UE shall not send any event triggered measurement reports as long as no reporting criteria is fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources being available for UE to send the measurement report on.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than Tidentify intra with index or T identify intra without index defined in TS 38.133 [6] clause 9.2.5.1 or clause 9.2.6.2.When L3 filtering is used an additional delay can be expected. In EN-DC and NE-DC operation, when the UE is configured to perform E-UTRA SRS carrier-based switching an additional delay can be expected in FR1 if the UE is capable of per-FR gap, or an additional delay can be expected in both FR1 and FR2 if the UE is not capable of per-FR gap.

A cell is detectable only if at least one SSBs measured from the Cell being configured remains detectable during the time period Tidentify\_intra\_without\_index or Tidentify\_intra\_with\_index as defined in TS 38.133 [6] clause 9.2.5.1 or clause 9.2.6.2. If a cell which has been detectable at least for the time period Tidentify intra without index or Tidentify intra with index defined in TS 38.133 [6] clause 9.2.5.1 or clause 9.2.6.2 becomes undetectable for a period ≤ 5 seconds and then the cell becomes detectable again with the same spatial reception parameter and triggers an event, the event triggered measurement reporting delay shall be less than TSSB\_measurement\_period\_intra provided the timing to that cell has not changed more than ± 3200/ Tc while the measurement gap has not been available and L3 filtering has not been used, where *µ* is the SCS configuration as defined in clause 4.2 of TS 38.211 [7]. When L3 filtering is used, an additional delay can be expected. In EN-DC and NE-DC operation, when the UE is configured to perform E-UTRA SRS carrier-based switching an additional delay can be expected in FR1 if the UE is capable of per-FR gap, or an additional delay can be expected in both FR1 and FR2 if the UE is not capable of per-FR gap.

#### 6.6.17.1 NR SA FR1 event triggered reporting tests with autonomous activation/deactivation Pre-MG

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.17.1.1 Test purpose

The purpose of this test is to verify that the UE makes correct measurement and corresponding event reporting. This test will partly verify the intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.6.2 and 9.2.6.3. And this test will also jointly verify pre-configured measurement gap activation/deactivation delay in TS 38.133 [6] clause 8.19.2.

6.6.17.1.2 Test applicability

This test applies to all types of NR UEs supporting 5GS NR SA FR1, BWP adaptation of at least 2 BWPs, BWP operation without bandwidth restriction, DCI and timer-based active BWP switching delay Type1 or Type2, CSI-RS-based RLM *and preconfiguredUE-AutonomousMeasGap-r17* capability from release 17 onwards.

6.6.17.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.17.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.17.1.

6.6.17.1.4 Test description

6.6.17.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.17.1.4-1.

Table 6.6.17.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 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. | |

Test environment parameters are given in Table 6.6.17.1.4.1-2.

Table 6.6.17.1.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.17.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.17.1.4.1-3.

2. Message contents are defined in clause 6.6.17.1.4.3.

3. There are three NR carriers and three cells specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.17.1.4.1-3: General test parameters for SA intra-frequency event triggered reporting with per-UE gaps for PCell in FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE gaps |  |
| Measurement gap Repetition periodicity | ms | 1, 2, 3 | 40 |  |
| Measurement gap length | ms | 1, 2, 3 | 6 |  |
| Measurement gap offset | ms | 1, 2, 3 | 39 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CSI-RS parameters |  | 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 |  |
| 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 | ms | 1, 2, 3 |  | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | 2 | 3 μs | Synchronous cells |
|  |  | 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 0.1 |  |
| T2 | s | 1, 2, 3 | 0.2 |  |
| T3 | s | 1,2, 3 | 5 |  |
| *bwp-InactivityTimer* | ms |  | 500 |  |

6.6.17.1.4.2 Test procedure

The test consists of 3 successive time periods, with durations of T1, T2, and T3, respectively.

There are two BWPs configured in Cell 1, BWP-1 which contains the cell defining SSB, and BWP-2 which does not contain any SSB of Cell 1.

PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE would have ACK/NACK sending except for the time duration when BWP is switching on Cell 1 and the time duration of T2.

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. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.17.1.4.1-3 and Table 6.6.17.1.5-1. Propagation conditions are set according to Annex C clauses C.2.2.

3. SS shall transmit an *RRCReconfiguration* message which include with Measurement configuration and 2 different UE-specific bandwidth parts for Cell 1 (PCell), BWP-1 and BWP-2.

- UE is indicated in firstActiveDownlinkBWP-Id that the active DL BWP is BWP-1 in PCell.

- Pre-MG status is assumed to be ‘deactivated’ when the BWP is active.

- BWP-1 includes bandwidth of the initial DL BWP and SSB.

- BWP-2 does not include bandwidth of the initial DL BWP and SSB.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE would have ACK/NACK sending for those PDSCHs scheduled in the slots overlapped with the pre-MG occasions in T1.

6. When T1 expires, at the start of time duration T2, the serving gNB trigger Pre-MG activation starts via the DCI format 1\_1 command for PCell DL BWP switch, is received at the UE side in PCell’s slot # denoted i. The UE shall switch its bandwidth part from BWP-1 to BWP-2. And UE is expected to complete the Pre-MG activation within the beginning of PCell’s DL slot (i+TBWPswitchDelay) + 5ms in T2 as defined in TS 38.133 [6] clause 8.6.2 and clause 8.19.2.

7. At the start of time duration T3, the SS shall switch the power setting from T2 to T3 as specified in Table 6.6.17.1.5-1.

8. The UE shall NOT be able to receive PDSCH and report corresponding ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

9. The UE shall transmit a *MeasurementReport* message triggered by Event A3. With the overall delays measured from the beginning of time period T3 is less than 802 ms.

10. After the SS receive the *MeasurementReport* message in step 9 or when T3 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

11. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

12. Depending on the choice in Step 10, the SS:  
- if the RRC Connection Release has been sent, transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5),  
Or  
- if the device has been switched off, switcheson the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.17.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.17.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ and GAP NEEDED  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5  Table H.3.1-6 with conditions Pattern #0 and Pre-CFG  Table H.3.1-7 with condition INTRA-FREQ  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.17.1.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

6.6.17.1.5 Test requirement

Table 6.6.17.1.4.1-3 and Table 6.6.17.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.17.1.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting with per-UE gaps for PCell in FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | |
|  |  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| TDD configuration |  | 1 | N/A | | | N/A | | |
|  |  | 2 | TDDConf.1.1 | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.2.1 | | | TDDConf.2.1 | | |
| Initial BWP configuration |  | 1,2,3 | DLBWP.0.1  ULBWP.0.1 | | | DLBWP.0.1  ULBWP.0.1 | | |
| BWP-1 Configuration |  | 1,2,3 | DLBWP.1.3  ULBWP.1.3 | | | N/A | | |
| BWP-2 Configuration |  | 1,2,3 | DLBWP.1.2  ULBWP.1.2 | | | N/A | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | | N/A | | |
|  |  | 2 | SR.1.1 TDD | | |  | | |
|  |  | 3 | SR.2.1 TDD | | |  | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | | CR.1.1 FDD | | |
|  |  | 2 | CR.1.1 TDD | | | CR.1.1 TDD | | |
|  |  | 3 | CR.2.1 TDD | | | CR.2.1 TDD | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | | CCR.1.1 FDD | | |
|  |  | 2 | CCR.1.2 TDD | | | CCR.1.1 TDD | | |
|  |  | 3 | CCR.2.1 TDD | | | CCR.2.1 TDD | | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | | OP.1 | | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | | N/A | | |
|  |  | 2 | TRS.1.1 TDD | | | N/A | | |
|  |  | 3 | TRS.1.2 TDD | | | N/A | | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | | DLBWP.0.1 ULBWP.0.1 | | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | | DLBWP.1.1 | | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | | ULBWP.1.1 | | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | | SSB | | |
| Note 2 | dBm/SCS | 1 | -98 | | | | | |
|  |  | 2 | -98 | | | | | |
|  |  | 3 | -95 | | | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | | | |
|  |  | 2 |  | | | | | |
|  |  | 3 |  | | | | | |
|  | dB | 1 | 4 | | -1.46 | -Infinity | | -1.46 |
|  |  | 2 |  | |  |  | |  |
|  |  | 3 |  |  | |  |
|  | dB | 1 | 4 | | 4 | -Infinity | | 4 |
|  |  | 2 |  | |  |  | |  |
|  |  | 3 |  |  | |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94 | | -94 | -Infinity | | -94 |
|  |  | 2 | -94 | | -94 | -Infinity | | -94 |
|  |  | 3 | -91 | | -91 | -Infinity | | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | | -62.25 | -64.60 | | -62.25 |
|  | dBm/9.36 MHz | 2 | -64.60 | | -62.25 | -64.60 | | -62.25 |
|  | dBm/38.16 MHz | 3 | -58.50 | | -56.16 | -58.50 | | -56.16 |
| 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. | | | | | | | | |

During T1,

The UE shall report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

During T2,

The UE is expected to complete the Pre-MG activation within the beginning of PCell’s DL slot (i+TBWPswitchDelay) + 5ms in T2 as defined in TS 38.133 [6] clause 8.6.2 and clause 8.19.2.

During T3,

The UE shall NOT be able to receive PDSCH and report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

The UE shall send one Event A3 triggered measurement report, with a overall measurement reporting delay less than 802ms from the beginning of time period T3.

NOTE: this gives a total of 800 ms for measurement reporting delay plus 2 ms for 2xTTIDCCH insertion uncertainty.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra

TPSS/SSS\_sync\_intra = 600 ms

TSSB\_measurement\_period\_intra = 200 ms

TTI insertion uncertainty = 2 ms

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

#### 6.6.17.2 NR SA FR1 event triggered reporting tests with pre-configured measurement gaps and network-controlled activation/deactivation

Editor's Note: This test case is incomplete in following aspects:

* Pre-MG configuration is missing in Message contents
* TT analysis is missing.

6.6.17.2.1 Test purpose

The purpose of this test is to verify that the UE correctly activates and deactivates the pre-MG and makes correct measurement and reporting of an event with activated and deactivated pre-MG. This test will partly verify the pre-MG activation and deactivation delay requirements in TS 38.133 [6] clause 8.19.2 and the intra-frequency cell search requirements in TS 38.133 [6] clause 9.2.6.2 and 9.3.4.

6.6.17.2.2 Test applicability

This test applies to all types of NR UEs supporting 5GS NR SA FR1, BWP adaptation of at least 2 BWPs, BWP operation without bandwidth restriction, DCI and timer-based active BWP switching delay Type1 or Type2, CSI-RS-based RLM *an*d *preconfiguredNW-ControlledMeasGap-r17* capability from release 17 onwards.

6.6.17.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.17.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.17.2.

6.6.17.2.4 Test description

6.6.17.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.17.2.4-1.

Table 6.6.17.2.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 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. | |

Test environment parameters are given in Table 6.6.17.2.4.1-2.

Table 6.6.17.2.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.17.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.17.2.4.1-3.

2. Message contents are defined in clause 6.6.17.2.4.3.

3. There are three NR carriers and three cells specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.17.2.4.1-3: General test parameters for SA intra-frequency event triggered reporting with with pre-configured measurement gaps and network-controlled activation/deactivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| 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 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| CSI-RS parameters |  | 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 |  |
| 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 | ms | 1, 2, 3 |  | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | 2 | 3 μs | Synchronous cells |
|  |  | 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 0.1 |  |
| T2 | s | 1, 2, 3 | 0.1 |  |
| T3 | s | 1, 2, 3 | 5 |  |

6.6.17.2.4.2 Test procedure

The test consists of 3 successive time periods, with durations of T1, T2, and T3, respectively.

There are two BWPs configured in Cell 1, BWP-1 which contains the cell defining SSB, and BWP-2 which does not contain any SSB of Cell 1.

PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE would have ACK/NACK sending except for the time duration when BWP is switching on Cell 1 and the time duration of T2.

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. 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. A pre-MG is configured before the test.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.17.2.4.1-3 and Table 6.6.17.2.5-1. Propagation conditions are set according to Annex C clauses C.2.2.

3. SS shall transmit an *RRCReconfiguration* message which include with Measurement configuration and 2 different UE-specific bandwidth parts for Cell 1 (PCell), BWP-1 and BWP-2.

- UE is indicated in firstActiveDownlinkBWP-Id that the active DL BWP is BWP-1 in PCell.

- BWP-1 includes bandwidth of the initial DL BWP and SSB with preConfGapStatus for BWP-1 is set to ‘0’ as ‘deactivated’.

- BWP-2 does not include bandwidth of the initial DL BWP and SSB with preConfGapStatus for BWP-2 is set to ‘1’ as ‘activated’.

4. The UE shall transmit RRCReconfigurationComplete message. T1 starts.

5. PDCCHs indicating new transmissions shall be sent continuously on Cell 1 to ensure that the UE would have ACK/NACK sending for those PDSCHs scheduled in the slots overlapped with the pre-MG occasions in T1.

6. When T1 expires, at the start of time duration T2, the serving gNB trigger Pre-MG activation starts via the DCI format 1\_1 command for PCell DL BWP switch, is received at the UE side in PCell’s slot # denoted i. The UE shall switch its bandwidth part from BWP-1 to BWP-2. And UE is expected to complete the Pre-MG activation within the beginning of PCell’s DL slot (i+TBWPswitchDelay) + 5ms in T2 as defined in TS 38.133 [6] clause 8.6.2 and clause 8.19.2.

7. At the start of time duration T3, the SS shall switch the power setting from T2 to T3 as specified in Table 6.6.17.2.5-1.

8. The UE shall NOT be able to receive PDSCH and report corresponding ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

9. The UE shall transmit a MeasurementReport message triggered by Event A3. With the overall delays measured from the beginning of time period T3 is less than 802 ms.

10. After the SS receive the MeasurementReport message in step 9 or when T3 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

11. Set NR Cell 2 physical cell identity = ((current NR cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

12. Depending on the choice in Step 10, the SS:

- if the RRC Connection Release has been sent, transmits in NR Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
Or   
- if the device has been switched off, switcheson the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5.

13. Repeat step 2-12 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.17.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.17.2.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ and GAP NEEDED  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5  Table H.3.1-6 with conditions Pattern #0 and Pre-CFG  Table H.3.1-7 with condition INTRA-FREQ  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.17.2.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

6.6.17.2.5 Test requirement

Table 6.6.17.2.4.1-3 and Table 6.6.17.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.17.2.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting with per-UE gaps for PCell in FR1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | Cell 2 | | |
|  |  |  | T1 | T2 | T3 | | T1 | T2 | T3 |
| TDD configuration |  | 1 | N/A | | | | N/A | | |
|  |  | 2 | TDDConf.1.1 | | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.2.1 | | | | TDDConf.2.1 | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | | | N/A | | |
|  |  | 2 | SR.1.1 TDD | | | |  | | |
|  |  | 3 | SR.2.1 TDD | | | |  | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | | | N/A | | |
|  |  | 2 | CR.1.1 TDD | | | | N/A | | |
|  |  | 3 | CR.2.1 TDD | | | | N/A | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | | | N/A | | |
|  |  | 2 | CCR.1.2 TDD | | | | N/A | | |
|  |  | 3 | CCR.2.1 TDD | | | | N/A | | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | | | OP.1 | | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | | | N/A | | |
|  |  | 2 | TRS.1.1 TDD | | | | N/A | | |
|  |  | 3 | TRS.1.2 TDD | | | | N/A | | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | | | N/A | | |
| Active DL BWP configuration for BWP-1 |  | 1, 2, 3 | DLBWP.1.3 | | | | N/A | | |
| Active UL BWP configuration for BWP-1 |  | 1, 2, 3 | ULBWP.1.3 | | | | N/A | | |
| Active DL BWP configuration for BWP-2 |  | 1, 2, 3 | DLBWP.1.2 | | | | N/A | | |
| Active UL BWP configuration for BWP-2 |  | 1, 2, 3 | ULBWP.1.2 | | | | N/A | | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | | | N/A | | |
| Note 2 | dBm/SCS | 1 | -98 | | | | | | |
|  |  | 2 | -98 | | | | | | |
|  |  | 3 | -95 | | | | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | | | | |
|  |  | 2 |  | | | | | | |
|  |  | 3 |  | | | | | | |
|  | dB | 1,2,3 | -1.46 | 4 | | -1.46 | -Infinity | -Infinity | -1.46 |
|  | dB | 1,2,3 | 4 | 4 | | 4 | -Infinity | -Infinity | 4 |
| SS-RSRP Note 3 | dBm/SCS kHz | 1,2 | -94 | -94 | | -94 | -Infinity | -Infinity | -94 |
|  |  | 3 | -91 | -91 | | -91 | -Infinity | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1,2 | -64.60 | -64.60 | | -62.25 | -64.60 | -64.60 | -62.25 |
|  | dBm/38.16 MHz | 3 | -58.50 | -58.50 | | -56.16 | -58.50 | -58.50 | -56.16 |
| 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 and T4.  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. | | | | | | | | | |

During T1,

The UE shall report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

During T2,

The UE is expected to complete the Pre-MG activation within the beginning of PCell’s DL slot (i+TBWPswitchDelay) + 5ms in T2 as defined in TS 38.133 [6] clause 8.6.2 and clause 8.19.2.

During T3,

The UE shall NOT be able to receive PDSCH and report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots overlapped with the Pre-MG occasions.

The UE shall send one Event A3 triggered measurement report, with an overall measurement reporting delay less than 802ms from the beginning of time period T3.

NOTE: this gives a total of 800 ms for measurement reporting delay plus 2 ms for 2xTTIDCCH insertion uncertainty.

The overall delays measured test requirement is expressed as:

Overall delays measured = measurement reporting delay + TTI insertion uncertainty

Measurement reporting delay = Tidentify\_intra\_without\_index

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + TSSB\_measurement\_period\_intra

TPSS/SSS\_sync\_intra = 600 ms

TSSB\_measurement\_period\_intra = 200 ms

TTI insertion uncertainty = 2 ms

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

### 6.6.18 SA event triggered reporting tests with concurrent gaps

#### 6.6.18.0 Minimum conformance requirements

##### 6.6.18.0.1 Minimum conformance requirements for Intra-frequency measurement

The UE shall be able to identify a new detectable intra-frequency cell within the time period specified in TS 38.133 [6].

Intra-frequency measurements without measurement gaps:

When UE supports *concurrentMeasGap-r17* and is configured with concurrent measurement gaps,

Kp is the scaling factor for an SSB frequency layer to be measured without measurement gaps. Kp = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

- For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gap and/or per-FR measurement gap within the same FR as the SSB frequency layer, and starting from the beginning of any SMTC occasion:

- Ntotal is the total number of SMTC occasions within the window, including those overlapped with measurement gap occasions within the window, and

- Navailable is the number of SMTC occasions that are not overlapped with any non-dropped MG occasion within the window W, after accounting for measurement gap collisions by applying the measurement gap collision rule in TS 38.133 [6] section 9.1.8.3.

Kp = 1 when Navailable = 0.

- Otherwise, when UE is not configured with or UE does not support concurrent measurement gaps:

When intra-frequency SMTC is fully non overlapping with measurement gaps or intra-frequency SMTC is fully overlapping with MGs, Kp =1

When intra-frequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP. When intra-frequency SMTC is partially overlapping with the ML of NCSG, Kp = 1/(1- (SMTC period /VIRP)), where SMTC period < VIRP. For calculation of Kp, if the high layer signalling (TS 38.331 [13]) of *smtc2* is configured, for cells indicated in the *pci-List* parameter in *smtc2*, the SMTC periodicity corresponds to the value of higher layer parameter *smtc2*; for the other cells, the SMTC periodicity corresponds to the value of higher layer parameter *smtc1.*

If the higher layer signalling in TS38.331 [13] signalling of *smtc2* is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, time period requirements are not specified to identify a new detectable intra-frequency cell.

Intra-frequency measurements with measurement gaps:

Kgap is the scaling factor for a SSB frequency layer to be measured within an associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps or not supporting [concurrent measurement gaps]. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE measurement gap and per-FR measurement gap within the same FR as the SSB frequency layer, and starting from the beginning of any SMTC occasion:

- Ntotal is the total number of SMTC occasions that are covered by instances of the associated measurement gap within the window W, including those overlapped with other measurement gap occasions within the window, and

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W after accounting for measurement gap collisions by applying the measurement gap collision rule in TS 38.133 [6] section 9.1.8.3.

When concurrent measurement gaps are configured, requirements in this clause do not apply ifNavailable =0.

If the higher layer signalling in TS 38.331 [13] of *smtc2* is present and smtc1 is fully overlapping with measurement gaps and smtc2 is partially overlapping with measurement gaps, time period requirements are not specified for identify a new detectable intra-frequency cell.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.3, 9.2.5 and 9.2.6.

##### 6.6.18.0.2 Minimum conformance requirements for Inter-frequency measurement

The UE shall be able to identify a new detectable inter-frequency cell within the time period specified in TS 38.133 [6].

Inter-frequency measurements without measurement gaps:

When UE supports *concurrentMeasGap-r17* and is configured with concurrent measurement gaps,

Kp is a scaling factor for an SSB frequency layer to be measured without measurement gaps. Kp = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

For a window W of duration max(SMTC period, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE MG and per-FR MG within the same FR as the SSB frequency layer, and starting at the beginning of any SMTC occasion:

Ntotal is the total number of SMTC occasions within the window, including those overlapped with MG occasions within the window, and

Navailable is the number of SMTC occasions that are not overlapped with any MG occasion within the window W, after accounting for MG collisions by applying the selected gap collision rule provided that concurrent measurement gaps are configured.

Kp = 1 when Navailable = 0.

Otherwise, when UE is not configured with or UE does not support concurrent measurement gaps:

When inter-frequency SMTC is fully non overlapping with measurement gaps or inter-frequency SMTC is fully overlapping with MGs, Kp =1.

When inter-frequency SMTC is partially overlapping with measurement gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP. When inter-frequency SMTC is partially overlapping with the VIL of NCSG, Kp = 1/(1- (SMTC period /VIRP)), where SMTC period < VIRP.

Inter-frequency measurements with measurement gaps:

Kgap is a scaling factor for a SSB frequency layer to be measured within an associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap = Ntotal / Navailable, where Navailable and Ntotal are calculated as follows:

- For a window W of duration max(SMTC period, MGRP\_max), where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) within the same FR, and starting from the beginning of any SMTC occasion:

- Ntotal is the total number of SMTC occasions that are covered by instances of the associated measurement gap within the window W, including those overlapped with other measurement gap occasions within the window, and

- Navailable is the number of SMTC occasions that are covered by instances of the non-dropped associated measurement gap within the window W, after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in TS 38.133 [6] section 9.1.8.3.

Kgap is only applicable for UE supporting *concurrentMeasGap-r17*. When concurrent measurement gaps are configured, requirements in this clause do not apply if Navailable =0.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.4, 9.3.5, 9.3.6.3, 9.3.9.

##### 6.6.18.0.3 Minimum conformance requirements for Inter-RAT measurement

The requirements are application for NR−E-UTRAN FDD and NR−E-UTRAN TDD when DRX is used or not.

When the UE requires measurement gaps to identify and measure inter-RAT cells and an appropriate measurement gap pattern is scheduled, or when the UE is capable of concurrent measurement gap patterns and concurrent measurement gap patterns are scheduled, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable FDD or TDD cell within the time period specified in TS 38.133 [6].

For a UE supporting and configured with concurrent measurement gaps, Kgap\_EUTRA: it is the scaling factor for an E-UTRAN frequency layer to be measured within the associated measurement gap pattern. Kgap = 1 when the UE is not configured with concurrent measurement gaps. Otherwise, Kgap\_EUTRA = Ntotal / Navailable for UE configured with concurrent measurement gaps.

For a window W of duration MGRP\_max, where MGRP\_max is the maximum MGRP across all configured per-UE measurement gap(s) and per-FR measurement gap(s) for FR1, and starting from the beginning of any associated gap occasion:

Ntotal is the total number of associated gap occasions within the window, including those overlapped with other MG occasions within the window, and

Navailable is the number of non-dropped associated measurement gap occasions after accounting for collisions between the measurement gaps by applying the measurement gap collision rule in TS 38.133 [6] section 9.1.8.3.

Requirements do not apply for UE configured with concurrent measurement gaps, if Navailable=0

The normative reference for this requirement is TS 38.133 [6] clause 9.4.2, 9.4.3.

##### 6.6.18.0.4 Minimum conformance requirements for PRS measurement

When physical layer receives last of *NR-TDOA-ProvideAssistanceData* message and *NR-TDOA-RequestLocationInformation* message from LMF via LPP specified in TS 37.355 [38], the UE shall be able to measure multiple (up to the UE capability specified in TS 38.133 [6] Clause 9.9.2.3) DL RSTD measurements, defined in TS 38.215 [10], during the measurement period defined in TS 38.133 [6] Clause 9.9.2.5

is a scaling factor for a positioning frequency layer to be measured within the associated measurement gap pattern, which is defined as = Ntotal / Navailable for UE configured with concurrent measurement gap, and = 1 for UE not configured with concurrent measurement gap.

- For a window W of duration max(, MGRP\_max), where MGRP max is the maximum MGRP across all configured per-UE MG and per-FR MG within the same FR as the positioning frequency layer, and starting at the beginning of any associated gap occasions covering the PRS occasion:

- Ntotal is the total number of associated gap occasions covering PRS occasions within the window, including those overlapped with other MG occasions within the window, and

- Navailable is the number of non-dropped associated gap occasions covering PRS occasions within the window W, after further accounting for MG collisions by applying the selected gap collision rule

- Requirements do not apply if Navailable =0.

The normative reference for this requirement is TS 38.133 [6] clause 9.9.2.

#### 6.6.18.1 NR SA FR1 event-triggered reporting for concurrent gaps non-overlap with SSB-based measurements in both inter-frequency layers

Editor's Note: This test case is incomplete in following aspects:

* Concurrent gap configuration is missing in Annex Table H.3.1-6
* TT analysis is missing.
* Message contents contain []

6.6.18.1.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting for concurrent gaps non-overlap with SSB-based measurement in both inter-frequency layers within inter-frequency cell search requirements in TS 38.133 [6] clause 9.3.4.

6.6.18.1.2 Test applicability

This test applies to all types of NR UEs supporting concurrent gap capability from release 17 onwards.

6.6.18.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.18.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.18.1.

6.6.18.1.4 Test description

6.6.18.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.18.1.4.1-1.

Table 6.6.18.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 6.6.18.1-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.18.1-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.18.1-3 | 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  Note 2: Target NR cells have the same SCS, BW and duplex mode as NR serving cells | |

Test environment parameters are given in Table 6.6.18.1.4.1-2.

Table 6.6.18.1.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.18.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.18.1.4.1-3.

2. Message contents are defined in clause 6.6.18.1.4.3.

3. There are three NR carriers and three cells specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.18.1.4.1-3: General test parameters for SA inter-frequency event triggered reporting for FR1 concurrent gaps with fully non-overlapping scenario for SSB-based measurements in both inter-frequency layers

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cells 2 and 3 | | NR cell 2 is on NR RF channel number 2. NR cell 3 is on NR RF channel number 3. |
| Gap Pattern Id |  | Config 1,2,3 | 0 for MeasGapId #1  1 for MeasGapId #2 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 39 for MeasGapId #1  19 for MeasGapId #2 | |  |
| 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 cell 1 |  | Config 1, 2, 3 | 3μs | | Synchronous. |
| Time offset between serving and neighbour cell 2 |  | Config 1, 2, 3 | 5ms | | Asynchronous.  The timing of Cell 3 is 5ms later than the timing of Cell 1. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.5 | 1.5 |  |

6.6.18.1.4.2 Test procedure

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 (Cell 2) as neighbour cell 1 in FR1 on NR RF channel 2, and NR cell 3 (Cell 3) as neighbour cell 2 in FR1 on NR RF channel 3. The test parameters are given in Table 6.6.18.1.4.1-3 and Table 6.6.18.1.5-1 respectively.

Two measurement gap patterns (MeasGapId #1 and MeasGapId #2) are configured with the gap pattern ID #0 and #1 as defined in Table 6.6.18.1.4.1-3. MeasGapId #2 is configured with a higher priority than MeasGapId #1. MeasGapId #1 and MeasGapId #2 are associated with the MOs for RF channel numbers #2 and #3 respectively.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used for both frequency layers. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.18.1.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.18.1.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If Cell2’s overall delays measured from the beginning of time period T2 is less than 920 ms, and Cell3’s overall delays measured from the beginning of time period T2 is less than 1280 ms, then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements, then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. And set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.18.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.18.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ and GAP NEEDED  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with conditions [TBD]  Table H.3.1-7 with condition INTER-FREQ |
| Specific message contents exceptions for Cell 2 | Table H.3.1-3 with conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Cell 3 | Table H.3.1-3 with condition INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |

6.6.18.1.5 Test requirement

Table 6.6.18.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.18.1.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 concurrent gaps with fully non-overlapping scenario for SSB-based measurements in both inter-frequency layers

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 | | | | | |
|  | |  | Config 2,3 | TDD | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | |
|  | |  | Config 2 | TDDConf.1.1 | | | | | |
|  | |  | Config 3 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | NA | | 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 | TRS.1.1 FDD | | NA | | NA | |
|  | |  | Config 2 | TRS.1.1 TDD | | NA | | NA | |
|  | |  | Config 3 | TRS.1.2 TDD | | NA | | NA | |
| 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 | |  | |  | |
|  | |  | Config 2 | SR.1.1 TDD | |  | |  | |
|  | |  | Config 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | |  | |  | |
|  | |  | Config 2 | CR.1.1 TDD | |  | |  | |
|  | |  | Config 3 | CR.2.1 TDD | |  | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | |  | |  | |
|  | Config 2 | CCR.1.1 TDD | |  | |  | |
|  | Config 3 | CCR.2.1 TDD | |  | |  | |
| SSB parameters | |  | Config 1,2,3 | SSB.1 FR1 | | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2,3 | SMTC.2 | | SMTC.2 | | SMTC.2 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | |
|  | |  | Config 3 | 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 |  | -98 | | -98 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | -98 | |
|  | |  | Config 3 | -95 | | -95 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | -Infinity | -91 |
|  | |  | Config 3 | -91 | -91 | -Infinity | -88 | -Infinity | -88 |
|  | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 | -Infinity | 7 |
|  | | dB | Config 1,2,3 | 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 |
|  | | dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 | -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. | | | | | | | | | |

The UE shall send one Event A3 triggered measurement report for each neighbouring cell, with a measurement reporting delay less than 920 ms for cell 2 and 1280ms for cell 3 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% with a confidence level of 95%.

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.

#### 6.6.18.2 NR SA FR1 event-triggered reporting for concurrent gaps partially-overlap with SSB-based measurements in both inter-frequency layers

Editor's Note: This test case is incomplete in following aspects:

* Concurrent gap configuration is missing in Annex Table H.3.1-6
* TT analysis is missing.
* Message contentscontain []

6.6.18.2.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting for concurrent gaps partially-overlap with SSB-based measurement in both inter-frequency layers within inter-frequency cell search requirements in TS 38.133 [6] clause 9.3.4.

6.6.18.2.2 Test applicability

This test applies to all types of NR UEs supporting concurrent gap capability from release 17 onwards.

6.6.18.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.18.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.18.2.

6.6.18.2.4 Test description

6.6.18.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.18.2.4.1-1.

Table 6.6.18.2.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 6.6.18.2-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.18.2-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.18.2-3 | 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  Note 2: Target NR cells have the same SCS, BW and duplex mode as NR serving cells | |

Test environment parameters are given in Table 6.6.18.2.4.1-2.

Table 6.6.18.2.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.18.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.18.2.4.1-3.

2. Message contents are defined in clause 6.6.18.2.4.3.

3. There are three NR carriers and three cells specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.18.2.4.1-3: General test parameters for SA inter-frequency event triggered reporting for FR1 concurrent gap with partial overlapping scenario for SSB-based measurements in both inter-frequency layers

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cells 2 and 3 | | NR cell 2 is on NR RF channel number 2. NR cell 3 is on NR RF channel number 3. |
| Gap Pattern Id |  | Config 1,2,3 | 0 for MeasGapId #1  1 for MeasGapId #2 | | As specified in clause 9.1.2-1. |
| Measurement gap offset | ms | Config 1,2,3 | 39 for MeasGapId #1  4 for MeasGapId #2 | |  |
| 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 cell 1 |  | Config 1, 2, 3 | 3μs | | Synchronous. |
| Time offset between serving and neighbour cell 2 |  | Config 1, 2, 3 | 5ms | | Asynchronous.  The timing of Cell 3 is 5ms later than the timing of Cell 1. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.5 | 1.5 |  |

6.6.18.2.4.2 Test procedure

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 (Cell 2) as neighbour cell 1 in FR1 on NR RF channel 2, and NR cell 3 (Cell 3) as neighbour cell 2 in FR1 on NR RF channel 3. The test parameters are given in Table 6.6.18.2.4.1-3, and Table 6.6.18.2.5-1 respectively. The TE schedules continuous DL data on PCell throughout the test.

Two measurement gap patterns (MeasGapId #1 and MeasGapId #2) are configured with the gap pattern ID #0 and #1 as defined in Table 6.6.18.2.4.1-3. MeasGapId #2 is configured with a higher priority than MeasGapId #1. MeasGapId #1 and MeasGapId #2 are associated with the MOs for RF channel numbers #2 and #3, respectively.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used for both frequency layers. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.18.2.5-1.

3. The SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. The SS shall configure transmission of PDSCH with a maximum number of 1 HARQ transmission in Cell 1.

6. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.18.2.5-1. T2 starts.

7. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 1280 ms for both Cell 2 and Cell 3, then the number of successful tests is increased by one. If the UE fails to report the event within the overall delays measured requirement, then the number of failure tests is increased by one.

8. After the SS receives the *MeasurementReport* message in step 7 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

9. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. And set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

10. Depending on the choice in Step 8, the SS:

- if the RRC Connection Release has been sent, transmits in Cell 1 a *Paging* message (including PagingRecord with UE-Identity) for the UE and ensures the UE in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5. (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.),  
OR:  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* according to TS 38.508-1 [14] clause 4.5.

11. Repeat step 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.18.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.18.2.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ and GAP NEEDED  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with condition [TBD]  Table H.3.1-7 with condition INTER-FREQ |
| Specific message contents exceptions for Cell 2 | Table H.3.1-3 with conditions INTER-FREQ MO and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Cell 3 | Table H.3.1-3 with condition INTER-FREQ MO  Table 7.3.1-3 in TS 38.508-1 [14] with condition [SMTC.Y] |

6.6.18.2.5 Test requirement

Table 6.6.18.2.5-1 defines the primary level settings including test tolerances for all tests.

**Table 6.6.18.2.5-1: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 concurrent gap with partial-overlapping scenario for SSB-based measurements in both inter-frequency layers**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 | | | | | |
|  | |  | Config 2,3 | TDD | | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | | |
|  | |  | Config 2 | TDDConf.1.1 | | | | | |
|  | |  | Config 3 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | NA | | 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 | TRS.1.1 FDD | | NA | | NA | |
|  | |  | Config 2 | TRS.1.1 TDD | | NA | | NA | |
|  | |  | Config 3 | TRS.1.2 TDD | | NA | | NA | |
| 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 | |  | |  | |
|  | |  | Config 2 | SR.1.1 TDD | |  | |  | |
|  | |  | Config 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | |  | |  | |
|  | |  | Config 2 | CR.1.1 TDD | |  | |  | |
|  | |  | Config 3 | CR.2.1 TDD | |  | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | |  | |  | |
|  | Config 2 | CCR.1.1 TDD | |  | |  | |
|  | Config 3 | CCR.2.1 TDD | |  | |  | |
| SSB parameters | |  | Config 1,2,3 | SSB.1 FR1 | | SSB.1 FR1 | | SSB.1 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1,2,3 | SMTC.2 | | SMTC.2 | | SMTC.7 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | | |
|  | |  | Config 3 | 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 |  | -98 | | -98 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | | -98 | |
|  | |  | Config 3 | -95 | | -95 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | -Infinity | -91 |
|  | |  | Config 3 | -91 | -91 | -Infinity | -88 | -Infinity | -88 |
|  | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 | -Infinity | 7 |
|  | | dB | Config 1,2,3 | 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 |
|  | | dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 | -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. | | | | | | | | | |

The UE shall send one Event A3 triggered measurement report for each neighbouring cell, with a measurement reporting delay less than 1280 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% with a confidence level of 95%.

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.

#### 6.6.18.3 NR SA FR1 NR - E-UTRAN and NR FR1 concurrent event-triggered reporting in non-DRX in FR1

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.18.3.1 Test purpose

The purpose of this test is to verify that the UE makes correct event-triggered reporting of concurrent inter-RAT E-UTRAN and NR FR1 measurements when operating in standalone (SA) operation with PCell in FR1.

6.6.18.3.2 Test applicability

This test applies to all types of NR UEs supporting concurrent gap capability from release 17 onwards.

6.6.18.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.18.0.2 and 6.6.18.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.18.3.

6.6.18.3.4 Test description

6.6.18.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.18.3.4.1-1.

Table 6.6.18.3.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.18.3-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE FDD |
| 6.6.18.3-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.18.3-3 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.18.3-4 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE TDD |
| 6.6.18.3-5 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE TDD |
| 6.6.18.3-6 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE TDD |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

Test environment parameters are given in Table 6.6.18.3.4.1-2.

Table 6.6.18.3.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-4 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.18.3.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.18.3.4.1-3.

2. Message contents are defined in clause 6.6.18.3.4.3.

3. There are two NR carriers and one E-UTRA cell specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.18.3.4.1-3: General test parameters for NR SA FR1 NR - E-UTRAN and NR FR1 concurrent event-triggered reporting in non-DRX in FR1



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 - 6 | 1, 2 | 2 NR carrier frequency is used in the test. |
| LTE RF Channel Number |  |  | 3 | 1 LTE carrier frequency is used in the test |
| Channel Bandwidth | MHz | 1 - 6 | As specified in Tables 6.6.18.3.5-1 and 6.6.18.3.5-2. |  |
| Active cell |  | 1 - 6 | NR Cell 1 (PCell in FR1) | Cell 1 is on NR RF channel number 1 |
| Neighbour cell 1 |  | 1 - 6 | Cell 2 (NR FR1) | Cell 2 is on NR RF channel number 2 |
| Neighbour cell 2 |  | 1 - 6 | Cell 3 (LTE) | Cell 3 is on LTE RF channel number 3 |
| Gap Pattern Id |  | 1 - 6 | 0 for MeasGapId #0  1 for MeasGapId #1 | As specified in TS 38.133 [6] Table 9.1.2-1. Per-UE gap pattern. |
| Measurement gap offset |  | 1 - 6 | 39 for Gap pattern Id #0  19 for Gap pattern Id #1 |  |
| NR measurement quantity |  |  | SS-RSRP | Measurement quantity for Cell 1 and Cell 2 |
| Inter-RAT E-UTRAN measurement quantity |  |  | RSRP | Measurement quantity for Cell 3 |
| b2-Threshold1 | dBm |  | As specified in Table 6.6.18.3.5-1 | Absolute NR SS-RSRP threshold for SS-RSRP measurement on Cell 1 for event B2 |
| b2-Threshold2EUTRA | dBm |  | -95 | Absolute E-UTRAN RSRP threshold for SS-RSRP measurement on Cell 3 for event B2 |
| Hysteresis | dB | 1 - 6 | 0 |  |
| TimeToTrigger | s | 1 - 6 | 0 |  |
| Filter coefficient |  | 1 - 6 | 0 | L3 filtering is not used |
| *offsetMO* | dB | 1 - 6 | 6 | NR Cell 2 |
| *a4-Threshold* | dBm | 1 - 6 | -105 | NR Cell 2 |
| DRX |  |  | OFF |  |
| Time offset between serving and neighbour cells |  | 1, 4 | 3ms | Asynchronous cells NR cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| 2, 3, 5, 6 | 3μs | Synchronous NR cells. |
| T1 | s | 1 - 6 | 5 | for LTE Cell 3 and NR FR1 Cell 2 |
| T2 | s | 1 - 6 | 5 | for LTE Cell 3 |
| 5.2 for PC1; 3.5 for other PC | for NR FR1 Cell 2 |

6.6.18.3.4.2 Test procedure

In this test, there are three cells: Cell 1 is the NR PCell, Cell 2 is an Inter-frequency NR FR1 neighbour cell on NR RF channel 2 and Cell 3 is an inter-RAT E-UTRAN neighbour cell on LTE RF channel 3. The test parameters are given in Table 6.6.18.3.4.1-3 and Tables 6.6.18.3.5-1/2 respectively.

In the measurement control information from the PCell it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) is to be used for the E-UTRAN cell (cell 3). In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A4 is used for the NR FR1 cell (cell 2).

Each test consists of two consecutive time periods, with durations T1 and T2, respectively. Prior to the start of time duration T1, the UE shall be fully synchronized to Cell 1. During T1, the UE shall not have any information on Cell 2 and Cell 3.

Two concurrent per-UE measurement gap pattern configurations # 0 as defined in Table 6.6.18.3.4.1-3 are provided for a UE. Two measurement gap patterns (MeasGapId #0 and MeasGapId #1) are configured with the gap pattern ID #0 as defined in Table 6.6.18.3.4.1-3. MeasGapId #1 is configured with a higher priority than MeasGapId #0. MeasGapId #0 and MeasGapId #1 are associated with the MOs for NR RF channel numbers #2 and LTE RF channel #3, respectively.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Tables 6.6.18.3.5-1/2.

3. SS shall transmit an *RRCReconfiguration* message to configure Event A4 triggered measurement report for Cell 2, Event B2 triggered measurement report for Cell 3 to the PCell and two concurrent per-UE measurement gap patterns with MeasGapId #1 configured with a higher priority than MeasGapId #0.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Tables 6.6.18.3.5-1/2. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A4 and B2. If Cell2’s overall delays measured from the beginning of period T2 is less than 5120 ms for UE supporting power class 1, or 3200 ms for UE supporting other power class, and Cell3’s overall delays measured from the beginning of period T2 is less than 3.84 s, then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements, then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. And set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.18.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.18.3.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ, INTER-RAT and GAP NEEDED  Table H.3.1-3A with conditions MGe with associatedMeasGap-r17 set to 1  Table H.3.1-4AA  Table H.3.1-4A  Table H.3.1-5 with condition INTER-RAT  Table H.3.1-6 with conditions MGe  Table H.3.1-7 with conditions INTER-FREQ and INTER-RAT |
| Specific message content exceptions for Test Configurations 6.6.18.3-1 and 6.6.18.3-4 | Table H.3.1-3 with conditions INTER- FREQ MO and MGe with associatedMeasGapSSB-r17 set to 0  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message content exceptions for Test Configurations 6.6.18.3-2, 6.6.18.3-3, 6.6.18.3-5 and 6.6.18.3-6 | Table H.3.1-3 with conditions INTER- FREQ MO and Synchronous cells and MGe with associatedMeasGapSSB-r17 set to 0  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.6.18.3.4.3-2: MeasConfig (Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation path: Table H.3.1-2 with condition INTER-FREQ, INTER-RAT and GAP NEEDED | | | |
| Information Element | Value/Remark | Comment | Condition |
| measConfig ::= SEQUENCE { |  |  |  |
| measObjectToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasObjectToAddMod SEQUENCE { | 3 entries |  |  |
| MeasObjectToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| measObjectId | 1 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectNR | MeasObjectNR-DEFAULT with condition INTRA-FREQ MO | NR Cell 1 |  |
| } |  |  |  |
| } |  |  |  |
| MeasObjectToAddMod[2] SEQUENCE { |  | Entry 2 |  |
| measObjectId | 2 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectNR | MeasObjectNR-DEFAULT with condition INTER-FREQ MO | NR Cell 2 |  |
| } |  |  |  |
| } |  |  |  |
| MeasObjectToAddMod[3] SEQUENCE { |  | Entry 3 |  |
| measObjectId | 3 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectEUTRA | MeasObjectEUTRA-DEFAULT | E-UTRAN Cell 3 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportConfigToAddModList SEQUENCE(SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod SEQUENCE { | 2 entries |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigNR | ReportConfigNR-DEFAULT with condition EVENT\_A4 | NR Cell 2 |  |
| } |  |  |  |
| } |  |  |  |
| ReportConfigToAddMod[2] SEQUENCE { |  | Entry 2 |  |
| reportConfigId | 2 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigInterRAT-DEFAULT with condition EVENT\_B2 | E-UTRAN Cell 3 |  |
| } |  |  |  |
| } |  |  |  |
| measIdToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod SEQUENCE { | 2 entries |  |  |
| MeasIdToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| measId | 1 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 1 |  |  |
| } |  |  |  |
| MeasIdToAddMod[2] SEQUENCE { |  | Entry 2 |  |
| measId | 2 |  |  |
| measObjectId | 3 |  |  |
| reportConfigId | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| quantityConfig | QuantityConfig-DEFAULT |  |  |
| measGapConfig |  |  | GAP NEEDED |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 SEQUENCE{ | 2 entries |  |  |
| GapConfig-r17[1] SEQUENCE{ |  | Entry 1 |  |
| measGapId-r17 | 0 |  | Pattern #0 |
| gapType-r17 | perUE |  |  |
| gapOffset-r17 | 39 |  | Pattern #0 |
| mgl-r17 | ms6 |  | Pattern #0 |
| mgrp-r17 | ms40 |  | Pattern #0 |
| mgta-r17 | ms0 |  | Pattern #0 |
| refServCellIndicator-r17 | Not present |  |  |
| refFR2-ServCellAsyncCA-r17 | Not present |  |  |
| preConfigInd-r17 | Not present |  |  |
| ncsgInd-r17 | Not present |  |  |
| gapAssociationPRS-r17 | Not present |  |  |
| gapSharing-r17 | Not present |  |  |
| gapPriority-r17 | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| GapConfig-r17[2] SEQUENCE{ |  | Entry 2 |  |
| measGapId-r17 | 1 |  | Pattern #1 |
| gapType-r17 | perUE |  |  |
| gapOffset-r17 | 19 |  | Pattern #1 |
| mgl-r17 | ms6 |  | Pattern #1 |
| mgrp-r17 | ms80 |  | Pattern #1 |
| mgta-r17 | ms0 |  |  |
| refServCellIndicator-r17 | Not present |  |  |
| refFR2-ServCellAsyncCA-r17 | Not present |  |  |
| preConfigInd-r17 | Not present |  |  |
| ncsgInd-r17 | Not present |  |  |
| gapAssociationPRS-r17 | Not present |  |  |
| gapSharing-r17 | Not present |  |  |
| gapPriority-r17 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.18.3.5 Test requirement

Tables 6.6.18.3.5-1/2 define the primary level settings including test tolerances for all tests.

Table 6.6.18.3.5-1: Cell specific test parameters of NR cells for NR SA FR1 NR - E-UTRAN and NR FR1 concurrent event-triggered reporting in non-DRX in FR1



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test configuration** | **Cell 1** | | **Cell 2** | | | |
|  | |  |  | **T1** | **T2** | **T1** | | **T2** | |
| NR RF Channel Number | |  | 1 - 6 | 1 | | 2 | | | |
| Duplex mode | |  | 1, 4 | FDD | | | | | |
|  | 2, 3, 5, 6 | TDD | | | | | |
| TDD Configuration | |  | 1, 4 | NA | | | | | |
|  | 2, 5 | TDDConf.1.1 | | | | | |
|  | 3, 6 | TDDConf.2.1 | | | | | |
| BWchannel | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | | | | | |
|  | |  | 2, 5 | 10: NRB,c = 52 (TDD) | | | | | |
|  | |  | 3, 6 | 40: NRB,c = 106 (TDD) | | | | | |
| BWP configuration | Initial DL BWP |  | 1 - 6 | DLBWP.0.1 | | | NA | | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | NA | | |
| Initial UL BWP |  | ULBWP.0.1 | | | NA | | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | NA | | |
| CSI-RS for tracking parameters on NR RF Channel 1 | |  | 1, 4 | TRS.1.1 FDD | | | - | | |
|  | 2, 5 | TRS.1.1 TDD | | |
|  | 3, 6 | TRS.1.2 TDD | | |
| OCNG Patterns | |  | 1 - 6 | OP.1 | | | | | |
| PDSCH Reference measurement channel | |  | 1, 4 | SR.1.1 FDD | | | - | | |
|  | 2, 5 | SR.1.1 TDD | | |
|  | 3, 6 | SR.2.1 TDD | | |
| RMSI CORESET Reference Channel | |  | 1, 4 | CR.1.1 FDD | | | - | | |
|  | 2, 5 | CR.1.1 TDD | | |
|  | 3, 6 | CR.2.1 TDD | | |
| Dedicated CORESET Reference Channel | |  | 1, 4 | CCR.1.1 FDD | | | - | | |
|  | 2, 5 | CCR.1.1 TDD | | |
|  | 3, 6 | CCR.2.1 TDD | | |
| SMTC configuration | |  | 1, 4 | SMTC.2 | | | SMTC.5 | | |
|  | 2, 3, 5, 6 | SMTC.1 | | | SMTC.4 | | |
| SSB configuration | |  | 1, 4 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | 2, 5 | SSB.1 FR1 | | | SSB.5 FR1 | | |
|  | 3, 6 | SSB.2 FR1 | | | SSB.6 FR1 | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 1, 2, 4 ,5 | 15 | | | | | |
| 3, 6 | 30 | | | | | |
| b2-Threshold1 | | dBm | 1, 2, 4, 5 | -96 | | - | | | |
| 3, 6 | -93 | | - | | | |
| EPRE ratio of PSS to SSS | | dB | 1 - 6 | 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) | |
| *Noc* note2 | | dBm/15 KHz | 1-6 | -98+TT | | | | | |
| *Noc* note2 | | dBm/SCS | 1, 2, 4, 5 | -98+TT | | | | | |
| 3, 6 | -95+TT | | | | | |
| Ês/Noc | | dB | 1 - 6 | 4+TT | 4+TT | -Infinity | | | 7+TT |
| Ês/Iot note3 | | dB | 1 - 6 | 4+TT | 4+TT | -Infinity | | | 7+TT |
| SS-RSRP note3 | | dBm/SCS | 1, 2, 4, 5 | -94+TT | -94+TT | -Infinity | | | -91+TT |
| 3, 6 | -91+TT | -91+TT | -Infinity | | | -88+TT |
| SSB\_RP note3 | | dBm/SCS | 1, 2, 4, 5 | -94+TT | -94+TT | -Infinity | | | -91+TT |
| 3, 6 | -91+TT | -91+TT | -Infinity | | | -88+TT |
| Io note3 | | dBm/9.36 MHz | 1, 2, 4, 5 | -67.11+TT | -67.11+TT | -Infinity | | | -65.38+TT |
| dBm/38.16 MHz | 3, 6 | -62.27+TT | -62.27+TT | -Infinity | | | -61.06+TT |
| Propagation condition | |  | 1 - 6 | AWGN | | | | | |
| Antenna Configuration and Correlation Matrix | |  | 1 - 6 | 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: Ês/Iot, SS-RSRP, SSB\_RP 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 6.6.18.3.5-2: Cell specific test parameters LTE cell for NR SA FR1 NR - E-UTRAN and NR FR1 concurrent event-triggered reporting in non-DRX in FR1



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Configuration** | **Cell 3** | |
|  |  |  | **T1** | **T2** |
| RF channel number |  | 1 - 6 | 3 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
|  | 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1 - 6 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  | 4, 5, 6 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  | 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1, 2, 3 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  | 4, 5, 6 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1 - 6 | 0 | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RANote3 |
| OCNG\_RBNote3 |
| NocNote4 | dBm/15kHz | 1 - 6 | -104+TT | |
| Ês/Noc | dB | 1 - 6 | -Infinity | 17+TT |
| Ês/IotNote5 | dB | 1 - 6 | -Infinity | 17+TT |
| RSRPNote5 | dBm/15kHz | 1 - 6 | -Infinity | -87+TT |
| SCH\_RPNote5 | dBm/15kHz | 1 - 6 | -Infinity | -87+TT |
| IoNote5 | dBm/9MHz | 1 - 6 | -73.21+TT+10log (NRB,c /50) | -56.12+TT+10log (NRB,c /50) |
| Propagation Condition |  | 1 - 6 | AWGN | |
| Antenna Configuration and Correlation Matrix |  | 1 - 6 | 1x2 Low | |
| NOTE 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].  NOTE 2: DL RMCs and OCNG patterns are specified in sections A 3.1 and A 3.2 of TS 36.133 [23] respectively.  NOTE 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27]. | | | | |

The UE shall send one Event A4 triggered measurement report for Cell 2, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

5120 for UE supporting power class 1, or

3200 for UE supporting other power class.

The UE shall send one Event B2 triggered measurement report for Cell 3 to the PCell, with a measurement reporting delay less than 3.84s from the start of period T2.

The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

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.

#### 6.6.18.4 NR SA FR1 event triggered reporting tests for PRS and SSB measurement in FR1 without SSB time index detection when DRX is not used

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.18.4.1 Test purpose

The purpose of this test is to verify that the UE makes correct reporting of an event.

6.6.18.4.2 Test applicability

This test applies to all types of NR UEs supporting concurrent gap and independent measurement gap configurations for PRS measurement capability from release 17 onwards.

6.6.18.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.18.0.2 and 6.6.18.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.18.4.

6.6.18.4.4 Test description

6.6.18.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.18.4.4.1-1.

Table 6.6.18.4.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.18.4-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.18.4-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.18.4-3 | 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 | |

Test environment parameters are given in Table 6.6.18.4.4.1-2.

Table 6.6.18.4.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.18.4.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.18.4.4.1-3.

2. Message contents are defined in clause 6.6.18.4.4.3.

3. There are three NR carriers specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.18.4.4.1-3: General test parameters for NR SA FR1 event triggered reporting tests for PRS and SSB measurement in FR1 without SSB time index detection when DRX is not used



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 3  2: Cell 2 | Two FR1 NR carrier frequencies are used for the NR cells. |
| Active cell |  | 1, 2, 3 | NR cell 1 (Pcell) | Cell 1 is the PCell and the DL-AoD reference cell in the positioning assistance data. |
| Neighbour cell |  | 1, 2, 3 | NR cell 2, NR cell 3 | Cell 2 is an inter-frequency neighbour cell  Cell 3 is an intra-frequency neighbour cell in the positioning assistance data. |
| Gap Pattern Id |  | 1, 2, 3 | 0 for MeasGapId #0  24 for MeasGapId #1 |  |
| Measurement gap offset | ms | 1, 2, 3 | 7 for MeasGapId #0  11 for MeasGapId #1 |  |
| A3-Offset | dB | 1, 2, 3 | -6 |  |
| Hysteresis | dB | 1, 2, 3 | 0 |  |
| DRX |  | 1, 2, 3 | NA | OFF |
| Time offset between serving and neighbour cells | ms | 1 | 3 | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
| μs | 2, 3 | 3 | Synchronous cells |
| Expected RSTD | μs | 1, 2, 3 | 3 |  |
| Expected RSTD uncertainty | μs | 1, 2, 3 | 5 |  |
| T1 | s | 1, 2, 3 | 2 |  |
| T2 | s | 1, 2, 3 | 5 |  |
| NOTE 1: GP#24 is configured if UE supports MG#24, otherwise GP#0 is configured. | | | | |

6.6.18.4.4.2 Test procedure

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, 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 1. The test parameters are given in Table 6.6.18.4.4.1-3 and Table 6.6.18.4.5-1 respectively.

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. Cell 1 and cell 3 transmit PRS during T2.

Two measurement gap patterns (MeasGapId #0 and MeasGapId #1) are configured with the gap pattern ID #0 and #1 as defined in Table 6.6.18.4.1-3. MeasGapId #1 is configured with a higher priority than MeasGapId #0. MeasGapId #0 and MeasGapId #1 are associated with the MOs for RF channel numbers #1 and #2, respectively.

The *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message as defined in TS 37.355 [38] shall be provided to the UE during T1. The last slot containing the two messages for the assistance data and location information request is denoted as #n.

The beginning of the time interval T2 shall be aligned with the beginning of the first MG instance of MeasGapId #1 containing the PRS resources that is ΔT after slot #n, where ΔT = 50 ms is the maximum processing time of the assistance data and location information request.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.18.4.5-1.

3. SS shall transmit an *RRCReconfiguration* message to configure Event A3 triggered measurement report and two concurrent per-UE measurement gap patterns with MeasGapId #1 configured with a higher priority than MeasGapId #0. One of concurrent gaps used for PRS measurement in same frequency layer of serving cells while the other concurrent gap in the different frequency layer of serving cells.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.18.4.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A3. If Cell2’s overall delays measured from the beginning of period T2 is less than 1840 ms, and report the PRS RSRP measurements for Cell 3 with respect to the reference cell in the DL-AoD assistance data, then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements, then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop. And set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.18.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.18.4.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ and GAP NEEDED  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-6 with conditions MGeTable H.3.1-7 with condition INTER-FREQ for Cell 2 and condition INTRA-FREQ for Cell 3 |
| Specific message contents exceptions for Test Configuration 6.6.1.8-1 | Table H.3.1-3 with conditions INTER-FREQ MO and MGe with associatedMeasGapSSB-r17 set to 0 for Cell 2 and condition INTRA-FREQ MO and MGe with associatedMeasGapSSB-r17 set to 2 for Cell 3Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.6.1.8-2 and 6.6.1.8-3 | Table H.3.1-3 with conditions INTER-FREQ MO and MGe with associatedMeasGapSSB-r17 set to 0 for Cell 2 and conditions INTRA-FREQ MO and MGe with associatedMeasGapSSB-r17 set to 2 for Cell 3 and Synchronous cellsTable 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.6.18.4.4.3-2: MeasConfig (Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation path: Table H.3.1-2 with condition INTER-FREQ and GAP NEEDED | | | |
| Information Element | Value/Remark | Comment | Condition |
| measConfig ::= SEQUENCE { |  |  |  |
| measObjectToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasObjectToAddMod SEQUENCE { | 2 entries |  |  |
| MeasObjectToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| measObjectId | 1 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectNR | MeasObjectNR-DEFAULT with condition INTRA-FREQ MO | NR Cell 1 and Cell 3 |  |
| } |  |  |  |
| } |  |  |  |
| MeasObjectToAddMod[2] SEQUENCE { |  | Entry 2 |  |
| measObjectId | 2 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectNR | MeasObjectNR-DEFAULT with condition INTER-FREQ MO | NR Cell 2 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| reportConfigToAddModList SEQUENCE(SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod SEQUENCE { | 1 entry |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigNR | ReportConfigNR-DEFAULT with condition EVENT\_A3 | NR Cell 2 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| measIdToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod SEQUENCE { | 1 entry |  |  |
| MeasIdToAddMod[1] SEQUENCE { |  | Entry 1 |  |
| measId | 1 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| quantityConfig | QuantityConfig-DEFAULT |  |  |
| measGapConfig |  |  | GAP NEEDED |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 SEQUENCE{ | 2 entries |  |  |
| GapConfig-r17[1] SEQUENCE{ |  | Entry 1 |  |
| measGapId-r17 | 0 |  | Pattern #0 |
| gapType-r17 | perUE |  |  |
| gapOffset-r17 | 7 |  | Pattern #0 |
| mgl-r17 | ms6 |  | Pattern #0 |
| mgrp-r17 | ms40 |  | Pattern #0 |
| mgta-r17 | ms0 |  | Pattern #0 |
| refServCellIndicator-r17 | Not present |  |  |
| refFR2-ServCellAsyncCA-r17 | Not present |  |  |
| preConfigInd-r17 | Not present |  |  |
| ncsgInd-r17 | Not present |  |  |
| gapAssociationPRS-r17 | Not present |  |  |
| gapSharing-r17 | Not present |  |  |
| gapPriority-r17 | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| GapConfig-r17[2] SEQUENCE{ |  | Entry 2 |  |
| measGapId-r17 | 2 |  | Pattern #24 |
| gapType-r17 | perUE |  |  |
| gapOffset-r17 | 11 |  | Pattern #24 |
| mgl-r17 | ms10 |  | Pattern #24 |
| mgrp-r17 | ms80 |  | Pattern #24 |
| mgta-r17 | ms0 |  |  |
| refServCellIndicator-r17 | Not present |  |  |
| refFR2-ServCellAsyncCA-r17 | Not present |  |  |
| preConfigInd-r17 | Not present |  |  |
| ncsgInd-r17 | Not present |  |  |
| gapAssociationPRS-r17 | true |  |  |
| gapSharing-r17 | Not present |  |  |
| gapPriority-r17 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.6.18.4.5 Test requirement

Tables 6.6.18.4.5-1 define the primary level settings including test tolerances for all tests.



Table 6.6.18.4.5-1: Cell specific test parameters of NR cells for NR SA FR1 event triggered reporting tests for PRS and SSB measurement in FR1 without SSB time index detection when DRX is not used

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  | |  | T1 | T2 | T1 | T2 | T1 | T2 |
| TDD configuration | |  | 1 | N/A | | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | | TDDConf.2.1 | |
| BWchannel | | MHz | 1,2,3 | 100: NRB,c = 66 | | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| BWP BW | | MHz | 1,2,3 | 100: NRB,c = 66 | | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| BWP configuration | Initial DL BWP |  | 1,2,3 | DLBWP.0.1 | | N/A | | N/A | |
| Initial UL BWP |  | ULBWP.0.1 | | N/A | | N/A | |
| Dedicated DL BWP |  | DLBWP.1.1 | | N/A | | N/A | |
| Dedicated UL BWP |  | ULBWP.1.1 | | N/A | | N/A | |
| OCNG Patterns | |  | 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH RMC configuration | |  | 1 | SR.1.1 FDD | | N/A | | N/A | |
| 2 | SR.1.1 TDD | |
| 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration | |  | 1 | CR.1.1 FDD | | N/A | | N/A | |
| 2 | CR.1.1 TDD | | N/A | | N/A | |
| 3 | CR.2.1 TDD | | N/A | | N/A | |
| Dedicated CORESET RMC configuration | |  | 1 | CCR.1.1 FDD | | N/A | | N/A | |
| 2 | CCR.1.1 TDD | | N/A | | N/A | |
| 3 | CCR.2.1 TDD | | N/A | | N/A | |
| SSB parameters | |  | 1 | SSB.1 FR1 | | SSB.1 FR1 | | SSB.1 FR1 | |
| 2 | SSB.1 FR1 | | SSB.1 FR1 | | SSB.1 FR1 | |
| 3 | SSB.2 FR1 | | SSB.2 FR1 | | SSB.2 FR1 | |
| SMTC configuration | |  | 1 | SMTC.2 | | SMTC.2 | | SMTC.2 | |
| 2 | SMTC.1 | | SMTC.1 | | SMTC.1 | |
| 3 | SMTC.1 | | SMTC.1 | | SMTC.1 | |
| TRS Configuration | |  | 1 | TRS.1.1 FDD | | N/A | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | | N/A | |
| PRS configuration | |  | 1 | PRS.1.4 FR1 | | N/A | | PRS.1.4 FR1 | |
| 2 | PRS.1.4 FR1 | | N/A | | PRS.1.4 FR1 | |
| 3 | PRS.2.4 FR1 | | N/A | | PRS.2.4 FR1 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 1 | 15 | | | | | |
| 2, 3 | 30 | | | | | |
| PRS muting configuration | |  | 1, 2, 3 | ‘10’ | | ‘01’ | | ‘01’ | |
| EPRE ratio of PSS to SSS | |  | 1, 2, 3 | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  | 1, 2, 3 |
| EPRE ratio of PBCH to PBCH DMRS | |  | 1, 2, 3 |
| EPRE ratio of PDCCH DMRS to SSS | |  | 1, 2, 3 |
| EPRE ratio of PDCCH to PDCCH DMRS | |  | 1, 2, 3 |
| EPRE ratio of PDSCH DMRS to SSS | |  | 1, 2, 3 |
| EPRE ratio of PDSCH to PDSCH | |  | 1, 2, 3 |
| EPRE ratio of OCNG DMRS to SSS (Note 1) | |  | 1, 2, 3 |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  | 1, 2, 3 |
| Note2 | | dBm/15kHz |  | -98+TT | | -98+TT | | -98+TT | |
| Note2 | | dBm/SCS | 1, 2 | -98 | | -98 | | -98 | |
| 3 | -95 | | -95 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS Note5 | 1, 2 | -94+TT | -94+TT | -Infinity | -94+TT | N/A | N/A |
| 3 | -91+TT | -91+TT | -Infinity | -94+TT | N/A | N/A |
| PRS-RSRP Note 3 | | dBm/SCS Note5 | 1, 2 | -Infinity | -101+TT | N/A | N/A | -Infinity | -108+TT |
| 3 | -Infinity | -98+TT | N/A | N/A | -Infinity | -105+TT |
| PRS | | dB | 1, 2, 3 | -Infinity | -3+TT | N/A | N/A | -Infinity | -10+TT |
| PRS | | dB | 1, 2, 3 | -Infinity | -3+TT | N/A | N/A | -Infinity | -10+TT |
| IoNote3 | | dBm/9.36 MHz | 1, 2 | -62.25+TT | | -64.60+TT | -62.25+TT | -62.25+TT | |
| dBm/38.16 MHz | 3 | -56.16+TT | | -58.50+TT | -56.16+TT | -56.16+TT | |
| Propagation Condition | |  | 1, 2, 3 | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP/PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP/PRS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | | |

The UE shall send one Event A3 triggered measurement report for cell 2, with a measurement reporting delay less than 1840 ms from the beginning of period T2.

The PRS RSRP measurement time fulfils the requirements specified in TS 38.133[6] Clause 9.9.3.5. The UE shall perform and report the PRS RSRP measurements for Cell 3 with respect to the reference cell in the DL-AoD assistance data, Cell 1, within the time duration specified in TS 38.133[6] section 9.9.3.5 starting from the beginning of time interval T2.

The rate of the correct events for the neighbour cell observed during repeated tests shall be at least 90% with a confidence level of 95%, where the reported PRS RSRP measurement for each correct event shall be within the PRS RSRP reporting range specified in TS 38.133[6] Clause 10.1.24.3, i.e., between PRS RSRP\_0 and PRS RSRP\_126.

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% with a confidence level of 95%.

IUE 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.

### 6.6.19 SA event triggered reporting tests with NCSG

#### 6.6.19.0 Minimum conformance requirements

##### 6.6.19.0.1 Minimum conformance requirements for intra-frequency measurement

For the UE supporting NCSG, if NCSG is provided, the UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise, UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within Tidentify\_intra\_without\_index. It is assumed that *deriveSSB-IndexFromCell* is always enabled for FR1 TDD and FR2.

Tidentify\_intra\_without\_index = TPSS/SSS\_sync\_intra + T SSB\_measurement\_period\_intra ms

Where:

TPSS/SSS\_sync\_intra: it is the time period used in PSS/SSS detection given in table 6.6.19.0.1-1 and 6.6.19.0.1-2 (deactivated Scell).

TSSB\_measurement\_period\_intra: equal to a measurement period of SSB based measurement given in table 6.6.19.0.1-3 and 6.6.19.0.1-4 (deactivated Scell).

CSSFintra: it is a carrier specific scaling factor and is determined according to CSSFwithin\_ncsg,i in TS 38.133 [6] clause 9.1.5.3 for measurement conducted within NCSG.

Table 6.6.19.0.1-1: Time period for PSS/SSS detection with NCSG (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | max(600ms, 5 x max(VIRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(600ms, ceil(M2Note 1x 5) x max(VIRP, SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | 5 x max(VIRP, DRX cycle) x CSSFintra |
| NOTE 1: When *highSpeedMeasFlag-r16* is not configured, M2 = 1.5; When *highSpeedMeasFlag-r16* is configured, M2 = 1.5 if SMTC periodicity > 40 ms, otherwise M2=1.  NOTE 2: When *highSpeedMeasFlag-r16* is configured, the requirements apply only to UE supporting either *measurementEnhancement-r16* or *[intraRAT-MeasurementEnhancement-r16]* on measurements of the primary component carrier and do not apply to measurements of a secondary component carrier with active SCell. | |

Table 6.6.19.0.1-2: Time period for PSS/SSS detection with NCSG (deactivated SCell) (FR1)

|  |  |
| --- | --- |
| DRX cycle | TPSS/SSS\_sync\_intra |
| No DRX | 5 x max(measCycleSCell, VIRP) x CSSFintra |
| DRX cycle≤ 320ms | 5 x max(measCycleSCell, VIRP, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320ms | 5 x max(measCycleSCell, VIRP, DRX cycle) x CSSFintra |

Table 6.6.19.0.1-3: Measurement period for intra-frequency measurements with NCSG (FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_intra |
| No DRX | max(200ms, 5 x max(VIRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x 5) x max(VIRP, SMTC period,DRX cycle))x CSSFintra |
| DRX cycle>320ms | 5 x max(VIRP, DRX cycle) x CSSFintra |

Table 6.6.19.0.1-4: Measurement period for intra-frequency measurements with NCSG (deactivated SCell) (FR1)

|  |  |
| --- | --- |
| DRX cycle | T SSB\_measurement\_period\_intra |
| No DRX | 5 x max(measCycleSCell, VIRP) x CSSFintra |
| DRX cycle≤ 320ms | 5 x max(measCycleSCell, VIRP, 1.5xDRX cycle) x CSSFintra |
| DRX cycle> 320ms | 5 x max(measCycleSCell, VIRP, DRX cycle) x CSSFintra |

The requirements given above apply, provided:

- The cell being identified or measured is detectable.

An intra-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] sections 10.1.2 are fulfilled for a corresponding Band,

- SS-RSRQ related side conditions given in TS 38.133 [6] sections 10.1.7 are fulfilled for a corresponding Band,

- SS-SINR related side conditions given in TS 38.133 [6] sections 10.1.12 are fulfilled for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.2 for a corresponding Band.

The RSRP measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.2.1.1 and 10.1.2.1.2, the RSRQ measurement accuracy for all measured cells shall be as specified in TS 38.133 [6] clauses 10.1.7.1.1, and the SINR measurement accuracy for all measured cells shall be as specified in the TS 38.133 [6] clause 10.1.12.1.1.

Reported RSRP, RSRQ and SINR measurements contained in event triggered measurement reports shall meet the requirements in TS 38.133 [6] clauses 10.1.2.1.1, 10.1.2.1.2, 10.1.7.1.1 and 10.1.12.1.1, respectively.

The UE shall not send any event triggered measurement reports, as long as no reporting criteria are fulfilled.

The measurement reporting delay is defined as the time between an event that will trigger a measurement report and the point when the UE starts to transmit the measurement report over the air interface. This requirement assumes that that the measurement report is not delayed by other RRC signalling on the DCCH. This measurement reporting delay excludes a delay uncertainty resulted when inserting the measurement report to the TTI of the uplink DCCH. The delay uncertainty is: 2 x TTIDCCH. This measurement reporting delay excludes a delay which caused by no UL resources for UE to send the measurement report.

The event triggered measurement reporting delay, measured without L3 filtering shall be less than Tidentify\_intra\_without\_index defined in TS 38.133 [6] section 9.2.7.1. When L3 filtering is used an additional delay can be expected.

The normative reference for this requirement is TS 38.133 [6] clauses 9.2.2, 9.2.4.2, 9.2.7.1, and 9.2.7.2.

##### 6.6.19.0.2 Minimum conformance requirements for inter-frequency measurement

For the UE supporting NCSG, if NCSG is provided, the UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured) or *deriveSSB-IndexFromCellInter-r17* is configured. Otherwise, UE shall be able to identify a new detectable inter frequency cell within Tidentify\_inter\_with\_index. The UE shall be able to identify a new detectable inter frequency SS block of an already detected cell within Tidentify\_inter\_without\_index.

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

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

Where:

TPSS/SSS\_sync\_inter: it is the time period used in PSS/SSS detection given in table 6.6.19.0.2-1.

TSSB\_measurement\_period\_inter: equal to a measurement period of SSB based measurement given in table 6.6.19.0.2-2.

Table 6.6.19.0.2-1: Time period for PSS/SSS detection with NCSG (FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | TPSS/SSS\_sync\_inter |
| No DRX | Max(600ms, 8 × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(600ms, Ceil(8\*1.5) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | 8 × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group. | |

Table 6.6.19.0.2-2: Measurement period for inter-frequency measurements with NCSG (FR1)

|  |  |
| --- | --- |
| Condition NOTE1,2 | T SSB\_measurement\_period\_inter |
| No DRX | Max(200ms, 8 × Max(VIRP, SMTC period)) × CSSFinter |
| DRX cycle ≤ 320ms | Max(200ms, Ceil(8 × 1.5) × Max(VIRP, SMTC period, DRX cycle)) × CSSFinter |
| DRX cycle > 320ms | 8 × DRX cycle × CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group. | |

When NCSG are provided for inter frequency measurements, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in TS 38.133 [6] clauses 10.1.4, 10.1.5, 10.1.9, 10.1.10, 10.1.14 and 10.1.15, respectively, as shown in table 6.6.19.0.2-2.

For UE supporting *nr-NeedForGapNCSG-reporting-r17* and indicating *NeedForGapNCSG-InfoNR* for inter-frequency measurement,

- An inter-frequency SSB measurement is defined as measurement with NCSG if

- the UE indicates ‘ncsg’ via *NeedForGapNCSG-InfoNR* for the inter-frequency measurement, and

- the SSB is not completely contained in the active BWP of the UE

When network configures NCSG, the delay requirements are specified in TS 38.133 [6] clause 9.3.10.

- For inter-frequency SSB based measurements with NCSG, UE may cause scheduling restriction as specified in TS 38.133 [6] clause 9.3.10.3.

An inter-frequency cell shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in TS 38.133 [6] clauses 10.1.4 and 10.1.5 for FR1 and FR2, respectively, for a corresponding Band,

- SS-RSRQ related side conditions given in TS 38.133 [6] clauses 10.1.9 and 10.1.10 for FR1 and FR2, respectively, for a corresponding Band,

- SS-SINR related side conditions given in TS 38.133 [6] clauses 10.1.14 and 10.1.15 for FR1 and FR2, respectively, for a corresponding Band,

- SSB\_RP and SSB Ês/Iot according to TS 38.133 [6] Annex B.2.3 for a corresponding Band.

The normative reference for this requirement is TS 38.133 [6] clause 9.3.2, 9.3.6.3, and 9.3.10.

##### 6.6.19.0.3 Minimum conformance requirements for inter-RAT measurement

The requirements are application for NR−E-UTRAN RSRP, RSRQ, and RS-SINR measurements.

In the requirements, an E-UTRAN cell is considered to be detectable when:

- RSRP related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.2 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RSRQ related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.3 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.3 of TS 36.133 [23],

- RS-SINR related conditions in the accuracy requirements in TS 38.133 [6] Section 10.2.5 are fulfilled for a corresponding Band, together with the corresponding side conditions in Annex B.2.3 and Annex B.3.19 of TS 36.133 [23].

For UE supporting *eutra-NeedForGapNCSG-reporting-r17* and indicating *NeedForGapNCSG-InfoEUTRA* for inter-RAT measurement,

- An inter-RAT measurement is defined as measurement with NCSG if

- the UE indicates ‘ncsg’ via *NeedForGapNCSG-InfoEUTRA* for the inter-RAT measurement

When network configures measurement gap or NCSG, the delay requirements are specified in TS 38.133 [6] clause 9.4.2 and 9.4.3.

Parameter TInter1 used in inter-RAT requirements in TS 38.133 [6] clause 9.4 is specified in Table 6.6.19.0.3-1 when NCSG is used.

Table 6.6.19.0.3-1: Minimum available time for inter-RAT measurements when NCSG is configured

|  |  |  |  |
| --- | --- | --- | --- |
| NCSG Pattern Id | Measurement Length (ML, ms) | Visible Interruption Repetition Period  (VIRP, ms) | Minimum available time for inter-frequency and inter-RAT measurements during 480 ms period  (Tinter1, ms) |
| 0 | 5 | 40 | 60 |
| 1 | 5 | 80 | 30 |
| 2 | 2 | 40 | 24Note 1 |
| 3 | 2 | 80 | 12Note 1 |
| 4 | 5 | 20 | 120 Note 1 |
| 6 | 3 | 20 | 72 Note 1,3 |
| 7 | 3 | 40 | 36 Note 1,3 |
| 8 | 3 | 80 | 18Note 1,3 |
| 10 | 2 | 20 | 48 Note 1 |
| NOTE 1: When determining UE requirements using Tinter1 for NCSG pattern IDs 2, 3, 4, 6, 7, 8, 10, Tinter1 = 60 for NCSG pattern IDs 2, 4, 6, 7, 10, and Tinter1 = 30 for NCSG pattern IDs 3 and 8 shall be used.  NOTE 2: NCSG pattern configurations applicability is as specified in Table 9.1.2C-1.  NOTE 3: This NCSG pattern is applicable for E-UTRA inter-frequency measurements only if NCSG based NR measurements are also configured. | | | |

The normative reference for this requirement is TS 38.133 [6] clauses 9.4.2, 9.4.3.

##### 6.6.19.0.4 Minimum conformance requirements for interruptions

It is up to UE implementation whether or not the UE is able to conduct transmission in the following slot(s),

- when *mgta* is not applied, in the L consecutive UL slots with respect to the SCS of the UL carrier with the same slot indices as the DL slots occurring immediately after the last each of the interrupted slots after VIL1 and VIL2.

where UL slot denotes that all the symbols in the slot are uplink symbols, and L=1 if  for the UL transmission is less than the length of one slot; L=2 otherwise.

Note: Network is supposed to take into account the possible difference between the estimated TA at network and actual TA at UE when scheduling UE in the above slot(s).

The interruptions of NCSG in number of slots are listed in Table 6.6.19.0.4-1 on all serving cells when per-UE NCSG is configured or on FR1 serving cells when per-FR FR1 NCSG is configured to *ncsg-MeasGapPerFR-r17* capable UE. There are two interruptions in each NCSG occasion, VIL1 before ML and VIL2 after ML, in NR standalone (with single carrier or NR CA). Each of them has number of interrupted slots captured in Table 6.6.19.0.4-1.

Table 6.6.19.0.4-1: Number of interrupted slots on all serving cells for per-UE NCSG or FR1 serving cells for FR1 NCSG during each VIL in NR standalone operation (with single carrier, NR CA)

|  |  |
| --- | --- |
| NR | Number of interrupted slots on serving cells |
| SCS | When MG timing advance of 0ms is applied |
| (kHz) | VIL=1ms |
| 15 | 1 |
| 30 | 2 |
| 60 | 4 |
| 120 | 8 |
| NOTE 1: NR SCS of 120 kHz is only applicable to the case with per-UE NCSG.  NOTE 2: Void | |

#### 6.6.19.1 NR SA FR1 event-triggered reporting tests with NCSG under non-DRX in FR1

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.19.1.1 Test purpose

To verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell identification and measurement period requirements in 38.133 [6] clauses 9.2.7.1 and 9.2.7.2, and also verify the scheduling availability during intra-frequency measurement with NCSG in 38.133 [6] clause 9.2.7.3.

6.6.19.1.2 Test applicability

This test applies to all types of NR UE from release 17 onwards supporting CSI-RS-based RLM, BWP operation without bandwidth restriction and NR NCSG capability. The UE is capable of NCSG and report ‘*ncsg*’ through *NeedForGapNCSG-InfoNR* for PCell. Test 1 is applicable to UEs not supporting per-FR NCSG (ncsg-MeasGapPerFR-r17, as defined in TS 38.306 [11]) and Test 2 is applicable only to UEs supporting per-FR NCSG.

6.6.19.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.19.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.19.1.

6.6.19.1.4 Test description

6.6.19.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.19.1.4.1-1.

Table 6.6.19.1.4.1-1: Supported test configurations for NR PCell

|  |  |
| --- | --- |
| Config | Description |
| 6.6.19.1-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.19.1-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.19.1-3 | 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  Note 2: Target NR cells have the same SCS, BW and duplex mode as NR serving cells | |

Test environment parameters are given in Table 6.6.19.1.4.1-2.

Table 6.6.19.1.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
|  | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.19.1.4.1-1 | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.19.1.4.1-3.

2. Message contents are defined in clause 6.6.19.1.4.3.

3. Two cells are deployed in the test, which are FR1 PCell(Cell 1) and FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The power levels and settings are according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.19.1.4.1-3: General test parameters for SA intra-frequency event triggered reporting for FR1 with NCSG

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| Active cell |  | 1, 2, 3 | Cell 1 | |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 | |  |
| NCSG type |  | 1, 2, 3 | Per-UE | Per-FR | Per-FR NCSG pattern is configured if UE support per-FR NCSG; otherwise, per-UE NCSG patter is configured. |
| NCSG pattern |  | 1, 2, 3 | 0 | 2 |  |
| Visible interruption repetition periodicity | ms | 1, 2, 3 | 40 | 40 |  |
| Measurement length | ms | 1, 2, 3 | 5 | 2 |  |
| NCSG offset | ms | 1, 2, 3 | 39 | 39 |  |
| SSB configuration |  | 1 | SSB.1 FR1 | |  |
|  |  | 2 | SSB.1 FR1 | |  |
|  |  | 3 | SSB.2 FR1 | |  |
| SMTC configuration |  | 1 | SMTC.2 | |  |
|  |  | 2 | SMTC.1 | |  |
|  |  | 3 | SMTC.1 | |  |
| CSI-RS parameters |  | 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 | |  |
| 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 | ms | 1, 2, 3 |  | | OFF |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | 2 | 3 μs | | Synchronous cells |
|  |  | 3 | 3 μs | | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 | |  |
| T2 | s | 1, 2, 3 | 1 | |  |

6.6.19.1.4.2 Test procedure

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. The PCell shall continuously scheduled with data in the DL starting from T2 until the UE has sent the measurement report during T2. The test parameters are given in Table 6.6.19.1.4.1-3 and Table 6.6.19.1.5-1 respectively.

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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.19.1.5-1.

3. SS shall transmt an *RRCReconfiguration* message.

4. The UE shall transmit RRCReconfigurationComplete message. T1 starts.

5. When T1 expores, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.19.1.5-1. T2 start.

6. SS schedules on PCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PCell.

7. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 802ms and DTX in PCell is not observed by the SS for the corresponding PDSCH scheduled in PCell in all the slots expect for the case where PDSCH or PUCCH is overlapped with VIL of NCSG pattern then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements or DTX in PCell is observed by the SS except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern, then the number of failure tests is increased by one.

8. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

9. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

10. Depending on the choice in Step 8, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

11. Repeat step 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.19.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.19.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with Condition INTRA-FREQ  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.2 and MGe with associatedMeasGapSSB-r17=1 for configuration 6.6.19.1-1  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.1 FR1, SMTC.1, MGe with associatedMeasGapSSB-r17=1 and synchronous cells for configuration 6.6.1.19-2  Table H.3.1-3 with Condition INTRA-FREQ MO, SSB.2 FR1, SMTC.1, MGe with associatedMeasGapSSB-r17=1 and synchronous cells for configuration 6.6.1.19- 3  Table H.3.1-4 with A3-offset = -4.5dB  Table H.3.1-5  Table H.3.1-7 with Condition INTRA-FREQ  Table H.3.1-8 with Condition CSI-RS RLM |

Table 6.6.19.1.4.3-2: *ServingCellConfig*

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| downlinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Downlink[1] | BWP-Downlink with condition BWP-Id1 | DLBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveDownlinkBWP-Id | 1 | Active DL BWP-ID (BWP2) | BWP-Id1 |
| defaultDownlinkBWP-Id | 0 | Initial BWP (BWP1) |  |
| uplinkConfig SEQUENCE { |  |  |  |
| uplinkBWP-ToAddModList SEQUENCE (SIZE (1..maxNrofBWPs)) OF SEQUENCE { |  |  |  |
| BWP-Uplink[1] | BWP-Uplink with condition BWP-Id1 | ULBWP.1.2 configuration |  |
| } |  |  |  |
| firstActiveUplinkBWP-Id | 1 | Active UL BWP-ID (BWP2) | BWP-Id1 |
| } |  |  |  |
| } |  |  |  |

|  |  |
| --- | --- |
| Condition | Explanation |
| BWP-Id1 | Active BWP (BWP2) |

Table 6.6.19.1.4.3-3: MeasGapConfig(Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table H.3.1-6 with condition MGe and NCSG | | | |
| Information Element | Value/remark | Comment | Condition |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 { | 1 entry |  |  |
| GapConfig-r17 SEQUENCE { |  |  |  |
| measGapId-r17 | 1 |  |  |
| gapType-r17 | perUE |  | Test1 |
|  | perFR1 |  | Test2 |
| gapOffset-r17 | 39 |  |  |
| mgl-r17 | ms5 |  | Test1 |
|  | ms2 |  | Test2 |
| mgrp-r17 | ms40 |  |  |
| mgta-r17 | ms0 |  |  |
| ncsgInd-r17 | true |  |  |
| } |  |  |  |

6.6.19.1.5 Test requirement

Table 6.6.19.1.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.19.1.5-1: NR Cell specific test parameters for SA intra-frequency event triggered reporting with NCSG for PCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
|  |  | 2 | SR.1.1 TDD | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | |
|  |  | 2 | CR.1.1 TDD | | N/A | |
|  |  | 3 | CR.2.1 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | N/A | |
|  |  | 2 | CCR.1.2 TDD | | N/A | |
|  |  | 3 | CCR.2.1 TDD | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | |
|  |  | 2 | TRS.1.1 TDD | | N/A | |
|  |  | 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1 | -98+TT | | | |
|  |  | 2 | -98+TT | | | |
|  |  | 3 | -95+TT | | | |
| Note 2 | dBm/15 kHz | 1 | -98+TT | | | |
|  |  | 2 |  | | | |
|  |  | 3 |  | | | |
|  | dB | 1 | 4+TT | -1.46+TT | -Infinity | -1.46+TT |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
|  | dB | 1 | 4+TT | 4+TT | -Infinity | 4+TT |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94+TT | -94+TT | -Infinity | -94+TT |
|  |  | 2 | -94+TT | -94+TT | -Infinity | -94+TT |
|  |  | 3 | -91+TT | -91+TT | -Infinity | -91+TT |
| Io | dBm/9.36 MHz | 1 | -64.60+TT | -62.25+TT | -64.60+TT | -62.25+TT |
|  | dBm/9.36 MHz | 2 | -64.60+TT | -62.25+TT | -64.60+TT | -62.25+TT |
|  | dBm/38.16 MHz | 3 | -58.50+TT | -56.16+TT | -58.50+TT | -56.16+TT |
| 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. | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to NR Cell2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

The overall delays measured shall be less than a total of 802ms in this test case (note: this gives a total of 800ms for measurement reporting delay plus 2ms for TTI insertion uncertainty)

The UE shall be scheduled on PCell continuously throughout the test. From the start of T2 until the measurement report is received during T2, UE shall send HARQ ACK/NACK for the corresponding PDSCH scheduled in PCell in all the slots except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern

For a test to be considered successful requirements on both Event A3 detection and 100% of all expected ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%.

#### 6.6.19.2 NR SA FR1 event-triggered reporting tests for FR1 with NCSG for inter-frequency measurement

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.19.2.1 Test purpose

To verify that the UE makes correct reporting of an event. This test will partly verify the inter-frequency cell identification and measurement period requirements in 38.133 [6] clauses 9.3.10.1 and 9.3.10.2, and also verify the scheduling availability during inter-frequency measurement with NCSG in 39.133 [6] clause 9.3.10.3.

6.6.19.2.2 Test applicability

This test applies to all types of NR UEs supporting NR NCSG capability from release 17 onwards. Test 1 is applicable to UEs not supporting per-FR NCSG (*ncsg-MeasGapPerFR-r17*, as defined in TS 38.306 [11]) and Test 2 is applicable only to UEs supporting per-FR NCSG. The serving frequency and the target frequency should be selected such that UE reports ‘ncsg’ for the target frequency given the serving frequency.

6.6.19.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.19.0.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.19.2.

6.6.19.2.4 Test description

6.6.19.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.19.2.4.1-1.

Table 6.6.19.2.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 6.6.19.2-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.19.2-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.19.2-3 | 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  Note 2: Target NR cells have the same SCS, BW and duplex mode as NR serving cells | |

Test environment parameters are given in Table 6.6.19.2.4.1-2.

Table 6.6.19.2.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.19.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.1.8.4 for TE part and A.3.2.5.2 for DUT part. | |  |

1. The general test parameter settings are set up according to Table 6.6.19.2.4.1-3.

2. Message contents are defined in clause 6.6.19.2.4.3.

3. There are two NR cells on two carriers specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup and Cell 2 is a target cell on a different carrier than Cell 1. The power levels and settings are according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.19.2.4.1-3: General test parameters for SA inter-frequency event triggered reporting for FR1 with NCSG

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies is used. |
| Active cell |  | Config 1,2,3 | NR cell 1 (Pcell) | | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR cell2 | | NR cell 2 is on NR RF channel number 2. |
| NCSG Pattern Id |  | Config 1,2,3 | 0 | 2 |  |
| NCSG offset |  | Config 1,2,3 | 9 | |  |
| SMTC-SSB parameters |  | Config 1 | SSB.1 FR1 | |  |
|  |  | Config 2 | SSB.1 FR1 | |  |
|  |  | Config 3 | SSB.2 FR1 | |  |
| 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 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | Config 2,3 | 3μs | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1 | |  |

6.6.19.2.4.2 Test procedure

Two cells are deployed in the test: NR cell 1 as PCell in FR1 on NR RF channel 1 and NR cell2 as neighbour cell in FR1 on NR RF channel 2. NR RF channel 1 and NR RF channel 2 should be selected such the UE reports ‘ncsg’ for the target frequency on NR RF channel 2. The test parameters are given in Table 6.6.19.2.4.1-3 and Table 6.6.19.2.5-1 respectively.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used for both frequency layers. 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.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.19.2.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.19.2.5-1. T2 starts.

6. SS schedules on PCell continuously and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PCell.

7. UE shall transmit a *MeasurementReport* message triggered by Event A3. If the overall delays measured from the beginning of time period T2 is less than 922ms and DTX in PCell is not observed by the SS for the corresponding PDSCH scheduled in PCell in all the slots expect for the case where PDSCH or PUCCH is overlapped with VIL of NCSG pattern, then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements or DTX in PCell is observed by the SS except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern, then the number of failure tests is increased by one.

8. After the SS receive the *MeasurementReport* message in step 6 or when T2 expires, the SS shall:

- transmit *RRCRelease* message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

9. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

10. Depending on the choice in Step 8, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

11. Repeat step 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.19.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.19.2.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-FREQ  Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC.5 and MGe with associatedMeasGapSSB-r17=1 for configuration 6.6.19.2-1  Table H.3.1-3 with Condition INTER-FREQ MO, SSB.1 FR1, SMTC.4, MGe with associatedMeasGapSSB-r17=1 and synchronous cells for configuration 6.6.19.2-2  Table H.3.1-3 with Condition INTER-FREQ MO, SSB.2 FR1, SMTC.4, MGe with associatedMeasGapSSB-r17=1 and synchronous cells for configuration 6.6.19.2-3  Table H.3.1-4 with A3-offset = -6dB  Table H.3.1-5  Table H.3.1-7 with condition INTER-FREQ |

Table 6.6.19.2.4.3-2: MeasGapConfig(Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table H.3.1-6 with condition MGe and NCSG | | | |
| Information Element | Value/remark | Comment | Condition |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 { | 1 entry |  |  |
| GapConfig-r17[1] SEQUENCE { |  |  |  |
| measGapId-r17 | 1 |  |  |
| gapType-r17 | perUE |  | Test1 |
| perFR1 |  | Test2 |
| gapOffset-r17 | 9 |  |  |
| mgl-r17 | ms5 |  | Test1 |
| ms2 |  | Test2 |
| mgrp-r17 | ms40 |  |  |
| mgta-r17 | ms0 |  |  |
| ncsgInd-r17 | true |  |  |
| } |  |  |  |

6.6.19.2.5 Test requirement

Table 6.6.19.2.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.19.2.5-1: Cell specific test parameters for SA event triggered reporting for FR1 with NCSG for inter-frequency measurement

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
|  | |  |  | T1 | T2 | | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | | 2 | |
| Duplex mode | |  | Config 1 | FDD | | | | |
|  | |  | Config 2,3 | TDD | | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | | |
|  | |  | Config 2 | TDDConf.1.1 | | | | |
|  | |  | Config 3 | TDDConf.2.1 | | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | | |
|  | |  | Config 3 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | | NA | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | | NA | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | | NA | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | | NA | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | | NA | |
|  | |  | Config 2 | TRS.1.1 TDD | | | NA | |
|  | |  | Config 3 | TRS.1.2 TDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | | |  | |
|  | |  | 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 | CR2.1 TDD | | |  | |
| Dedicated CORESET Reference Channel | |  | Config 1 | CCR.1.1 FDD | | |  | |
|  | Config 2 | CCR.1.1 TDD | | |  | |
|  | Config 3 | CCR.2.1 TDD | | |  | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | |  | Config 2 | SSB.1 FR1 | | | SSB.5 FR1 | |
|  | |  | Config 3 | SSB.2 FR1 | | | SSB.6 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | | SMTC.5 | |
|  | |  | Config 2, 3 | SMTC.1 | | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | | |
|  | |  | Config 3 | 30 | | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  | | |  | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  | | |  | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  | | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  |  | | |  | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | |  | |
| Note2 | | dBm/15kHz |  | -98+TT | | -98+TT | | |
| Note2 | | dBm/SCS | Config 1,2 | -98+TT | | -98+TT | | |
|  | |  | Config 3 | -95+TT | | -95+TT | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94+TT | -94+TT | | -Infinity | -91+TT |
|  | |  | Config 3 | -91+TT | -91+TT | | -Infinity | -88+TT |
|  | | dB | Config 1,2,3,4,5,6 | 4+TT | 4+TT | | -Infinity | 7+TT |
|  | | dB | Config 1,2,3 | 4+TT | 4+TT | | -Infinity | 7+TT |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59+TT | -64.59+TT | | -70.05+TT | -62.26+TT |
|  | | dBm/38.16MHz | Config 3 | -58.49+TT | -58.49+TT | | -63.94+TT | -56.15+TT |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A3 triggered measurement report to NR Cell2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

The overall delays measured shall be less than a total of 922ms in this test case (note: this gives a total of 920ms for measurement reporting delay plus 2ms for TTI insertion uncertainty)

The UE shall be scheduled on PCell continuously throughout the test. From the start of T2 until the measurement report is received during T2, UE shall send HARQ ACK/NACK for the corresponding PDSCH scheduled in PCell in all the slots except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern

For a test to be considered successful requirements on both Event A3 detection and 100% of all expected ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90% with a confidence level of 95%

#### 6.6.19.3 NR SA FR1 NR - E-UTRAN event-triggered reporting in non-DRX in FR1 with NCSG

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.19.3.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct event-triggered reporting of inter-RAT E-UTRAN measurements based on NCSG when operating in standalone (SA) operation with PCell in FR1.

6.6.19.3.2 Test applicability

This test applies to all types of NR Release 17 and forward supporting 5GS NR SA FR1, E-UTRAN and NCSG capability for E-UTRAN from release 17 onwards. The serving frequency and target frequency should be selected such that UE reports ‘ncsg’ for the target frequency given the serving frequency.

6.6.19.3.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.19.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.19.3.

6.6.19.3.4 Test description

6.6.19.3.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.19.3.4.1-1.

Table 6.6.19.3.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 6.6.19.3-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE FDD |
| 6.6.19.3-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.19.3-3 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE FDD |
| 6.6.19.3-4 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode, LTE TDD |
| 6.6.19.3-5 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode, LTE TDD |
| 6.6.19.3-6 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode, LTE TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Test environment parameters are given in Table 6.6.19.3.4.1-2.

Table 6.6.19.3.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.19.3.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.2 |
| Exceptions to connection diagram | N/A | |  |

1. The general test parameter settings are set up according to Table 6.6.19.3.4.1-3.

2. Message contents are defined in clause 6.6.19.3.4.3.

3. There are one NR carriers and one E-UTRAN cell specified in the test. Cell 1 (NR cell 1) is the cell used for connection setup with the power level set according to Annex C.1.2 and C.1.3 for this test.

Table 6.6.19.3.4.1-3: General test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number |  | 2 | 1 LTE carrier frequency is used in the test |
| Channel Bandwidth | MHz | As specified in Tables 6.6.19.3.5-1 and 6.6.19.3.5-2. |  |
| Active cell |  | Cell 1 | Cell 1 is on NR RF channel number 1 |
| Neighbour cell |  | Cell 2 | Cell 2 is on LTE RF channel number 2 |
| NCSG Pattern Id |  | 0 | As specified in TS 38.133[6] Table 9.1.9.3-1. |
| NCSG offset | ms | 39 |  |
| NCSG mgta | ms | 0 |  |
| NR measurement quantity |  | SS-RSRP | Measurement quantity for Cell 1 |
| Inter-RAT E-UTRAN measurement quantity |  | RSRP | Measurement quantity for Cell 2 |
| b2-Threshold1 | dBm | As specified in Table 6.6.19.3-5-1 | SS-RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| b2-Threshold2EUTRA | dBm | -95 | E-UTRAN RSRP threshold for SS-RSRP measurement on cell1 for event B2 |
| Hysteresis | dB | 0 |  |
| TimeToTrigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  | OFF | OFF |
| T1 | s | 5 |  |
| T2 | s | 5 |  |

6.6.19.3.4.2 Test procedure

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 tming information of cell 2. The test parameters are given in Table 6.6.19.3.4.1-3, Table 6.6.19.3.5-1 and Table 6.6.19.3.5-2 respectively.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.19.3.5-1.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message.

5. T1 starts, SS continuously schedules on PCell with data in the DL starting from T1 and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PCell.

6. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.19.3.5-1. T2 starts.

7. UE shall transmit a *MeasurementReport* message triggered by Event B2. If the overall delays measured from the beginning of time period T2 is less than 3842ms and DTX in PCell is not observed by the SS for the corresponding PDSCH scheduled in PCell in all the slots expect for the case where PDSCH or PUCCH is overlapped with VIL of NCSG pattern then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements or DTX in PCell is observed by the SS except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern, then the number of failure tests is increased by one.

8. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

9. Set Cell 2 physical cell identity = ((current cell 2 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

10. Depending on the choice in Step 8, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

11. Repeat step 2-10 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.19.3.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.19.3.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions INTER-RAT  Table H.3.1-3A with condition MGe with associatedMeasGap-r17=1  Table H.3.1-4A  Table H.3.1-3 with condition SMTC.1, SSB.1 FR1 for configuration 6.6.19.3-1 and 6.6.19.3-4  Table H.3.1-3 with condition SMTC.1, SSB.1 FR1 and synchronous cells for configuration 6.6.19.3-2 and 6.6.19.3-5  Table H.3.1-3 with condition SMTC.1, SSB.2 FR1 and synchronous cells for configuration 6.6.19.3-3 and 6.6.19.3-6  Table H.3.1-5 with conditions INTER-RAT  Table H.3.1-7 with condition INTER-RAT |

Table 6.6.19.3.4.3-2: MeasGapConfig(Step 3)

|  |  |  |
| --- | --- | --- |
| Derivation Path: Table H.3.1-6 with condition MGe and NCSG | | |
| Information Element | Value/remark | Comment |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 { | 1 entry |  |
| GapConfig-r17[1] SEQUENCE { |  |  |
| measGapId-r17 | 1 |  |
| gapOffset-r17 | 39 |  |
| mgl-r17 | ms5 |  |
| mgrp-r17 | ms40 |  |
| mgta-r17 | ms0 |  |
| ncsgInd-r17 | true |  |
| } |  |  |

6.6.19.3.5 Test requirement

Table 6.6.19.3.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.19.3.5-1: PCell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 1 | |
|  | | |  |  | T1 | T2 |
| RF channel number | | |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode | | |  | 1, 2, 3 | FDD | |
|  | | |  | 4, 5, 6 | TDD | |
| TDD Configuration | | SCS=15 KHz |  | 2, 5 | TDDConf.1.1 | |
|  | | SCS=30 KHz |  | 3, 6 | TDDConf.2.1 | |
| BWchannel | | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | |
|  | | |  | 2, 5 | 10: NRB,c = 52 (TDD) | |
|  | | |  | 3, 6 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | | |  | 1, 4 | SR.1.1 FDD | |
|  | | |  | 2, 5 | SR.1.1 TDD | |
|  | | |  | 3, 6 | SR.2.1 TDD | |
| RMSI CORSET reference channel | | |  | 1, 4 | CR.1.1 FDD | |
|  | | |  | 2, 5 | CR.1.1 TDD | |
|  | | |  | 3, 6 | CR.2.1 TDD | |
| Dedicated CORSET reference channel | | |  | 1, 4 | CCR.1.1 FDD | |
|  | | |  | 2, 5 | CCR.1.1 TDD | |
|  | | |  | 3, 6 | CCR.2.1 TDD | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | |
|  | Dedicated DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | |
|  | Initial UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | |
|  | Dedicated UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | |
| OCNG patternNote1 | | |  | 1, 2, 3, 4, 5, 6 | OP.1 | |
| SMTC configuration | | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | |
| SSB configuration | | |  | 1, 2, 4, 5 | SSB.1 FR1 | |
|  | | |  | 3, 6 | SSB.2 FR1 | |
| CSI-RS for tracking | | |  | 1, 4 | TRS.1.1 FDD | |
|  | 2, 5 | TRS.1.1 TDD | |
|  | 3, 6 | TRS.1.2 TDD | |
| b2-Threshold1 | | | dBm | 1, 2, 4, 5 | -96 | |
|  | | |  | 3, 6 | -93 | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3, 4, 5, 6 | 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 SSS | | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS | | |  |  |  | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -104+TT | |
| *Noc*Note2 | | | dBm/SCS | 1, 2, 4, 5 | -104+TT | |
|  | | |  | 3, 6 | -101+TT | |
| Ês/Noc | | | dB | 1, 2, 3, 4, 5, 6 | 16+TT | 0+TT |
| Ês/IotNote3 | | | dB | 1, 2, 3, 4, 5, 6 | 16+TT | 0+TT |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88+TT | -104+TT |
|  | 3, 6 | -85+TT | -101+TT |
| SSB\_RPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88+TT | -104+TT |
|  | 3, 6 | -85+TT | -101+TT |
| IoNote3 | | | dBm/9.36 MHz | 1, 2, 4, 5 | -59.94+TT | -73.04+TT |
|  | | | dBm/38.16 MHz | 3, 6 | -53.84+TT | -66.93+TT |
| Propagation condition | | |  | 1, 2, 3, 4, 5, 6 | TDL-C 300ns 100Hz | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

Table 6.6.19.3.5-2: E-UTRAN neighbor cell specific test parameters for SA inter-RAT E-UTRAN event triggered reporting in non-DRX with PCell

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 2 | |
|  |  |  | **T1** | **T2** |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 1 | |
| Duplex mode |  | 1, 2, 3 | FDD | |
|  |  | 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1, 2, 3 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 4, 5, 6 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -104+TT | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 17+TT |
| Ês/IotNote5 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 17+TT |
| RSRPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -87+TT |
| SCH\_RPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -87+TT |
| IoNote5 | dBm/9MHz | 1, 2, 3, 4, 5, 6 | -76.22+10log (NRB,c /50) +TT | -59.13+10log (NRB,c /50) +TT |
| Propagation Condition |  | 1, 2, 3, 4, 5, 6 | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 6: Propagation condition and correlation matrix are defined in section B.2 in TS 36.101 [27]. | | | | |

The UE shall send one Event B2 triggered measurement report for Cell 2 to the PCell, with a measurement reporting delay less than 3842ms from the start of period T2. The measurement reporting delay is defined as the time from the beginning of time period T2 to the moment when the UE sends the measurement report on PUSCH.

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

The overall delays measured shall be less than a total of 3842 ms in this test case (note: this gives a total of 3840 ms for measurement reporting delay plus 2 ms for TTI insertion uncertainty).

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, UE shall send HARQ ACK/NACK for the corresponding PDSCH scheduled in PCell in all the slots except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern.

For a test to be considered successful requirements on both Event B2 detection and 100% of all expected ACK/NACKs have to be fulfilled simultaneously.

The rate of correct events observed during repeated tests shall be at least 90% with confidence level of 95%

#### 6.6.19.4 NR SA FR1 Event triggered reporting on SCC with deactivated SCell test with per-UE NCSG under non-DRX

Editor's Note: This test case is incomplete in following aspects:

* TT analysis is missing.

6.6.19.4.1 Test purpose

The purpose of this test is to verify UE’s ability to make a correct reporting for NCSG with SSB-based measurement with deactivated SCELL.

6.6.19.4.2 Test applicability

This test applies to all types of NR UEs supporting NR NCSG capability from release 17 onwards supporting 2DL CA.

6.6.19.4.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.19.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.6.19.4.

6.6.19.4.4 Test description

6.6.19.4.4.1 Initial conditions

This test shall be tested using any of the test configurations in this clause. The supported test configurations for NR PCell are shown in Table 6.6.19.4.4.1-1. Supported test configurations for NR SCell are shown in Table 6.6.19.4.4.1-1A. Test configuration for NR PCell and test configuration for NR SCell are chosen independently.

Table 6.6.19.4.4.1-1: Supported test configurations for NR PCell

|  |  |
| --- | --- |
| Config | Description |
| 6.6.19.4-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.19.4-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.19.4-3 | 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  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table 6.6.19.4.4.1-1A: Supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 6.6.19.4-1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.19.4-2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.19.4-3 | 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  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Test environment parameters are given in Table 6.6.19.4.4.1-2.

Table 6.6.19.4.4.1-2: Test environment parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1 and 4.4.2. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.19.4.1-1 | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part | A.3.1.8.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram | - Without LTE link  - For 4Rx capable UEs without any 2Rx RF bands use A.3.2.5.2 for DUT part and A.3.1.8.4 for TE part. | |  |

1. The general test parameter settings are set up according to Table 6.6.19.4.4.1-3.

2. Message contents are defined in clause 6.6.19.4.4.3.

3. Three cells are deployed in the test, which are FR1 PCell (Cell 1), FR1 SCell (Cell2) and FR1 neighbour cell (Cell3) on the same frequency as the SCell. Cell 1 and Cell 2 shall be configured according to Annex C.1.1 and C.1.2.

Table 6.6.19.4.4.1-3: General test parameters for event triggered reporting on SCC with deactivated SCell with per-UE NCSG for FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Configured deactivated 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 |  |
| RF Channel Number |  | 1, 2, 3 | 2: Cell 2 and Cell 3 |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE NCSG |  |
| NCSG pattern |  | 1, 2, 3 | ID # 0 |  |
| MGTA | ms | 1, 2, 5 | 0 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| A6-Offset | dB | 1, 2, 3 | -4.5 |  |
| 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 |
| SCell measurement cycle (measCycleSCell) | ms | 1, 2, 3 | 160 |  |
| Cell 2 timing offset to Cell 1 | μs | 1, 2, 3 | 0 |  |
| Time alignment error between Cell 2 and Cell 1 | μs | 1, 2, 3 | ≤ Time alignment error 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. |
| Cell 3 timing offset to Cell 1 | μs | 1, 2, 3 | 3 | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 5 |  |

6.6.19.4.4.2 Test procedure

Three cells are delployed in the test, which are FR1 PCell(Cell1), FR1 SCell(Cell2) and FR1 neighbour cell(Cell3) on the same frequency as the SCell. The SCell is deactivated during the test. 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 with Event A6 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. The PCell shall continuously scheduled with data in the DL starting from T1 until the UE has sent the measurement report during T2. The test parameters are given in Table 6.6.19.4.4.1-3 and Table 6.6.19.4.5-1 respectively.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.19.4.5-1.

3. SS shall configure SCell (Cell2) on the SCC as per TS 38.508-1[14] clause 7.5.1 and provide measurement configurations.

4. T1 starts, SS continuously schedules on PCell with data in the DL starting from T1 and UE shall start sending ACK/NACK reports. The SS shall monitor ACK/NACK/DTX on PCell.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.19.4.5-1. T2 starts.

6. UE shall transmit a *MeasurementReport* message triggered by Event A6. If the overall delays measured from the beginning of time period T2 is less than 1602 ms and DTX in PCell is not observed by the SS for the corresponding PDSCH scheduled in PCell in all the slots expect for the case where PDSCH or PUCCH is overlapped with VIL of NCSG pattern, then the number of successful tests is increased by one. If the UE fails to report the events within the overall delays measured requirements or DTX in PCell is observed by the SS except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern, then the number of failure tests is increased by one.

7. After the SS receive the MeasurementReport message in step 6 or when T2 expires, the SS shall:

- transmit RRCRelease message to release the RRC connection which includes the release of the established radio bearers as well as all radio resources

OR

- switch the UE off.

8. Set Cell 3 physical cell identity = ((current cell 3 physical cell identity + 1) mod 14 + 2) for next iteration of the test procedure loop.

9. Depending on the choice in Step 7, the SS:  
- if the RRC Connection Release has been sent, transmits in Cell 1 a Paging message (including PagingRecord with UE-Identity) for the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5 (if the paging fails, switches off and on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR, Connected without release On according to TS 38.508-1 [14] clause 4.5),  
OR  
- if the device has been switched off, switches on the UE and ensures the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release On according to TS 38.508-1 [14] clause 4.5.

10. Repeat step 2-9 until the confidence level according to Tables G.2.3-1 in Annex G clause G.2 is achieved.

6.6.19.4.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 4.6 with the following exceptions:

Table 6.6.19.4.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with conditions Deactivated SCell  Table H.3.1-5  Table H.3.1-7 with condition Deactivated SCell |

Table 6.6.19.4.4.3-2: ServingCellConfig (Cell 2)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-167 with condition MEAS | | | |
| Information Element | Value/remark | Comment | Condition |
| ServingCellConfig ::= SEQUENCE { |  |  |  |
| servingCellMO | 2 | MeasObjectId for SCell in Table H.3.1-2 |  |
| } |  |  |  |

Table 6.6.19.4.4.3-3: MeasObjectNR for SCell

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: Table H.3.1-3 with condition Deactivated SCell and Synchronous cells | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectNR::= SEQUENCE { |  |  |  |
| smtc1 | SSB-MTC specified in TS 38.508-1 [14] Table 7.3.1-3 with condition SMTC.1 |  | Configuration 6.6.19.4-2 and 6.6.19.4-3 |
|  | SSB-MTC specified in TS 38.508-1 [14] Table 7.3.1-3 with condition SMTC.2 |  | Configuration 6.6.19.4-1 |
| measCycleSCell-v1530 | sf160 |  |  |
| associatedMeasGapSSB-r17 | 1 |  |  |
| } |  |  |  |

Table 6.6.19.4.4.3-4: ReportConfigNR(Step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition EVENT\_A6 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| eventTriggered SEQUENCE { |  |  |  |
| eventId CHOICE { |  |  |  |
| eventA6 SEQUENCE { |  |  |  |
| a6-Offset CHOICE { |  |  |  |
| rsrp | -9 | The actual value is field value \* 0.5 dB. |  |
| } |  |  |  |
| hysteresis | 0 |  |  |
| timeToTrigger | ms0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
|  |  |  |  |

Table 6.6.19.4.4.3-5: MeasGapConfig(Step 3)

|  |  |  |
| --- | --- | --- |
| Derivation Path: Table H.3.1-6 with condition MGe and NCSG | | |
| Information Element | Value/remark | Comment |
| gapToAddModList-r17 SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF GapConfig-r17 { | 1 entry |  |
| GapConfig-r17[1] SEQUENCE { |  |  |
| measGapId-r17 | 1 |  |
| gapOffset-r17 | 39 |  |
| mgl-r17 | ms5 |  |
| mgrp-r17 | ms40 |  |
| mgta-r17 | ms0 |  |
| ncsgInd-r17 | true |  |
| } |  |  |

6.6.19.4.5 Test requirement

Table 6.6.19.4.5-1 defines the primary level settings including test tolerances for all tests.

Table 6.6.19.4.5-1: NR Cell specific test parameters for event triggered reporting on SCC with deactivated SCell with per-UE NCSG for FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | | N/A | | N/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | SR.1.1 TDD | |  | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | CR.1.1 TDD | | N/A | | N/A | |
|  |  | 3 | CR.2.1 TDD | | N/A | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | | N/A | |
|  |  | 2 | CCR.1.1 TDD | | N/A | | N/A | |
|  |  | 3 | CCR.2.1 TDD | | N/A | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | | TRS.1.1 FDD | |  | |
|  |  | 2 | TRS.1.1 TDD | | TRS.1.1 TDD | | N/A | |
|  |  | 3 | TRS.1.2 TDD | | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | | N/A | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | | DLBWP.1.1 | | N/A | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | | ULBWP.1.1 | | N/A | |
| Note 2 | dBm/SCS | 1 | -98+TT | | | | | |
|  |  | 2 | -98+TT | | | | | |
|  |  | 3 | -95+TT | | | | | |
| Note 2 | dBm/15 kHz | 1, 2, 3 | -98+TT | | | | | |
|  | dB | 1, 2, 3 | 4+TT | 4+TT | 4+TT | -1.46+TT | -Infinity | -1.46+TT |
|  | dB | 1, 2, 3 | 4+TT | 4+TT | 4+TT | 4+TT | -Infinity | 4+TT |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94+TT | -94+TT | -94+TT | -94+TT | -Infinity | -94+TT |
|  |  | 2 | -94+TT | -94+TT | -94+TT | -94+TT | -Infinity | -94+TT |
|  |  | 3 | -91+TT | -91+TT | -91+TT | -91+TT | -Infinity | -91+TT |
| Io | dBm/9.36 MHz | 1 | -64.60+TT | -64.60+TT | -64.60+TT | -62.25+TT | -64.60+TT | -62.25+TT |
|  | dBm/9.36 MHz | 2 | -64.60+TT | -64.60+TT | -64.60+TT | -62.25+TT | -64.60+TT | -62.25+TT |
|  | dBm/38.16 MHz | 3 | -58.50+TT | -58.50+TT | -58.50+TT | -56.16+TT | -58.50+TT | -56.16+TT |
| 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. | | | | | | | | |

The overall delays measured is defined as the time from the beginning of time period T2, to the moment the UE send one Event A6 triggered measurement report to NR Cell3. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

The overall delays measured shall be less than a total of 1602ms in this test case (note: this gives a total of 1600ms for measurement reporting delay plus 2ms for TTI insertion uncertainty)

The UE shall be scheduled on PCell continuously throughout the test. From the start of T1 until the measurement report is received during T2, UE shall send HARQ ACK/NACK for the corresponding PDSCH scheduled in PCell in all the slots except for the case where PDSCH or PUCCH is overlapped with the VIL of NCSG pattern.

For a test to be considered successful requirements on both Event A6 detection and 100% of all expected ACK/NACKs have to be fulfilled simultaneously.

For the test to pass, the total number of successful tests shall be more than 90% of the cases with a confidence level of 95%.

### 6.6.20 UE Rx-Tx time difference measurement for propagation delay compensation

#### 6.6.20.0 Minimum conformance requirements

[38.133 clause 9.12.4.1, 9.12.5 and 10.1.25.3.1] for measurement time

When UE is configured with *prs-Ref-r17* in *MeasObjectRxTxDiff*-r17 defined in TS 38.331 [2] and provided with PRS resource configuration, the UE shall be able to measure UE Rx-Tx time difference on PCell within the measurement period TUERx-Tx\_PRS, where:

Where:

is the maximum number of DL PRS resources configured in a slot,

is UE capability for number of DL PRS resources that it can process in a slot corresponding to *maxNumberPRS-ResourceProcessedPerSlot-r17* as specified in TS38.331 [2],

is the number of UE Rx-Tx time difference measurement samples and = 4,

is the PRS resource periodicity specific for RTT-based propagation delay compensation,

is the DRX cycle length when DRX is in use, 1ms otherwise.

is

Ntotal / Navailable, when Navailable>0

Where,

- For a window W of duration LCM(TPRS, MGRP\_max, TSMTC) and starting at the beginning of any PRS resource occasion, where TSMTC is the periodicity of SMTC for intra-frequency measurement without gap, and MGRP\_max is the maximum MGRP across all configured per-UE measurement gaps and per-FR measurement gaps within the same FR as PCell for a UE supporting *concurrentMeasGap-r17* and is configured with concurrent measurement gaps, otherwise MGRP max is the MGRP of configured per-UE measurement gap or per-FR measurement gap within the same FR as PCell:

- Ntotal is the total number of PRS resource occasions within the window, including those overlapped with measurement gap occasions or SMTC occasions within the window, and

- Navailable is the number of PRS resource occasions that are not overlapped with:

- For FR1: any measurement gap occasions after accounting for measurement gap collisions by applying the measurement gap collision rule in section 9.1.8.3 within the window W

No requirements shall apply if Navailable=0.

UE is only required to perform UE Rx-Tx time difference on PRS within the active DL BWP.

When UE is configured to perform UE Rx-Tx time difference measurement based on PRS, the requirements apply provided that the SCS of the PRS is same as that of the active BWP on PCell.

If PRS resources overlap with Type 1A/1B/2 PPW, the UE is allowed longer measurement period to measure UE Rx-Tx time difference on PCell.

The UE Rx-Tx time difference measurement values contained in measurement report shall be based on the

measurement report mapping requirements specified below.

The reporting range for the absolute UE Rx-Tx time difference measurement (TUE Rx-Tx) is defined from -985024×Tc to 985024×Tc with the resolution step of 2*k*×Tc.

Table 6.6.20.0-1: Absolute UE Rx-Tx time difference measurement report mapping for *k*=5

|  |  |  |
| --- | --- | --- |
| Reported Quantity Value | Measured Quantity Value | Unit |
| RX-TX\_TIME\_DIFFERENCE\_0000 | TUE Rx-Tx < -985024 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_0001 | -985024  TUE Rx-Tx < -984992 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_0002 | -984992  TUE Rx-Tx < -984960 | Tc |
|  |  | … |
| RX-TX\_TIME\_DIFFERENCE\_30782 | -32  TUE Rx-Tx < 0 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_30783 | 0  TUE Rx-Tx < 32 | Tc |
| … | … | … |
| RX-TX\_TIME\_DIFFERENCE\_61563 | 984960  TUE Rx-Tx < 984992 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_61564 | 984992  TUE Rx-Tx < 985024 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_61565 | 985024  TUE Rx-Tx | Tc |

[TS 38.133 clause 10.1.39.2] for measurement accuracy

The error in the reported value of UE Rx-Tx time difference measurement, including both the measurement error and the reporting quantization error, should be within the accuracy requirements specified in this clause.

The UE Rx-Tx time difference measurement accuracy requirements in this clause shall apply provided that:

- The UE transmits SRS within [-160, 160] msec of at least one PDC DL PRS resource from the serving cell (PCell).

When a serving cell change occurs during the UE Rx-Tx measurement period, the UE Rx-Tx time difference measurement accuracy requirements in this clause shall apply provided that the serving cell change does not impact SRS configuration for the UE Rx-Tx measurement.

The accuracy requirements in Table 6.6.20.0-2 for FR1 are valid under the following conditions:

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

PRP|dBm according to Annex [TBD] for a corresponding Band.

AWGN propagation condition.

Table 6.6.20.0-2: UE Rx-Tx time difference measurement accuracy in FR1 in AWGN

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | Conditions | | | | | | |
| PRS Ês/Iot | Minimum PRS bandwidth | PRS SCS | PRS resource repetition Note 3 | NR operating band groupsNote 2 | IoNote 4 range | |
| Minimum IoNote 1 | Maximum Io |
| TcNote 5 | dB | RB | kHz |  |  | dBm / SCSPRS | dBm/BW |
| ± [78+d+ℇ] | -3 | ≥[24] | 15 | ≥[4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -50 |
|  |  |  |  |  | NR\_FDD\_FR1\_B | -120.5 |  |
|  |  |  |  |  | NR\_TDD\_FR1\_C | -120 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_F | -118.5 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_G | -118 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_H | -117.5 |  |
| ± [59+d+ℇ] |  | ≥[52] |  | ≥[1] | Note 6 | NOTE 6 | NOTE 6 |
| ± [30+d+ℇ] |  | >[104] |  | ≥[1] | Note 6 | NOTE 6 | NOTE 6 |
| ± [57+d+ℇ] |  | ≥[24] | 30 | ≥[4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -118 | -50 |
|  |  |  |  |  | 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 |  |
| ± [30+d+ℇ] |  | ≥[48] |  | ≥[1] | NOTE 6 | NOTE 6 | NOTE 6 |
| ± [15+d+ℇ] |  | ≥[132] |  | ≥[1] | NOTE 6 | NOTE 6 | NOTE 6 |
| ± [29+d+ℇ] |  | ≥[24] | 60 | ≥[4] | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -115 | -50 |
|  |  |  |  |  | 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 | -113.5 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_G | -113 |  |
|  |  |  |  |  | NR\_FDD\_FR1\_H | -111.5 |  |
| ± [15+d+ℇ] |  | ≥[64] |  | ≥[1] | NOTE 6 | NOTE 6 | NOTE 6 |
| ± [7+d+ℇ] |  | ≥[132] |  | ≥[1] | NOTE 6 | NOTE 6 | NOTE 6 |
| NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.  NOTE 2: NR operating band groups are as defined in Section 3.5.  NOTE 3: are configured by higher layer parameter *dl-PRS-ResourceRepetitionFactor, dl-PRS-NumSymbols and dl-PRS-CombSizeN*defined in TS 37.355 [38].  NOTE 4: The Io is defined in PRS slots. The same Io range applies to PRS and non-PRS symbols. Io levels are different in PRS and non-PRS symbols within the same slot.  NOTE 5: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 6: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the PRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 7: δ is the margin determined from Table 10.1.39.2-3.  NOTE 8: ℇ is the margin for reporting quantization error and ℇ=16 Tc. | | | | | | | |

**Table 6.6.20.0-3: Margin for UE Rx-Tx time difference measurement accuracy in FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| Min(PRS BW, SRS BW) (RB) | | | Margin (Tc Note 1) |
| SCS = 15 kHz | SCS = 30 kHz | SCS = 60 kHz |
| ≥ 24 | N/A | N/A | [160] |
| ≥ 52 | ≥ 24 | N/A | [80] |
| ≥ 104 | ≥ 48 | ≥ 24 | [56] |
| N/A | ≥ 132 | ≥ 64 | [24] |
| N/A | N/A | ≥ 132 | [24] |
| NOTE 1: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 2: If SRS and PRS have different SCS, the margin corresponding to the smallest RS BW in MHz applies. | | | |

#### 6.6.20.1 UE Rx-Tx time difference measurement with PRS for RTT-based PDC in FR1 SA

6.6.20.1.1 Test purpose

The purpose of the test is to verify that the UE Rx-Tx measurement for RTT-based PDC meets the requirements specified in TS 38.133[6] clause 9.12.4.1 for measurement delay and clause 10.1.X for measurement accuracy in AWGN propagation condition in FR1 in standalone scenario.

6.6.20.1.2 Test applicability

This test applies to all types of NR UE release 17 onwards supporting *rtt-BasedPDC-PRS-r17 or gNB-SideRTT-BasedPDC-r17.*

6.6.20.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.20.0.

The normative reference for this requirement is TS 38.133 [6] clauses 9.12.4.1, 9.12.5, 10.1.39.2 and A.6.6.20.

6.6.20.1.4 Test description

6.6.20.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.20.1.4.1-1

Table 6.6.20.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.20-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.20-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.20-3 | 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. | |

Configure the test requirement and the DUT according to the parameters in Table 6.6.20.1.4.1-2.

Table 6.6.20.1.4.1-2: Initial conditions for UE Tx-Rx time difference measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.20.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2 |
| Connection Diagram | TE Part | A.3.1.7.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |
| Exceptions to connection diagram |  | |  |

1. The general test parameter settings are set up according to Table 6.6.20.1.4.1-3.

2. Message contents are defined in clause 6.6.20.1.4.3.

3. The test scenario comprises of 1 NR Cell. The connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.20.1.4.1-3: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value |
| Active cell |  | 1, 2, 3 | Cell 1 |
| RF Channel Number |  | 1, 2, 3 | 1 |
| BWchannel | MHz | 1 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| SSB configuration |  | 1 | SSB.1 FR1 |
|  |  | 2 | SSB.1 FR1 |
|  |  | 3 | SSB.2 FR1 |
| SMTC configuration |  | 1 | SMTC.2 |
|  |  | 2 | SMTC.1 |
|  |  | 3 | SMTC.1 |
| CP length |  | 1, 2, 3 | Normal |
| DRX |  | 1, 2, 3 | OFF |
| T1 | s | 1, 2, 3 | 5 |
| T2 | s | 1, 2, 3 | 10 |

6.6.20.1.4.2 Test procedure

The test is considered with one cell (Cell 1) in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. The Cell 1 mutes PRS transmission during T1 and transmits PRS during T2.

*measObject* with *measObjectRxTxDiff-r17,* and *NR-DL-PRS-PDC-Info* is defined ~~in~~ as per 6.6.20.1.4.3 and shall be provided to the UE during T1.

The last TTI containing the RRC configuration shall be provided to the UE DT ms before the start of T2, where DT = 10 ms. The UE is configured to transmit SRS during T2.

The general and cell specific test parameters for PCell is given in Table 6.6.20.1.4.1-3 and Table 6.6.20.1.5-1, respectively. In the measurement control information, a measurement object is configured for the frequency of the PCell, and. The test consists of two successive time periods, with time duration of T1, and T2 respectively.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.20.1.5-1 as appropriate.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.20.1.5-1. T2 starts.

6. The UE shall transmit periodically MeasurementReport messages.

7. After 10s wait from Step 3, the SS shall check the *result-k5-r17* reported values in the periodic MeasurementReport. If the *result-k5* value is outside the limits in Table 6.6.20.0-1 or the UE fails to report the measurement value for serving cell, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

8. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6.6.20.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table 4.6.3-76Bin 38.508-1 [14] withcondition PRS\_REF |
| Specific message contents exceptions for Test Configuration 6.6.20-1 and 6.6.20-2 | Table 4.6.3-84ACin38.508-1 [14] withcondition SCS15 |
| Specific message contents exceptions for Test Configuration 6.6.20-3 | Table 4.6.3-84ACin38.508-1 [14] withcondition SCS30 |

6.6.20.1.5 Test requirements

Table 6.6.20.1.4.1-3 and Table 6.6.20.1.5-1 define the primary level settings including test tolerances for UE Rx-Tx time difference measurement with PRS for RTT-based PDC in FR1 SA.

Table 6.6.20.1.5-1: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | |
|  |  | T1 | T2 |
| TDD configuration |  | 1 | N/A | |
|  | 2 | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | |
|  | 2 | SR.1.1 TDD | |
|  | 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | |
|  | 2 | CR.1.1 TDD | |
|  |  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | |
|  | 2 | TRS.1.1 TDD | |
|  |  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | |
| PRS configuration |  | 1 | PRS.1.2 FR1 | |
|  | 2 | PRS.1.2 FR1 | |
|  | 3 | PRS.2.2 FR1 | |
| PRS muting info |  | 1, 2, 3 | ‘10’ | |
| SRS configuration |  | 1 | PDC-SRS.1 | |
|  |  | 2 | PDC-SRS.1 | |
|  |  | 3 | PDC-SRS.2 | |
| Note 2 | dBm/SCS | 1 | -98 | |
|  | 2 | -98~~+TT~~ | |
|  | 3 | -95~~+TT~~ | |
| Note 2 | dBm/15 kHz | 1 | -98~~+TT~~ | |
|  | 2 | -98~~+TT~~ | |
|  | 3 | -98~~+TT~~ | |
| PRS | dB | 1 | -Infinity | -2.41~~+TT~~ |
|  | 2 |  |  |
|  |  | 3 |  |  |
| PRS | dB | 1 | -Infinity | -2~~+TT~~ |
|  | 2 |  |  |
|  |  | 3 |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -100~~+TT~~ |
|  | 2 | -Infinity | -100~~+TT~~ |
|  | 3 | -Infinity | -97~~+TT~~ |
| Io | dBm/9.36 MHz | 1 | N/A | -67.67~~+TT~~ |
| dBm/9.36 MHz | 2 | -67.67~~+TT~~ |
| dBm/38.16 MHz | 3 | -61.57~~+TT~~ |
| 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: The 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: PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

**Table 6.6.20.1.5-2: SRS Configuration for FR1 Propagation Delay Compensation**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PDC-SRS.1** | **PDC-SRS.2** |  |
| **Field** |  |  | **Comment** |
| c-SRS | Same as NRB,c in the test case | Same as NRB,c in the test case |  |
| b-SRS | 0 | 0 |  |
| b-hop | 0 | 0 | Frequency hopping is disabled |
| groupOrSequenceHopping | neither | neither | No group or sequence hopping |
| freqDomainPosition | 0 | 0 | Frequency domain position of SRS |
| freqDomainShift | 0 | 0 |  |
| pathlossReferenceRS  ssb-Index | 0 | 0 | SSB #0 is used for SRS path loss estimation |
| usage | usagePDC-r17 | usagePDC-r17 |  |
| startPosition | 5 | 5 | resourceMapping setting |
| nrofSymbols | 4 | 4 |  |
| repetitionFactor | n.a. | n.a. | without repetition. |
| transmissionComb | n4 | n4 |  |
| combOffset-n2 | 0 | 0 | transmissionComb setting |
| cyclicShift-n2 | 0 | 0 |  |
| nrofSRS-Ports | port1 | port1 | Number of antenna ports used for SRS transmission |
| resourceType | Periodic | Periodic |  |
| periodicityAndOffset-p | sl160, 20 | Sl320, 40 | SRS transmission periodicity |

The UE Rx-Tx time difference measurement time shall fulfils the requirements specified in clause 6.6.20.0. The UE shall perform and report the UE Rx-Tx time difference measurements for Cell 1 within the specified UE Rx-Tx time difference measurement time starting from the beginning of time interval T2.

The reported UE Rx-Tx measurement for each correct event shall be within the UE Rx-Tx reporting range specified in clause 6.6.20.0

The UE Rx-Tx time difference measurement time fulfils the UE Rx-Tx measurement accuracy requirements specified in clause 6.6.20.0 for Cell 1.

For the test to pass, the ratio of successful reported values shall be more than 90% with a confidence level of 95%.

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.

### 6.6.21 UE Rx-Tx time difference measurement for propagation delay compensation with TRS

#### 6.6.21.0 Minimum conformance requirements

[38.133 clause 9.12.4.2, 9.12.5 and 10.1.25.3.1] for measurement time

When UE is configured with *csi-RS-Ref-r17* in *MeasObjectRxTxDiff*-r17 defined in TS 38.331 [2] and provided with TRS resource configuration, the UE shall be able to measure UE Rx-Tx time difference on PCell within the measurement period TUERx-Tx\_TRS, where:

Where

is the number of UE Rx-Tx time difference measurement samples and is [4],

is the TRS resource periodicity specific for RTT-based propagation delay compensation,

is the DRX cycle length when DRX is in use, 1ms otherwise.

is

Ntotal / Navailable when Navailable>0

Where,

- For a window W of duration LCM(TTRS, MGRP\_max, TSMTC) and starting at the beginning of any TRS resource occasion, where TSMTC is the periodicity of SMTC for intra-frequency measurement without gap, and MGRP\_max is the maximum MGRP across all configured per-UE measurement gaps and per-FR measurement gaps within the same FR as PCell for a UE supporting *concurrentMeasGap-r17*and is configured with concurrent measurement gaps, otherwise MGRP\_max is the MGRP of configured per-UE measurement gap or per-FR measurement gap within the same FR as PCell:

- Ntotal is the total number of TRS resource occasions within the window, including those overlapped with measurement gap occasions or SMTC occasions within the window, and

- Navailable is the number of TRS resource occasions that are not overlapped with

- For FR1: any measurement gap occasions after accounting for measurement gap collisions by applying the measurement gap collision rule in section 9.1.8.3 within the window W

No requirements shall apply if Navailable=0.

UE is only required to perform UE Rx-Tx time difference on TRS within the active DL BWP. When UE is configured to perform UE Rx-Tx time difference measurement based on TRS, the requirements apply provided that the SCS of the TRS is same as that of the active BWP on PCell.

If TRS resources overlap with Type 1A/1B/2 PPW, the UE is allowed longer measurement period to measure UE Rx-Tx time difference on PCell.

The UE Rx-Tx time difference measurement values contained in measurement report shall be based on the measurement report mapping requirements specified in below.

The reporting range for the absolute UE Rx-Tx time difference measurement (TUE Rx-Tx) is defined from -985024×Tc to 985024×Tc with the resolution step of 2*k*×Tc.

Table 6.6.21.0-1: Absolute UE Rx-Tx time difference measurement report mapping for *k*=5

|  |  |  |
| --- | --- | --- |
| Reported Quantity Value | Measured Quantity Value | Unit |
| RX-TX\_TIME\_DIFFERENCE\_0000 | TUE Rx-Tx < -985024 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_0001 | -985024  TUE Rx-Tx < -984992 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_0002 | -984992  TUE Rx-Tx < -984960 | Tc |
|  |  | … |
| RX-TX\_TIME\_DIFFERENCE\_30782 | -32  TUE Rx-Tx < 0 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_30783 | 0  TUE Rx-Tx < 32 | Tc |
| … | … | … |
| RX-TX\_TIME\_DIFFERENCE\_61563 | 984960  TUE Rx-Tx < 984992 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_61564 | 984992  TUE Rx-Tx < 985024 | Tc |
| RX-TX\_TIME\_DIFFERENCE\_61565 | 985024  TUE Rx-Tx | Tc |

[TS 38.133 clause 10.1.39.3] for measurement accuracy

The error in the reported value of UE Rx-Tx time difference measurement, including both the measurement error and the reporting quantization error, should be within the accuracy requirements specified in this clause.

The UE Rx-Tx time difference measurement accuracy requirements in this clause shall not apply, if:

- NTA\_offset defined in Table 7.1.2-2 changes during the UE Rx-Tx measurement period or

- if the uplink transmission timing changes during the UE Rx-Tx measurement period due to the network-configured Timing Advance.

The UE Rx-Tx time difference measurement accuracy requirements in this clause shall apply provided that:

- The UE transmits SRS within [-160, 160] msec of at least one PDC TRS resource from the serving cell (PCell).

When a serving cell change occurs during the UE Rx-Tx measurement period, the UE Rx-Tx time difference measurement accuracy requirements in this clause shall apply provided that the serving cell change does not impact SRS configuration for the UE Rx-Tx measurement.

The accuracy requirements in Table 6.6.21.0-2 for FR1 are valid under the following conditions:

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

PRP|dBm according to Annex [TBD] for a corresponding Band.

AWGN propagation condition.

Table 6.6.21.0-2: UE Rx-Tx time difference measurement accuracy in FR1 in AWGN

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | Conditions | | | | | |
| TRS Ês/Iot | Minimum TRS bandwidth | TRS SCS | NR operating band groupsNote 2 | IoNote 3 range | |
| Minimum IoNote 1 | Maximum Io |
| TcNote 4 | dB | RB | kHz |  | dBm / SCSTRS | dBm/BW |
| [116+δ+ℇ] | -3 | ≥[24] | 15 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -50 |
|  |  |  |  | NR\_FDD\_FR1\_B | -120.5 |  |
|  |  |  |  | NR\_TDD\_FR1\_C | -120 |  |
|  |  |  |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 |  |
|  |  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 |  |
|  |  |  |  | NR\_FDD\_FR1\_F | -118.5 |  |
|  |  |  |  | NR\_FDD\_FR1\_G | -118 |  |
|  |  |  |  | NR\_FDD\_FR1\_H | -117.5 |  |
| [60+δ+ℇ] |  | ≥[52] |  | Note 5 | NOTE 5 | NOTE 5 |
| [29+δ+ℇ] |  | >[104] |  | Note 5 | NOTE 5 | NOTE 5 |
| [56+δ+ℇ] |  | ≥[24] | 30 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -118 | -50 |
|  |  |  |  | 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 |  |
| [29+δ+ℇ] |  | ≥[48] |  | NOTE 5 | NOTE 5 | NOTE 5 |
| [15+δ+ℇ] |  | ≥[132] |  | NOTE 5 | NOTE 5 | NOTE 5 |
| [29+δ+ℇ] |  | ≥[24] | 60 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -115 | -50 |
|  |  |  |  | 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 | -113.5 |  |
|  |  |  |  | NR\_FDD\_FR1\_G | -113 |  |
|  |  |  |  | NR\_FDD\_FR1\_H | -111.5 |  |
| [14+δ+ℇ] |  | ≥[64] |  | NOTE 5 | NOTE 5 | NOTE 5 |
| [7+δ+ℇ] |  | ≥[132] |  | NOTE 5 | NOTE 5 | NOTE 5 |
| NOTE 1: This minimum Io condition is expressed as the average Io per RE over all REs in an OFDM symbol.  NOTE 2: NR operating band groups are as defined in Section 3.5.  NOTE 3: The Io is defined in TRS slots. The same Io range applies to TRS and non-TRS symbols. Io levels are different in TRS and non-TRS symbols within the same slot.  NOTE 4: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 5: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding requirement with the TRS bandwidth of the smallest RB number for the corresponding SCS.  NOTE 6: δ is the margin determined from Table 10.1.39.3-3.  NOTE 7: ℇ is the margin for reporting quantitization error and ℇ=16 Tc. | | | | | | |

Table 6.6.21.0-3: Margin for UE Rx-Tx time difference measurement accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Min(TRS BW, SRS BW) (RB) | | | Margin (Tc Note 1) |
| SCS = 15 kHz | SCS = 30 kHz | SCS = 60 kHz |
| ≥ 24 | N/A | N/A | [160] |
| ≥ 52 | ≥ 24 | N/A | [80] |
| ≥ 104 | ≥ 48 | ≥ 24 | [56] |
| N/A | ≥ 132 | ≥ 64 | [24] |
| N/A | N/A | ≥ 132 | [24] |
| NOTE 1: Tc is the basic timing unit defined in TS 38.211 [6].  NOTE 2: If SRS and TRS have different SCS, the margin corresponding to the smallest RS BW in MHz applies. | | | |

#### 6.6.21.1 UE Rx-Tx time difference measurement with TRS for RTT-based PDC in FR1 SA

6.6.21.1.1 Test purpose

The purpose of the test is to verify that the UE Rx-Tx measurement with TRS for RTT-based PDC meets the requirements specified in clause 9.12.4.2 for measurement delay and clause 10.1.X.2 for measurement accuracy in AWGN propagation condition in FR1 in standalone scenario.

6.6.21.1.2 Test applicability

This test applies to all types of NR UE release 17 onwards supporting *rtt-BasedPDC-CSI-RS-ForTracking-r17 or gNB-SideRTT-BasedPDC-r17.*

6.6.21.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.6.21.0.

The normative reference for this requirement is TS 38.133 [6] clauses 9.12.4.2, 9.12.5, 10.1.39.3 and A.6.6.21.

6.6.21.1.4 Test description

6.6.21.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.6.21.1.4.1-1

Table 6.6.21.1.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 6.6.21-1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 6.6.21-2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.6.21-3 | 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. | |

Configure the test requirement and the DUT according to the parameters in Table 6.6.21.1.4.1-2.

Table 6.6.21.1.4.1-2: Initial conditions for UE Tx-Rx time difference measurement for FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.6.21.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2 |
| Connection Diagram | TE Part | A.3.1.7.2 | As specified in TS 38.508-1 [14] Annex A. |
| DUT Part | A.3.2.3.4 |

1. The general test parameter settings are set up according to Table 6.6.21.1.4.1-3.

2. Message contents are defined in clause 6.6.21.1.4.3.

3. The test scenario comprises of 1 NR Cell. The connection setup with the power level set according to Annex C.1.1 and C.1.2 for this test.

Table 6.6.21.1.4.1-3: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value |
| Active cell |  | 1, 2, 3 | Cell 1 |
| RF Channel Number |  | 1, 2, 3 | 1 |
| BWchannel | MHz | 1 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| SSB configuration |  | 1 | SSB.1 FR1 |
|  |  | 2 | SSB.1 FR1 |
|  |  | 3 | SSB.2 FR1 |
| SMTC configuration |  | 1 | SMTC.2 |
|  |  | 2 | SMTC.1 |
|  |  | 3 | SMTC.1 |
| CP length |  | 1, 2, 3 | Normal |
| DRX |  | 1, 2, 3 | OFF |
| T1 | s | 1, 2, 3 | 1 |
| T2 | s | 1, 2, 3 | 1 |

6.6.21.1.4.2 Test procedure

The test is considered with one cell (Cell 1) in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. Cell 1 does not have TRS transmission during T1 and transmits TRS during T2.

The measurement control information with *MeasObjectRxTxDiff* set to ‘csi-RS-Ref’ as defined in table 6.6.21.1.4.3-1, shall be provided to the UE during T1. The last TTI containing the RRC message shall be provided to the UE ΔT ms before the start of T2, where ΔT = 10 ms is the maximum processing time of the measurement request. The UE is configured to transmit SRS during T2.

The general and cell specific test parameters for PCell is given in Table 6.6.21.1.4.1-3 and Table 6.6.21.1.5-1, respectively. The test consists of two sub-tests with different TRS BW.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to T1 in Table 6.6.21.1.5-1 as appropriate.

3. SS shall transmit an *RRCReconfiguration* message.

4. The UE shall transmit *RRCReconfigurationComplete* message. T1 starts.

5. When T1 expires, the SS shall switch the power setting from T1 to T2 as specified in Table 6.6.21.1.5-1. T2 starts.

6. The UE shall transmit periodically MeasurementReport messages.

7. After 10s wait from Step 3, the SS shall check the *result-k5-r17* reported values in the periodic MeasurementReport. If the *result-k5* value is outside the limits in Table 6.6.21.0-2 or the UE fails to report the measurement value for serving cell, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

8. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6.6.21.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table 4.6.3-76Bin38.508-1 [14] withcondition CSI-RS\_REF |
| Specific message contents exceptions for Test Configuration 6.6.21-1 and 6.6.21-2 | Table 4.6.3-84ACin38.508-1 [14] withcondition SCS15 |
| Specific message contents exceptions for Test Configuration 6.6.21-3 | Table 4.6.3-84ACin38.508-1 [14] withcondition SCS30 |

6.6.21.1.5 Test requirements

Table 6.6.21.1.4.1-3 and Table 6.6.21.1.5-1 define the primary level settings including test tolerances for UE Rx-Tx time difference measurement with TRS for RTT-based PDC in FR1 SA.

Table 6.6.21.1.5-1: Cell specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Values | |
|  |  | T1 | T2 |
| TDD configuration |  | 1 | N/A | |
|  | 2 | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | |
|  | 2 | SR.1.1 TDD | |
|  | 3 | SR.2.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | |
|  | 2 | CR.1.1 TDD | |
|  |  | 3 | CR.2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | |
|  | 2 | CCR.1.1 TDD | |
|  | 3 | CCR.2.1 TDD | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | |
| TRS Configuration |  | 1 | TRS.1.1 FDD | |
|  | 2 | TRS.1.1 TDD | |
|  |  | 3 | TRS.1.2 TDD | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | |
| SRS configuration |  | 1 | PDC-SRS.1 | |
|  |  | 2 | PDC-SRS.1 | |
|  |  | 3 | PDC-SRS.2 | |
| Note 2 | dBm/SCS | 1 | -98~~+TT~~ | |
|  | 2 | -98~~+TT~~ | |
|  | 3 | -95~~+TT~~ | |
| Note 2 | dBm/15 kHz | 1 | -98~~+TT~~ | |
|  | 2 |  | |
|  | 3 |  | |
| TRS | dB | 1 | -Infinity | -3~~+TT~~ |
|  | 2 |  |  |
|  |  | 3 |  |  |
| TRS | dB | 1 | -Infinity | -3~~+TT~~ |
|  | 2 |  |  |
|  |  | 3 |  |  |
| TRS-RSRP Note 3 | dBm/SCS kHz | 1 | -Infinity | -101~~+TT~~ |
|  | 2 | -Infinity | -101~~+TT~~ |
|  | 3 | -Infinity | -98~~+TT~~ |
| Io | dBm/9.36 MHz | 1 | N/A | -68.28~~+TT~~ |
| dBm/9.36 MHz | 2 | -68.28~~+TT~~ |
| dBm/38.16 MHz | 3 | -62.19~~+TT~~ |
| 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: TRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

**Table 6.6.21.1.5-2: SRS Configuration for FR1 Propagation Delay Compensation**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PDC-SRS.1** | **PDC-SRS.2** |  |
| **Field** |  |  | **Comment** |
| c-SRS | Same as NRB,c in the test case | Same as NRB,c in the test case |  |
| b-SRS | 0 | 0 |  |
| b-hop | 0 | 0 | Frequency hopping is disabled |
| groupOrSequenceHopping | neither | neither | No group or sequence hopping |
| freqDomainPosition | 0 | 0 | Frequency domain position of SRS |
| freqDomainShift | 0 | 0 |  |
| pathlossReferenceRS  ssb-Index | 0 | 0 | SSB #0 is used for SRS path loss estimation |
| usage | usagePDC-r17 | usagePDC-r17 |  |
| startPosition | 5 | 5 | resourceMapping setting |
| nrofSymbols | 4 | 4 |  |
| repetitionFactor | n.a. | n.a. | without repetition. |
| transmissionComb | n4 | n4 |  |
| combOffset-n2 | 0 | 0 | transmissionComb setting |
| cyclicShift-n2 | 0 | 0 |  |
| nrofSRS-Ports | port1 | port1 | Number of antenna ports used for SRS transmission |
| resourceType | Periodic | Periodic |  |
| periodicityAndOffset-p | sl160, 20 | Sl320, 40 | SRS transmission periodicity |

The UE Rx-Tx time difference measurement time fulfils the requirements specified in clause 6.6.21.0. The UE shall be able to report the Rx-Tx time difference measurement results no later than TBD ms from the beginning of T2.

The UE Rx-Tx time difference measurement time fulfils the UE Rx-Tx measurement accuracy requirements specified in clause 6.6.21.0.

For the test to pass, the ratio of successful reported values shall be more than 90% with a confidence level of 95%.

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.

## 6.7 Measurement performance requirements

### 6.7.1 SS-RSRP

#### 6.7.1.0 Minimum conformance requirements

##### 6.7.1.0.1 Intra-frequency absolute SS-RSRP measurement accuracy requirements

Same as in clause 4.7.1.0.1.

##### 6.7.1.0.2 Intra-frequency relative SS-RSRP measurement accuracy requirements

Same as in clause 4.7.1.0.2.

##### 6.7.1.0.3 Inter-frequency absolute SS-RSRP measurement accuracy requirements

Same as in clause 4.7.1.0.3.

##### 6.7.1.0.4 Inter-frequency relative SS-RSRP measurement accuracy requirements

Same as in clause 4.7.1.0.4.

#### 6.7.1.1 Intra-frequency measurements

##### 6.7.1.1.1 NR SA FR1 SS-RSRP absolute measurement accuracy

6.7.1.1.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.1.

6.7.1.1.1.4 Test description

6.7.1.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.1.1.4.1-1.

Table 6.7.1.1.1.4.1-1: NR SA FR1 SS-RSRP measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.1.1.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.1.1.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.1.1.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.1.1.4.1-2.

Table 6.7.1.1.1.4.1-2: Initial conditions for SS-RSRP intra frequency absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.1.1.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without LTE link | |  |

1. Message contents are defined in clause 6.7.1.1.1.4.3.

2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in the same frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.1.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.1.1.1.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values in the periodic MeasurementReport. The SS-RSRP value of Cell 2 reported by the UE is compared to the expected SS-RSRP. If the value is outside the limits in Table 6.7.1.1.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.1.1.1.5-1 as appropriate and repeat steps 5-7.

6.7.1.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.1.1.1.4.3-1: Common Exception messages for NR SA FR1 SS-RSRP absolute measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5  Table H.3.1-7 |
| Specific message contents exceptions for Test Configuration 6.7.1.1.1-1 | Table H.3.1-3 with Condition SSB.1 FR1  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.1.1.1-2 | Table H.3.1-3 with Condition SSB.1 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.1.1.1-3 | Table H.3.1-3 with Condition SSB.2 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.1.1.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-RSRP Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrq | false |  |  |
| sinr | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.1.1.1.5 Test requirement

Table 6.7.1.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.1.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.1.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.1.1.1.5-3 for test configuration 3.

Table 6.7.1.1.1.5-1: NR SA FR1 SS-RSRP measurement accuracy test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | | Test 2 | | | Test 3 | | | |
| Cell 1 | Cell 2 | | | Cell 1 | Cell 2 | | Cell 1 | | Cell 2 | |
| Physical cell ID | | |  | 489 | 0 | | | 489 | 0 | | 489 | | 0 | |
| SSB ARFCN | | |  | freq1 | | | | freq1 | | | 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 | | | | | | | | | | |
| BWP BW | | Config 1 |  | 10: NRB,c = 52 | | | | | | | | | | |
| Config 2 | 10: NRB,c = 52 | | | | | | | | | | |
| Config 3 | 40: NRB,c = 106 | | | | | | | | | | |
| 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 | | | ms | Not Applicable | | | | | | | | | | |
| TRS Configuration | | Config 1 |  | TRS.1.1 FDD | | - | | TRS.1.1 FDD | - | | TRS.1.1 FDD | | | - |
| Config 2 | TRS.1.1 TDD | | TRS.1.1 TDD | TRS.1.1 TDD | | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | TRS.1.2 TDD | | |
| PDSCH Reference measurement channel | | Config 1 |  | SR.1.1 FDD | | - | | SR.1.1 FDD | - | | SR.1.1 FDD | | | - |
| Config 2 | SR.1.1 TDD | | SR.1.1 TDD | SR.1.1 TDD | | |
| Config 3 | SR2.1 TDD | | SR2.1 TDD | SR2.1 TDD | | |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 FDD | | - | | CR.1.1 FDD | - | | CR.1.1 FDD | | | - |
| Config 2 | CR.1.1 TDD | | CR.1.1 TDD | CR.1.1 TDD | | |
| Config 3 | CR2.1 TDD | | CR2.1 TDD | CR2.1 TDD | | |
| Control Channel RMC | | Config 1 |  | CCR.1.1 FDD | | - | | CCR.1.1 FDD | - | | CCR.1.1 FDD | | | - |
| Config 2 | CCR.1.1 TDD | | CCR.1.1 TDD | CCR.1.1 TDD | | |
| Config 3 | CR2.1 TDD | | CCR2.1 TDD | CCR2.1 TDD | | |
| SSB configuration | | Config 1 |  | SSB 1.FR1 | | SSB.1 FR1 | | SSB 1.FR1 | SSB.1 FR1 | | SSB 1.FR1 | | | SSB.1 FR1 |
| Config 2 | SSB 1.FR1 | | SSB.1 FR1 | | SSB 1.FR1 | SSB.1 FR1 | | SSB 1.FR1 | | | SSB.1 FR1 |
| Config 3 | SSB 2.FR1 | | SSB.2 FR1 | | SSB 2.FR1 | SSB.2 FR1 | | SSB 2.FR1 | | | SSB.2 FR1 |
| Time offset with Cell 2 | | Config 1 | ms | - | | 3 | | - | 3 | | - | | | 3 |
| Config 2,3 | μs | - | | 3 | | - | 3 | | - | | | 3 |
| SMTC Configuration | | Config 1 |  | SMTC.2 | | | | | | | | | | |
| Config 2,3 |  | SMTC.1 | | | | | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | | | | | |
| Config 3 | 30kHz | | | | | | | | | | |
| 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 | Depending on band group | dBm/15KhZ | -107.5 | | | | -88 | | | | -116 + ΔBG\_offset | | |
| Config 3 | Depending on band group | N/ANote 6 | | | | -94 | | | | -116 + ΔBG\_offset | | |
| Note2 | Config 1,2 | | dBm/SCS | -107.4 | | | | -88 | | | | Same as Noc/15kHz | | |
| Config 3 | Depending on band group | N/ANote 6 | | | | -91 | | | | -113 + ΔBG\_offset | | |
|  | | | dB | 1.88 | | | -5.57 | 1.88 | | -5.57 | | 0.09 | | -5.56 |
|  | | | dB | 6 | | | 1.4 | 6 | | 1.4 | | 3 | | -0.8 |
| SS-RSRPNote3 | Config 1,2 | Depending on band group | dBm/SCS | -101.5 | | | -106.1 | -82 | | -86.6 | | -113 + ΔBG\_offset | | -116.8 + ΔBG\_offset |
| Config 3 | Depending on band group | N/ANote 6 | | | N/ANote 6 | -85 | | -89.6 | | -110+ ΔBG\_offset | | -113.8+ ΔBG\_offset |
| IoNote3 | Config 1,2 | Depending on band group | dBm/  9.36MHz | -71.68 | | | | -52.18 | | | | -82.39+ ΔBG\_offset | | |
| Config 3 | Depending on band group | dBm/  38.16MHz | N/ANote 6 | | | | -51.91 | | | | -76.12 + ΔBG\_offset | | |
| 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: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2.  Note 6: Subtest 1 is not used when testing with 30kHz SSB SCS. | | | | | | | | | | | | | | |

Table 6.7.1.1.1.5-2: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest reported value (Cell 2) | 44 | 60 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 34 |
| Bands NR\_FDD\_FR1\_B | 34 |
| Bands NR\_TDD\_FR1\_C | 35 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 35 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 36 |
| Bands NR\_FDD\_FR1\_G | 37 |
| Bands NR\_FDD\_FR1\_H | 37 |
| Highest reported value (Cell 2) | 56 | 79 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 46 |
| NR\_FDD\_FR1\_B | 46 |
| NR\_TDD\_FR1\_C | 47 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 47 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 48 |
| NR\_FDD\_FR1\_G | 49 |
| NR\_FDD\_FR1\_H | 49 |
| Extreme Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest reported value (Cell 2) | 40 | 57 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 29 |
| Bands NR\_FDD\_FR1\_B | 30 |
| Bands NR\_TDD\_FR1\_C | 30 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 31 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 31 |
| Bands NR\_FDD\_FR1\_G | 33 |
| Bands NR\_FDD\_FR1\_H | 34 |
| Highest reported value (Cell 2) | 61 | 82 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 50 |
| Bands NR\_FDD\_FR1\_B | 51 |
| Bands NR\_TDD\_FR1\_C | 51 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 52 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 52 |
| Bands NR\_FDD\_FR1\_G | 53 |
| Bands NR\_FDD\_FR1\_H | 54 |
| Note 1: NR operating band groups are as defined in Section 3A.4.1. | | | | |

Table 6.7.1.1.1.5-3: SS-RSRP Intra frequency absolute accuracy requirements for the reported values for test configuration 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest reported value (Cell 2) | N/A | 57 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 37 |
| Bands NR\_FDD\_FR1\_B | 37 |
| Bands NR\_TDD\_FR1\_C | 38 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 38 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 39 |
| Bands NR\_FDD\_FR1\_G | 40 |
| Bands NR\_FDD\_FR1\_H | 40 |
| Highest reported value (Cell 2) | N/A | 76 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 49 |
| Bands NR\_FDD\_FR1\_B | 49 |
| Bands NR\_TDD\_FR1\_C | 50 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 50 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 51 |
| Bands NR\_FDD\_FR1\_G | 52 |
| Bands NR\_FDD\_FR1\_H | 52 |
| Extreme Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest reported value (Cell 2) | N/A | 54 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 32 |
| Bands NR\_FDD\_FR1\_B | 33 |
| Bands NR\_TDD\_FR1\_C | 33 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 34 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 34 |
| Bands NR\_FDD\_FR1\_G | 35 |
| Bands NR\_FDD\_FR1\_H | 36 |
| Highest reported value (Cell 2) | N/A | 79 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 53 |
| Bands NR\_FDD\_FR1\_B | 54 |
| Bands NR\_TDD\_FR1\_C | 54 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 55 |
| Bands NR\_FDD\_FR1\_E, Bands NR\_TDD\_FR1\_E | 55 |
| Bands NR\_FDD\_FR1\_G | 56 |
| Bands NR\_FDD\_FR1\_H | 57 |
| Note 1: NR operating band groups are as defined in Section 3A.4.1. | | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.1.1.2 NR SA FR1 SS-RSRP relative measurement accuracy

6.7.1.1.2.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.1.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.1.

6.7.1.1.2.4 Test description

6.7.1.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.1.2.4.1-1.

Table 6.7.1.1.2.4.1-1: NR SA FR1 SS-RSRP measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.1.1.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.1.1.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.1.1.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.1.2.4.1-2.

Table 6.7.1.1.2.4.1-2: Initial conditions for SS-RSRP intra frequency relative accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.1.1.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without LTE link | |  |

1. Message contents are defined in clause 6.7.1.1.2.4.3.

2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in the same frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.1.2.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR* Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.1.1.2.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-RSRP reported values of Cell 1 and Cell 2 in the periodic MeasurementReport. The SS-RSRP value of Cell 2 reported by the UE is compared to the reported SS-RSRP of Cell 1. If the resulting value is outside the limits in Table 6.7.1.1.2.5-2 or the UE fails to report the measurement value for Cell 1 or Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.1.1.2.5-1 as appropriate and repeat steps 5-7.

6.7.1.1.2.4.3 Message contents

Message contents are same as in clause 6.7.1.1.1.4.3.

6.7.1.1.2.5 Test requirement

Table 6.7.1.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.1.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.1.2.5-2.

Table 6.7.1.1.2.5-1: Same as Table 6.7.1.1.1.5-1 with the following exceptions:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | Test 2 | | | Test 3 | | | |
| Cell 1 | Cell 2 | | Cell 1 | Cell 2 | | Cell 1 | | Cell 2 | |
| Note2 | Config 1,2 | Depending on band group | dBm/15KhZ | -106 | | | -88 | | | | -116 + ΔBG\_offset | | |
| Config 3 | Depending on band group | N/ANote 6 | | | -94 | | | | -116 + ΔBG\_offset | | |
| Note2 | Config 1,2 | | dBm/SCS | Same as Noc/15kHz | | | Same as Noc/15kHz | | | | Same as Noc/15kHz | | |
| Config 3,6 | Depending on band group | N/ANote 6 | | | -91 | | | | -113 + ΔBG\_offset | | |
|  | | | dB | 1.88 | | -4.97 | 1.88 | | -4.97 | | -0.01 | | -4.76 |
|  | | | dB | 6 | | 2 | 6 | | 2 | | 3 | | 0 |
| SS-RSRPNote3 | Config 1,2 | Depending on band group | dBm/SCS | -100 | | -104 | -82 | | -86 | | -113 + ΔBG\_offset | | -116 + ΔBG\_offset |
| Config 3 | Depending on band group | N/ANote 6 | | N/ANote 6 | -85 | | -89 | | -110 + ΔBG\_offset | | -113 + ΔBG\_offset |
| IoNote3 | Config 1,2 | Depending on band group | dBm/  9.36MHz | -70.05 | | | -52.05 | | | | -82.20+ ΔBG\_offset | | |
| Config 3 | Depending on band group | dBm/  38.16MHz | N/ANote 6 | | | -51.77 | | | | -75.93 + ΔBG\_offset | | |

Table 6.7.1.1.2.5-2: SS-RSRP Intra frequency relative accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | | |
| Lowest reported value (Cell 2) | RSRP\_x - 8 | RSRP\_x - 8 | RSRP\_x - 7 |
| Highest reported value (Cell 2) | RSRP\_x - 1 | RSRP\_x - 1 | RSRP\_x + 1 |
| Extreme Conditions | | | |
| Lowest reported value (Cell 2) | RSRP\_x - 8 | RSRP\_x - 8 | RSRP\_x - 7 |
| Highest reported value (Cell 2) | RSRP\_x - 1 | RSRP\_x - 1 | RSRP\_x + 1 |
| RSRP\_x is the reported value of Cell 1 | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.1.2 Inter-frequency measurements

##### 6.7.1.2.1 NR SA FR1-FR1 SS-RSRP absolute measurement accuracy

6.7.1.2.1.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.2.

6.7.1.2.1.4 Test description

6.7.1.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.2.1.4.1-1.

Table 6.7.1.2.1.4.1-1: NR SA FR1-FR1 SS-RSRP measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.1.2.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.1.2.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.1.2.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.2.1.4.1-2.

Table 6.7.1.2.1.4.1-2: Initial conditions for SS-RSRP inter frequency absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] sclause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.1.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.1.2.1.4.3.

2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in a different FR1 frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.2.1.4.2 Test procedure

Same as in clause 6.7.1.1.1.4.2 but replacing Table 6.7.1.1.1.5-1 and 6.7.1.1.1.5-2 with 6.7.1.2.1.5-1 and 6.7.1.2.1.5-2, respectively.

6.7.1.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.1.2.1.4.3-1: Common Exception messages for NR SA FR1-FR1 SS-RSRP absolute measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-FREQ and GAP NEEDED  Table H.3.1-5  Table H.3.1-7 with condition INTER-FREQ  Table H.3.1-6 with condition Pattern #0 |
| Specific message contents exceptions for Test Configuration 6.7.1.2.1-1 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.1 FR1  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.1.2.1-2 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.1 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.1.2.1-3 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.2 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.1.2.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-RSRP Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrq | false |  |  |
| sinr | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.1.2.1.5 Test requirement

Table 6.7.1.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.2.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.2.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.1.2.1.5-3 for test configuration 3.

Table 6.7.1.2.1.5-1: SS-RSRP inter-frequency test parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | | | Test 2 | | |
| Cell 1 | Cell 2 | | Cell 1 | Cell 2 | |
| SSB ARFCN | | 1~3 |  | freq1 | freq2 | | freq1 | freq2 | |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| 2 | 10: NRB,c = 52 | | | 10: NRB,c = 52 | | |
| 3 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | | |
| Gap pattern ID | |  |  | 0 | | | 0 | | |
| Duplex mode | | 1 |  | FDD | | | FDD | | |
| 2 | TDD | | | TDD | | |
| 3 | TDD | | | TDD | | |
| TDD configuration | | 1 |  | N/A | | | N/A | | |
| 2 | TDDConf.1.1 | | | TDDConf.1.1 | | |
| 3 | TDDConf.2.1 | | | TDDConf.2.1 | | |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | - | | SR.1.1 FDD | - | |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | - | | CR.1.1 FDD | - | |
| 2 | CR.1.1 TDD | - | | CR.1.1 TDD | - | |
| 3 | CR.2.1 TDD | - | | CR.2.1 TDD | - | |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | - | |
| 2 |  | CCR.1.1 TDD | - | | CCR.1.1 TDD | - | |
| 3 |  | CCR.2.1 TDD | - | | CCR.2.1 TDD | - | |
| SSB configuration | | 1 |  | SSB.1 FR1 | | | SSB.1 FR1 | | |
| 2 | SSB.1 FR1 | | | SSB.1 FR1 | | |
| 3 | SSB.2 FR1 | | | SSB.2 FR1 | | |
| OCNG Patterns | | 1~3 |  | OP.1 | | | OP.1 | | |
| TRS configuration | | 1 |  | TRS.1.1 FDD | | - | TRS.1.1 FDD | | - |
| 2 | TRS.1.1 TDD | | TRS.1.1 TDD | |
| 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |
| 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 |  | SMTC.2 | | | SMTC.2 | | |
| 2,3 |  | SMTC.1 | | | SMTC.1 | | |
| Time offset between Cell 2 and Cell 3 | | 1 | ms | 3 | | | 3 | | |
| 2,3 | μs | 3 | | | 3 | | |
| EPRE ratio of PSS to SSS | | 1~3 | 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 | Depending on band group | 1,2 | dBm/15kHz | -94.65 | -94.65 | | ( for Cell 2 +8dB) + ΔBG\_offset | -115+ ΔBG\_offset | |
| Note2 | Depending on band group | 3 | dBm/15kHz | -96 | -96 | | ( for Cell 2 +8dB) + ΔBG\_offset | -115+ ΔBG\_offset | |
| Note2 | Depending on band group | 1,2 | dBm/SSB SCS | -94.65 | -94.65 | | ( for Cell 2 +8dB) + ΔBG\_offset | -115+ ΔBG\_offset | |
| Depending on band group | 3 | -93 | -93 | | ( for Cell 2 +8dB) + ΔBG\_offset | -112.00+ ΔBG\_offset | |
|  | | 1~3 | dB | 10 | 10 | | 13 | -3 | |
| SS-RSRPNote3 | Depending on band group | 1,2, | dBm/SCS | -84.65 | -84.65 | | (RSRP for Cell 2 +25dB) + ΔBG\_offset | -118.00+ ΔBG\_offset | |
| Depending on band group | 3 | -83 | -83 | | (RSRP for Cell 2 +25dB) + ΔBG\_offset | -115.00+ ΔBG\_offset | |
| IoNote3 | Depending on band group | 1,2 | dBm/  9.36MHz | 56.28 | 56.28 | | (Io for Channel 2 +19.75dB) + ΔBG\_offset | -85.28+ ΔBG\_offset | |
| Depending on band group | 3 | dBm/  38.16MHz | -51.53 | -51.53 | | (Io for Channel 2 +19.75dB) + ΔBG\_offset | -79.19+ ΔBG\_offset | |
|  | | 1~3 | dB | 10 | 10 | | 13 | -3 | |
| Propagation condition | | 1~3 | - | 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: 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.  Note 6: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2. | | | | | | | | | |

Table 6.7.1.2.1.5-2: SS-RSRP Inter frequency absolute accuracy requirements for the reported values for test configurations 1, 2, 4 and 5

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 2) | 62 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 32 |
| Bands NR\_FDD\_FR1\_B | 33 |
| Bands NR\_TDD\_FR1\_C | 33 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 34 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 34 |
| Bands NR\_FDD\_FR1\_G | 35 |
| Bands NR\_FDD\_FR1\_H | 36 |
| Highest reported value (Cell 2) | 81 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 45 |
| Bands NR\_FDD\_FR1\_B | 45 |
| Bands NR\_TDD\_FR1\_C | 46 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 46 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 47 |
| Bands NR\_FDD\_FR1\_G | 48 |
| Bands NR\_FDD\_FR1\_H | 48 |
| Extreme Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 2) | 59 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 28 |
| Bands NR\_FDD\_FR1\_B | 28 |
| Bands NR\_TDD\_FR1\_C | 29 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 29 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 30 |
| Bands NR\_FDD\_FR1\_G | 31 |
| Bands NR\_FDD\_FR1\_H | 31 |
| Highest reported value (Cell 2) | 84 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 49 |
| Bands NR\_FDD\_FR1\_B | 50 |
| Bands NR\_TDD\_FR1\_C | 50 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 51 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 51 |
| Bands NR\_FDD\_FR1\_G | 52 |
| Bands NR\_FDD\_FR1\_H | 53 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2. | | | |

Table 6.7.1.2.1.5-3: SS-RSRP Inter frequency absolute accuracy requirements for the reported values for test configurations 3 and 6

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 2) | 64 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 35 |
| Bands NR\_FDD\_FR1\_B | 36 |
| Bands NR\_TDD\_FR1\_C | 36 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 37 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 37 |
| Bands NR\_FDD\_FR1\_G | 38 |
| Bands NR\_FDD\_FR1\_H | 39 |
| Highest reported value (Cell 2) | 83 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 48 |
| Bands NR\_FDD\_FR1\_B | 48 |
| Bands NR\_TDD\_FR1\_C | 49 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 49 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 50 |
| Bands NR\_FDD\_FR1\_G | 51 |
| Bands NR\_FDD\_FR1\_H | 51 |
| Extreme Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 2) | 61 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 31 |
| Bands NR\_FDD\_FR1\_B | 31 |
| Bands NR\_TDD\_FR1\_C | 32 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 32 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 33 |
| Bands NR\_FDD\_FR1\_G | 34 |
| Bands NR\_FDD\_FR1\_H | 34 |
| Highest reported value (Cell 2) | 86 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 52 |
| Bands NR\_FDD\_FR1\_B | 53 |
| Bands NR\_TDD\_FR1\_C | 53 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 54 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 54 |
| Bands NR\_FDD\_FR1\_G | 55 |
| Bands NR\_FDD\_FR1\_H | 56 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2 | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.1.2.2 NR SA FR1-FR1 SS-RSRP relative measurement accuracy

6.7.1.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.1.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.1.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.1.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.1.2.

6.7.1.2.2.4 Test description

6.7.1.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.1.2.2.4.1-1.

Table 6.7.1.2.2.4.1-1: NR SA FR1-FR1 SS-RSRP relative measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.1.2.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.1.2.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.1.2.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.1.2.2.4.1-2.

Table 6.7.1.2.2.4.1-2: Initial conditions for SS-RSRP inter frequency relative accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.1.2.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.1.2.2.4.3.

2. Cell 1 is the NR FR1 serving cell (PCell) and Cell 2 is the NR neighbour in a different FR1 frequency and the target cell for SS-RSRP measurements. The connection setup is done according to the settings in Annex C.1.1 and C.1.2.

6.7.1.2.2.4.2 Test procedure

Same as in clause 6.7.1.1.2.4.2 but replacing Table 6.7.1.1.2.5-1 and 6.7.1.1.2.5-2 with 6.7.1.2.2.5-1 and 6.7.1.2.2.5-2, respectively.

6.7.1.2.2.4.3 Message contents

Message contents are same as in Clause 6.7.1.2.1.4.3.

6.7.1.2.2.5 Test requirement

Table 6.7.1.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.1.2.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.1.2.2.5-2.

**Table 6.7.1.2.2.5-1: same as Table 6.7.1.2.1.5-1**

Table 6.7.1.2.2.5-2: SS-RSRP Intra frequency relative accuracy requirements for the reported values

|  |  |  |
| --- | --- | --- |
|  | Test 1 | Test 2 |
|  | All bands | All bands |
| Normal Conditions | | |
| Lowest reported value (Cell 2) | SS-RSRP\_x - 7 | SS-RSRP\_x - 31 |
| Highest reported value (Cell 2) | SS-RSRP\_x + 7 | SS-RSRP\_x - 18 |
| Extreme Conditions | | |
| Lowest reported value (Cell 2) | SS-RSRP\_x - 9 | SS-RSRP\_x - 33 |
| Highest reported value (Cell 2) | SS-RSRP\_x + 9 | SS-RSRP\_x - 17 |
| SS-RSRP\_x is the reported value of Cell 1 | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.2 SS-RSRQ

#### 6.7.2.0 Minimum conformance requirements

##### 6.7.2.0.1 Intra-frequency SS-RSRQ measurement accuracy requirements

Same as in clause 4.7.2.0.1.

##### 6.7.2.0.2 Inter-frequency SS-RSRQ absolute measurement accuracy requirements

Same as in clause 4.7.2.0.2.

##### 6.7.2.0.3 Inter-frequency SS-RSRQ relative measurement accuracy requirements

Same as in clause 4.7.2.0.3.

#### 6.7.2.1 NR SA FR1 SS-RSRQ measurement accuracy

6.7.2.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-RSRQ measurement accuracy is within the specified limits for all bands.

6.7.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.2.1.

6.7.2.1.4 Test description

6.7.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.2.1.4.1-1.

Table 6.7.2.1.4.1-1: NR SA FR1 SS-RSRQ measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.2.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.2.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.2.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.2.1.4.1-2.

Table 6.7.2.1.4.1-2: Initial conditions for SS-RSRQ intra frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.2.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.3.

6.7.2.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.2.1.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-RSRQ reported values in the periodic MeasurementReport. The SS-RSRQ value of Cell 2 reported by the UE is compared to the expected SS-RSRQ. If the value is outside the limits in Table 6.7.2.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.2.1.5-1 as appropriate and repeat steps 5-7.

6.7.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.2.1.4.3-1: Common Exception messages for NR SA FR1 SS-RSRQ measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5  Table H.3.1-7 |
| Specific message contents exceptions for Test Configuration 6.7.2.1-1 | Table H.3.1-3 with Condition SSB.1 FR1  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.2.1-2 | Table H.3.1-3 with Condition SSB.1 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.2.1-3 | Table H.3.1-3 with Condition SSB.2 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.2.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-RSRQ Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| sinr | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.2.1.5 Test requirement

Table 6.7.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRQ measurement report for each of the tests in Table 6.7.2.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.2.1.5-2.

Table 6.7.2.1.5-1: 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 |  | 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 | | | | | | | | | |
| 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 | - | | SR.1.1 FDD | - | | SR.1.1 FDD | | - | |
| Config 2 | SR.1.1 TDD | SR.1.1 TDD | SR.1.1 TDD | |
| Config 3 | SR2.1 TDD | SR2.1 TDD | SR2.1 TDD | |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 FDD | - | | CR.1.1 FDD | - | | CR.1.1 FDD | |  | |
| Config 2 | CR.1.1 TDD | CR.1.1 TDD | CR.1.1 TDD | |
| Config 3 | CR.2.1 TDD | CR.2.1 TDD | CR.2.1 TDD | |
| Control Channel RMC | | Config 1 |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | - | | CCR.1.1 FDD | | - | |
| Config 2 | CCR.1.1 TDD | CCR.1.1 TDD | CCR.1.1 TDD | |
| Config 3 | CCR.2.1 TDD | CCR.2.1 TDD | CCR.2.1 TDD | |
| TRS Configuration | | Config 1 |  | TRS.1.1 FDD | - | | TRS.1.1 FDD | - | | TRS.1.1 FDD | | - | |
| Config 2 | TRS.1.1 TDD | TRS.1.1 TDD | TRS.1.1 TDD | |
| Config 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 2, 3 | μs | - | | 3 | - | | 3 | | - | | 3 |
| Config 1 | ms | - | | 3 | - | | 3 | | - | | 3 |
| SMTC configuration | | Config 2, 3 |  | SMTC.1 | | | | | | | | | |
| Config 1 |  | SMTC.2 | | | | | | | | | |
| SSB configuration | | Config 1,2 |  | SSB.1 FR1 | | | | | | | | | |
| Config 3 | SSB.2 FR1 | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | | | | |
| Config 3 | 30kHz | | | | | | | | | |
| 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 | Depending on band group | dBm/15kHz | -86.5 | | | -101 | | | -114+ ΔBG\_offset | | | |
| Config 3 | Depending on band group | -92.6 | | | - | | | -114+ ΔBG\_offset | | | |
| Note2 | Config 1,2 | Depending on band group | dBm/SC S | -86.5 | | | -101 | | | -114+ ΔBG\_offset | | | |
| Config 3 | Depending on band group | -89.6 | | | - | | | -111+ ΔBG\_offset | | | |
|  | | | dB | -1.76 | | | -4.7 | | | -5.46 | | -5.46 | |
|  | | | dB | 3 | 3 | | -2.9 | -2.9 | | -4 | | -4 | |
| SS-RSRPNote3 | Config 1,2 | Depending on band group | dBm/SCS | -83.5 | -83.5 | | -103.9 | -103.9 | | -118+ΔBG\_offset | | -118+ ΔBG\_offset | |
| Config 3 | Depending on band group | -86.6 | -86.6 | | - | - | | -115+ ΔBG\_offset | | -115+ ΔBG\_offset | |
| SS-RSRQ Note3 | |  | dB | -14.77 | -14.77 | | -16.76 | -16.76 | | -17.34 | | -17.34 | |
| IoNote3 | Config 1,2 | Depending on band group | dBm/  9.36MHz | -51.57 | | | -70 | | | -83.28+ ΔBG\_offset | | | |
| Config 3 | Depending on band group | dBm/  38.16MHz | -51.56 | | | - | | | -76.67+ ΔBG\_offset | | | |
| 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: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2.  Note 6: Subtest 2 is not used when testing with 30kHz SSB SCS.  Note 7: 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. | | | | | | | | | | | | | |

Table 6.7.2.1.5-2: SS-RSRQ Intra frequency absolute accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | | |
| Lowest reported value (Cell 2) | SS-RSRQ\_52 | SS-RSRQ\_46 | SS-RSRQ\_44 |
| Highest reported value (Cell 2) | SS-RSRQ\_62 | SS-RSRQ\_60 | SS-RSRQ\_59 |
| Extreme Conditions | | | |
| Lowest reported value (Cell 2) | SS-RSRQ\_49 | SS-RSRQ\_45 | SS-RSRQ\_43 |
| Highest reported value (Cell 2) | SS-RSRQ\_65 | SS-RSRQ\_61 | SS-RSRQ\_60 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.2.2 Inter-Frequency SS-RSRQ measurement accuracy

##### 6.7.2.2.1 NR SA FR1-FR1 SS-RSRQ absolute measurement accuracy

6.7.2.2.1.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRQ absolute measurement accuracy is within the specified limits for all bands.

6.7.2.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.2.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.2.2.1.

6.7.2.2.1.4 Test description

6.7.2.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.2.2.1.4.1-1.

Table 6.7.2.2.1.4.1-1: NR SA FR1-FR1 SS-RSRQ measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.2.2.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.2.2.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.2.2.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.2.2.1.4.1-2.

Table 6.7.2.2.1.4.1-2: Initial conditions for SS-RSRQ inter frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.2.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.2.2.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the different frequency as Cell 1. Cell 2 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.2.2.1.4.2 Test procedure

Same as in clause 6.7.2.1.1.4.2 but replacing Table 6.7.2.1.1.5-1 and 6.7.2.1.1.5-2 with 6.7.2.2.1.5-1 and 6.7.2.2.1.5-2, respectively.

6.7.2.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.2.2.1.4.3-1: Common Exception messages for NR SA FR1-FR1 SS-RSRQ absolute measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-FREQ and GAP NEEDED  Table H.3.1-5  Table H.3.1-7 with condition INTER-FREQ  Table H.3.1-6 with condition Pattern #0 |
| Specific message contents exceptions for Test Configuration 6.7.2.2.1-1 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.1 FR1  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.2.2.1-2 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.1 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.2.2.1-3 | Table H.3.1-3 with Conditions INTER-FREQ MO, SSB.2 FR1 and Synchronous cells  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.2.2.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-RSRQ Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| sinr | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.2.2.1.5 Test requirement

Table 6.7.2.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Table 6.7.2.2.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.2.2.1.5-2.

Table 6.7.2.2.1.5-1: 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 | |  | 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 | - | SR.1.1 FDD | - | SR.1.1 FDD | - | |
| Config 2 | | SR.1.1 TDD | SR.1.1 TDD | SR.1.1 TDD |
| Config 3 | | SR2.1 TDD | SR2.1 TDD | SR2.1 TDD |
| RMSI CORESET Reference Channel | | Config 1 | |  | CR.1.1 FDD | - | R.1.1 FDD | - | CR.1.1 FDD |  | |
| Config 2 | |  | CR.1.1 TDD |  | CR.1.1 TDD |  | CR.1.1 TDD |  | |
| Config 3 | |  | CR2.1 TDD |  | CR2.1 TDD |  | CR2.1 TDD |  | |
| Dedicated CORESET Reference Channel | | Config 1 | |  | CCR.1.1 FDD | - | CCR.1.1 FDD | - | CCR.1.1 FDD | - | |
| Config 2 | | CCR.1.1 TDD | CCR.1.1 TDD | CCR.1.1 TDD |
| Config 3 | | CCR2.1 TDD | CCR2.1 TDD | CCR2.1 TDD |
| TRS Configuration | | Config 1 | |  | TRS.1.1 FDD | - | TRS.1.1 FDD | - | TRS.1.1 FDD | - |
| Config 2 | | TRS.1.1 TDD | TRS.1.1 TDD | TRS.1.1 TDD |
| Config 3 | | TRS.1.2 TDD | TRS.1.2 TDD | TRS.1.2 TDD |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| Time offset with Cell 1 | | Config 2, 3 | | μs | 3 | | | | | | |
| Config 1 | | ms | 3 | | | | | | |
| SMTC configuration | | Config 2, 3 | |  | SMTC.1 | | | | | | |
| Config 1 | |  | SMTC.2 | | | | | | |
| SSB configuration | | Config 1,2 | |  | SSB.1 in FR1 | | | | | | |
| Config 3 | |  | SSB.2 in FR1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | | kHz | 15 kHz | | | | | | |
| Config 3 | | 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 | | Depending on band group | dBm/15kHz | -81.68 | -81.68 | -106 | -106 | -116 + ΔBG\_offset | -116 + ΔBG\_offset | |
| Note2 | Config 3 | | Depending on band group | dBm/15kHz | -87.80 | -87.80 | -113 | -113 | -116+ ΔBG\_offset | -116+ ΔBG\_offset | |
| Note2 | Config 1,2 | | Depending on band group | dBm/SCS | -81.68 | -81.68 | -106 | -106 | -116 + ΔBG\_offset | -116 + ΔBG\_offset | |
| Config 3 | | Depending on band group | -84.8 | -84.8 | -110 | -110 | -113+ ΔBG\_offset | -113+ ΔBG\_offset | |
|  | | | | dB | -1.75 | -1.75 | -1.75 | -1.75 | 3 | -1.75 | |
|  | | | | dB | -1.75 | -1.75 | -1.75 | -1.75 | 3 | -1.75 | |
| SS-RSRPNote3 | Config 1,2 | | Depending on band group | dBm/SCS | -83.43 | -83.43 | -107.75 | -107.75 | -113+ ΔBG\_offset | -117.75+ ΔBG\_offset | |
| Config 3 | | Depending on band group | -86.54 | -86.54 | -111.75 | -111.75 | -110+ ΔBG\_offset | -114.75+ ΔBG\_offset | |
| SS-RSRQNote3 | | |  | dB | -14.76 | -14.76 | -14.76 | -14.76 | -12.56 | -14.76 | |
| IoNote3 | Config 1,2 | | Depending on band group | dBm/Ch BW | -51.51 | -51.51 | -75.83 | -75.83 | -83.28+ ΔBG\_offset | -85.83+ ΔBG\_offset | |
| Config 3 | | Depending on band group | -51.52 | -51.52 | -76.73 | -76.73 | -77.19+ ΔBG\_offset | -79.73+ ΔBG\_offset | |
| 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: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2  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. | | | | | | | | | | | |

Table 6.7.2.2.1.5-2: SS-RSRQ Intra frequency absolute accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | | |
| Lowest reported value (Cell 2) | SS-RSRQ\_52 | SS-RSRQ\_52 | SS-RSRQ\_52 |
| Highest reported value (Cell 2) | SS-RSRQ\_62 | SS-RSRQ\_62 | SS-RSRQ\_62 |
| Extreme Conditions | | | |
| Lowest reported value (Cell 2) | SS-RSRQ\_49 | SS-RSRQ\_49 | SS-RSRQ\_49 |
| Highest reported value (Cell 2) | SS-RSRQ\_65 | SS-RSRQ\_65 | SS-RSRQ\_65 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.2.2.2 NR SA FR1-FR1 SS-RSRQ relative measurement accuracy

6.7.2.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-RSRQ relative measurement accuracy is within the specified limits for all bands.

6.7.2.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.2.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.2.2.2.

6.7.2.2.2.4 Test description

6.7.2.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.2.2.2.4.1-1.

Table 6.7.2.2.2.4.1-1: NR SA FR1-FR1 SS-RSRQ measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.2.2.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.2.2.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.2.2.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.2.2.2.4.1-2.

Table 6.7.2.2.2.4.1-2: Initial conditions for SS-RSRQ inter frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.2.2.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.2.2.2.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-RSRQ measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.2.2.2.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.2.2.2.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-RSRQ reported values in the periodic MeasurementReport. The SS-RSRQ value of Cell 2 reported by the UE is compared to the SS-RSRQ value of Cell 1 reported by the UE. If the difference between both values is outside the limits in Table 6.7.2.2.2.5-2 or the UE fails to report the measurement value for Cell 2 or Cell 1, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.2.2.2.5-1 as appropriate and repeat steps 5-7.

6.7.2.2.2.4.3 Message contents

Message contents are same as in Clause 6.7.2.2.1.4.3.

6.7.2.2.2.5 Test requirement

Table 6.7.2.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRQ measurement report for each of the tests in Table 6.7.2.2.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.2.2.2.5-2.

**Table 6.7.2.2.2.5-1: same as Table 6.7.2.2.1.5-1**

Table 6.7.2.2.2.5-2: SS-RSRQ Inter frequency relative accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | |  |
| Lowest reported value (Cell 2) | SS-RSRQ\_x - 7 | SS-RSRQ\_x - 7 | SS-RSRQ\_x - 11 |
| Highest reported value (Cell 2) | SS-RSRQ\_x + 7 | SS-RSRQ\_x + 7 | SS-RSRQ\_x + 2 |
| Extreme Conditions | | |  |
| Lowest reported value (Cell 2) | SS-RSRQ\_x - 9 | SS-RSRQ\_x - 9 | SS-RSRQ\_x – 13 |
| Highest reported value (Cell 2) | SS-RSRQ\_x + 9 | SS-RSRQ\_x + 9 | SS-RSRQ\_x + 4 |
| RSRQ\_x is the reported value of Cell 1 | | |  |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.3 SS-SINR

#### 6.7.3.0 Minimum conformance requirements

##### 6.7.3.0.1 Intra-frequency SS-SINR measurement accuracy requirements

Same as in clause 4.7.3.0.1.

##### 6.7.3.0.2 Inter-frequency absolute SS-SINR measurement accuracy requirements

Same as in clause 4.7.3.0.2.

##### 6.7.3.0.3 Inter-frequency relative SS-SINR measurement accuracy requirements

Same as in clause 4.7.3.0.3.

#### 6.7.3.1 NR SA FR1 SS-SINR measurement accuracy

6.7.3.1.1 Test purpose

The purpose of this test is to verify that the intra-frequency SS-SINR measurement accuracy is within the specified limits for all bands.

6.7.3.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards, which support ss-SINR-Meas.

6.7.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.3.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.3.1.

6.7.3.1.4 Test description

6.7.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.3.1.4.1-1.

Table 6.7.3.1.4.1-1: NR SA FR1 SS-SINR measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.3.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.3.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.3.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.3.1.4.1-2.

Table 6.7.3.1.4.1-2: Initial conditions for SS-SINR intra frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.3.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-SINR measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.3.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.3.1.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-SINR reported values in the periodic MeasurementReport. The SS-SINR value of Cell 2 reported by the UE is compared to the expected SS-SINR. If the value is outside the limits in Table 6.7.3.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.3.1.5-1 as appropriate and repeat steps 5-7.

6.7.3.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.3.1.4.3-1: Common Exception messages for NR SA FR1 SS-SINR measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5  Table H.3.1-7 |
| Specific message contents exceptions for Test Configuration 6.7.3.1-1 | Table H.3.1-3 with Condition SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.3.1-2 | Table H.3.1-3 with Condition Synchronous cells and SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.3.1-3 | Table H.3.1-3 with Condition Synchronous cells and SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.3.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-SINR Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| rsrq | false |  |  |
| sinr | true |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.3.1.5 Test requirements

Table 6.7.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-SINR measurement report for each of the tests in Table 6.7.3.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.3.1.5-2

Table 6.7.3.1.5-1: 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 | | | | | | |
| Config 2,3 | | TDD | | | | | | |
| TDD configuration | | | Config 1 | |  | Not Applicable | | | | | | |
| Config 2 | | TDDConf.1.1 | | | | | | |
| Config 3 | | TDDConf.2.1 | | | | | | |
| 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 | |  | 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 | SR2.1 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 | | | | | | |
| SS-RSSI-Measurement | | | | |  | Not Applicable | | | | | | |
| Time offset with Cell 1 | | | | Config 2, 3 | μs | - | | 3 | | - | 3 | |
| Config 1 | ms | - | | 3 | | - | 3 | |
| SMTC configuration | | | | Config 2, 3 |  | SMTC.1 | | | | | | |
| Config 1 |  | SMTC.2 | | | | | | |
| SSB configuration | | | Config 1,2 | |  | SSB.1 FR1 | | | | | | |
| Config 3 | | SSB.2 FR1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | | kHz | 15 | | | | | | |
| Config 3 | | 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 | | | Depending on band group | | dBm/15kHz | -93 | | | -116+ ΔBG\_offset | | | |
| Note2 | Config 1,2 | | | | dBm/SCS | -93.2 | | | Same as Noc for 15kHz | | | |
| Config 3 | | Depending on band group | | -90.2 | | | -113+ ΔBG\_offset | | | |
|  | | | | | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | | | dB | 4.54 | 2.66 | | -3.5 | | | -3.5 |
| SS-RSRPNote3 | Config 1,2 | | Depending on band group | | dBm/SCS | -88.46 | -90.34 | | -119.5+ ΔBG\_offset | | | -119.5+ ΔBG\_offset |
| Config 3 | | Depending on band group | | -85.65 | -87.53 | | -116.5+ ΔBG\_offset | | | -116.5+ ΔBG\_offset |
| SS-SINR Note3 | | |  | | dB | 0 | -3.19 | | -5.1 | | | -5.1 |
| IoNote3 | | Config 1,2 | Depending on band group | | dBm/  9.36MHz | -57.5 | | | -85.28+ ΔBG\_offset | | | |
| Config 3 | Depending on band group | | dBm/  38.16MHz | -51.59 | | | -79.17+ ΔBG\_offset | | | |
| 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: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2  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 | | | | | | | | | | | | |

Table 6.7.3.1.5-3: SS-SINR Intra frequency absolute accuracy requirements for the reported values

|  |  |  |
| --- | --- | --- |
|  | Test 1 | Test 2 |
|  | All bands | All bands |
| Normal Conditions | | |
| Lowest reported value (Cell 2) | SS-SINR\_31 | SS-SINR\_28 |
| Highest reported value (Cell 2) | SS-SINR\_49 | SS-SINR\_45 |
| Extreme Conditions | | |
| Lowest reported value (Cell 2) | SS-SINR\_30 | SS-SINR\_27 |
| Highest reported value (Cell 2) | SS-SINR\_50 | SS-SINR\_46 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.3.2 Inter-Frequency SS-SINR measurement accuracy

##### 6.7.3.2.1 NR SA FR1-FR1 SS-SINR absolute measurement accuracy

6.7.3.2.1.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-SINR absolute measurement accuracy is within the specified limits for all bands.

6.7.3.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards, which support ss-SINR-Meas.

6.7.3.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.3.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.3.2.1.

6.7.3.2.1.4 Test description

6.7.3.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.3.2.1.4.1-1.

Table 6.7.3.2.1.4.1-1: NR SA FR1-FR1 SS-SINR measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.3.2.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.3.2.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.3.2.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.3.2.1.4.1-2.

Table 6.7.3.2.1.4.1-2: Initial conditions for SS-SINR inter frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.3.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.3.2.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-SINR measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.3.2.1.4.2 Test procedure

Same as in clause 6.7.3.1.4.2 but replacing Table 6.7.3.1.5-1 and 6.7.3.1.5-2 with 6.7.3.2.1.5-1 and 6.7.3.2.1.5-2, respectively.

6.7.3.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.3.2.1.4.3-1: Common Exception messages for NR SA FR1-FR1 SS-SINR absolute measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-FREQ and GAP NEEDED  Table H.3.1-5  Table H.3.1-7 with condition INTER-FREQ  Table H.3.1-6 with condition Pattern #0 |
| Specific message contents exceptions for Test Configuration 6.7.3.2.1-1 | Table H.3.1-3 with Conditions INTER-FREQ MO and SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.2 |
| Specific message contents exceptions for Test Configuration 6.7.3.2.1-2 | Table H.3.1-3 with Conditions INTER-FREQ MO, and Synchronous cells and SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |
| Specific message contents exceptions for Test Configuration 6.7.3.2.1-3 | Table H.3.1-3 with Conditions INTER-FREQ MO, and Synchronous cells and SS-SINR  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.3.2.1.4.3-2: ReportConfigNR-DEFAULT(Periodical) for NR SA FR1 SS-SINR Accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-142 with condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  | PERIODICAL |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| rsrq | false |  |  |
| sinr | true |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.3.2.1.5 Test requirements

Table 6.7.3.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-SINR measurement report for each of the tests in Table 6.7.3.2.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.3.2.1.5-2.

Table 6.7.3.2.1.5-1: 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 | | | | | | | | | | | |
| Config 2,3 | TDD | | | | | | | | | | | |
| TDD configuration | | | Config 1 |  | Not Applicable | | | | | | | | | | | |
| Config 2 | TDDConf.1.1 | | | | | | | | | | | |
| Config 3 | TDDConf.2.1 | | | | | | | | | | | |
| 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 |  | TRS.1.1 FDD |  | | TRS.1.1 FDD | |  | | TRS.1.1 FDD | |  | | |
| Config 2 |  | TRS.1.1 TDD | - | | TRS.1.1 TDD | | - | | TRS.1.1 TDD | | - | | |
| Config 3 |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | |  | | TRS.1.2 TDD | |  | | |
| PDSCH Reference measurement channel | | | Config 1 |  | SR.1.1 FDD | - | | SR.1.1 FDD | | - | | SR.1.1 FDD | | - | | |
| Config 2 | SR.1.1 TDD | SR.1.1 TDD | | SR.1.1 TDD | |
| Config 3 | SR.2.1 TDD | SR.2.1 TDD | | SR.2.1 TDD | |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 FDD | - | | CR.1.1 FDD | | - | | CR.1.1 FDD | | - | | |
| Config 2 | CR.1.1 TDD | CR.1.1 TDD | | CR.1.1 TDD | |
| Config 3 | CR.2.1 TDD | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 FDD | - | | CCR.1.1 FDD | | - | | CCR.1.1 FDD | | - | | |
| Config 2 | CCR.1.1 TDD | CCR.1.1 TDD | | CCR.1.1 TDD | |
| Config 3 | CCR.2.1 TDD | CCR.2.1 TDD | | CCR.2.1 TDD | |
| OCNG Patterns | | | |  | OP.1 | | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | | |
| Time offset with Cell 1 | | Config 2, 3 | | μs | - | | 3 | | - | | 3 | | - | | | 3 |
| Config 1 | | ms | - | | 3 | | - | | 3 | | - | | | 3 |
| SMTC configuration | | Config 2, 3 | |  | SMTC.1 | | | | | | | | | | | |
| Config 1 | |  | SMTC.2 | | | | | | | | | | | |
| SSB configuration | | | Config 1,2 |  | SSB.1 FR1 | | | | | | | | | | | |
| Config 3 | SSB.2 FR1 | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz | 15 | | | | | | | | | | | |
| Config 3 | 30 | | | | | | | | | | | |
| 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 | | Depending on band group | dBm/15kHz | -88 | -88 | | -108.5 | | -108.5 | | -119.5+ ΔBG\_offset | | | -119.5+ ΔBG\_offset | |
| Note2 | Config 1,2 | | | dBm/SCS | -88 | -88 | | -108.5 | | -108.5 | | Same as Noc for 15kHz | | | Same as Noc for 15kHz | |
| Config 3 | | Depending on band group | -85 | -85 | | -105.5 | | -105.5 | | -116.5+ ΔBG\_offset | | | 116.5+ ΔBG\_offset | |
|  | | | | dB | -1.75 | -1.75 | | 20 | | 20 | | -3.2 | | | -3.2 | |
|  | | | | dB | -1.75 | -1.75 | | 20 | | 20 | | -3.2 | | | -3.2 | |
| SS-RSRPNote3 | Config 1,2 | | Depending on band group | dBm/SCS | -89.75 | -89.75 | | -88.5 | | -88.5 | | -122.7+ ΔBG\_offset | | | -122.7+ ΔBG\_offset | |
| Config 3 | | Depending on band group | -86.75 | -86.75 | | -85.5 | | -85.5 | | -119.7+ ΔBG\_offset | | | -119.7+ ΔBG\_offset | |
| SS-SINR Note3 | | |  | dB | -1.75 | -1.75 | | 20 | | 20 | | -3.2 | | | -3.2 | |
| IoNote3 | Config 1,2 | | Depending on band group | dBm/  9.36MHz | -57.83 | -57.83 | | -60.5 | | -60.5 | | -89.85+ ΔBG\_offset | | | -89.85+ ΔBG\_offset | |
| Config 3 | | Depending on band group | dBm/  38.16MHz | -51.73 | -51.73 | | -54.41 | | -54.41 | | -83.75+ ΔBG\_offset | | | -83.75+ ΔBG\_offset | |
| 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: ΔBG\_offset is defined in clause 3A.4, Table 3A.4.1-2  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 | | | | | | | | | | | | | | | | |

Table 6.7.3.2.1.5-2: SS-SINR Inter frequency absolute accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | | |
| Lowest reported value (Cell 2) | SS-SINR\_35 | SS-SINR\_79 | SS-SINR\_32 |
| Highest reported value (Cell 2) | SS-SINR\_51 | SS-SINR\_94 | SS-SINR\_49 |
| Extreme Conditions | | | |
| Lowest reported value (Cell 2) | SS-SINR\_33 | SS-SINR\_77 | SS-SINR\_31 |
| Highest reported value (Cell 2) | SS-SINR\_53 | SS-SINR\_96 | SS-SINR\_50 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.3.2.2 NR SA FR1-FR1 SS-SINR relative measurement accuracy

6.7.3.2.2.1 Test purpose

The purpose of this test is to verify that the inter-frequency SS-SINR relative measurement accuracy is within the specified limits for all bands.

6.7.3.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards, which support ss-SINR-Meas.

6.7.3.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.2.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.3.2.2.

6.7.3.2.2.4 Test description

6.7.3.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.3.2.2.4.1-1.

Table 6.7.3.2.2.4.1-1: NR SA FR1-FR1 SS-SINR measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.3.2.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.3.2.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.3.2.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.3.2.2.4.1-2.

Table 6.7.3.2.2.4.1-2: Initial conditions for SS-SINR inter frequency accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.3.2.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without the LTE link | |  |

1. Message contents are defined in clause 6.7.3.2.2.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex A.6. Cell 2 is an NR FR1 cell in the same frequency as Cell 1. Cell 2 is the target cell for SS-SINR measurements. The connection setup is done according to the settings in Annex C.1.1.

6.7.3.2.2.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.3.2.2.5-1 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the SS-SINR reported values in the periodic MeasurementReport. The SS- SINR value of Cell 2 reported by the UE is compared to the SS- SINR value of Cell 1 reported by the UE. If the difference between both values is outside the limits in Table 6.7.3.2.2.5-2 or the UE fails to report the measurement value for Cell 2 or Cell 1, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.3.2.2.5-1 as appropriate and repeat steps 5-7.

6.7.3.2.2.4.3 Message contents

Message contents are same as in Clause 6.7.3.2.1.4.3.

6.7.3.2.2.5 Test requirements

Table 6.7.3.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-SINR measurement report for each of the tests in Table 6.7.3.2.2.5-1 shall meet the corresponding relative accuracy requirements in Table 6.7.3.2.2.5-2

**Table 6.7.3.2.2.2.5-1: same as Table 6.7.3.2.2.1.5-1**

Table 6.7.3.2.2.5-2: SS-SINR Inter frequency relative accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1 | Test 2 | Test 3 |
|  | All bands | All bands | All bands |
| Normal Conditions | | |  |
| Lowest reported value (Cell 2) | SS-SINR\_x - 10 | SS-SINR\_x - 10 | SS-SINR\_x - 11 |
| Highest reported value (Cell 2) | SS-SINR\_x + 10 | SS-SINR\_x + 10 | SS-SINR\_x + 11 |
| Extreme Conditions | | |  |
| Lowest reported value (Cell 2) | SS-SINR\_x - 12 | SS-SINR\_x - 12 | SS-SINR\_x - 12 |
| Highest reported value (Cell 2) | SS-SINR\_x + 12 | SS-SINR\_x + 12 | SS-SINR\_x + 12 |
| RSRQ\_x is the reported value of Cell 1 | | |  |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.4 L1-RSRP

#### 6.7.4.0 Minimum conformance requirements

##### 6.7.4.0.1 SSB based absolute L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.1.

##### 6.7.4.0.2 SSB based relative L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.2.

##### 6.7.4.0.3 CSI-RS based absolute L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.3.

##### 6.7.4.0.4 CSI-RS based relative L1-RSRP measurement accuracy requirements

Same as 4.7.4.0.4.

#### 6.7.4.1 SSB based L1-RSRP measurements

##### 6.7.4.1.1 NR SA FR1 SSB based L1-RSRP absolute measurement accuracy

6.7.4.1.1.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.4.1.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.1.

6.7.4.1.1.4 Test description

6.7.4.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.1.1.4.1-1.

Table 6.7.4.1.1.4.1-1: NR SA FR1 SSB based L1-RSRP absolute measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.4.1.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.4.1.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.4.1.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.1.1.4.1-2.

Table 6.7.4.1.1.4.1-2: Initial conditions for SSB based L1-RSRP absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.4.1.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.4.1.1.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for SSB-based L1-RSRP measurements. The UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.1.1.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.4.1.1.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.4.1.1.4.1-2.

2. Set the parameters according to T1 in Table 6.7.4.1.1.5-1.

3. The UE shall start sending L1-RSRP report including results of both SSB#0 and SSB#1 every 80 slots.

4. The SS shall check the L1-RSRP reported values of SSB#0 or SSB#1 in the periodic L1-RSRP reports. If the value for the strongest SSB is within the limits in Table 6.7.4.1.1.5-2 or Table 6.7.4.1.1.5-3 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-RSRP report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.4.1.1.5-1 as appropriate and repeat steps 3-5.

6.7.4.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.4.1.1.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6-2 with conditions PERIODIC and SS-RSRP  Table H.3.6-3 with conditions SSB and PERIODIC  Table H.3.5-8  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.4.1.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.4.1.1.5 Test requirement

Table 6.7.4.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-RSRP measurement report for each of the tests in Table 6.7.4.1.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.4.1.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.4.1.1.5-3 for test configuration 3.

Table 6.7.4.1.1.5-1: L1-RSRP test parameters

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Config** | | **Unit** | | **Test 1** | | **Test 2** | |
| SSB GSCN | | | 1~3 | |  | | freq1 | | freq1 | |
| Duplex mode | | | 1 | |  | | FDD | | FDD | |
| 2 | | TDD | | TDD | |
| 3 | | TDD | | TDD | |
| TDD Configuration | | | 1 | |  | | N/A | | N/A | |
| 2 | | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | | TDDConf.2.1 | | TDDConf.2.1 | |
| BWchannel | | | 1 | | MHz | | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| 2 | | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| 3 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| PDSCH Reference measurement channel | | | 1 | |  | | SR.1.1 FDD | | SR.1.1 FDD | |
| 2 | | SR.1.1 TDD | | SR.1.1 TDD | |
| 3 | | SR.2.1 TDD | | SR.2.1 TDD | |
| RMSI CORESET Reference Channel | | | 1 | |  | | CR.1.1 FDD | | CR.1.1 FDD | |
| 2 | | CR.1.1 TDD | | CR.1.1 TDD | |
| 3 | | CR.2.1 TDD | | CR.2.1 TDD | |
| Dedicated CORESET Reference Channel | | | 1 | |  | | CCR.1.1 FDD | | CCR.1.1 FDD | |
| 2 | | CCR.1.1 TDD | | CCR.1.1 TDD | |
| 3 | | CCR.2.1 TDD | | CCR.2.1 TDD | |
| SSB configuration | | | 1 | |  | | SSB.3 FR1 | | SSB.3 FR1 | |
| 2 | | SSB.3 FR1 | | SSB.3 FR1 | |
| 3 | | SSB.4 FR1 | | SSB.4 FR1 | |
| OCNG Patterns | | | 1~3 | |  | | OP.1 | | OP.1 | |
| TRS configuration | | | 1 | |  | | TRS.1.1 FDD | | TRS.1.1 FDD | |
| 2 | | TRS.1.1 TDD | | TRS.1.1 TDD | |
| 3 | | TRS.1.2 TDD | | TRS.1.2 TDD | |
| 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 | | SMTC.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 | | Depending on band group | 1,2 | | dBm/15kHz | | -94.65 | | -117+ ΔBG\_offset | |
| 3 | | -96.00 | | 117+ ΔBG\_offset | |
| Note2 | | 1,2 | | dBm/SSB SCS | | -94.65 | | -117+ ΔBG\_offset | |
| 3 | | -93.00 | | -114+ ΔBG\_offset | |
|  | | | 1~3 | | dB | | 10 | | -2.2 | |
| SSB RSRP Note3 | | Depending on band group | 1,2 | | dBm/SSB SCS | | -84.65 | | -119.2 + ΔBG\_offset | |
| 3 | | -83.00 | | -116.2 + ΔBG\_offset | |
| Io Note3 | | Depending on band group | 1,2 | | dBm/9.36 MHz | | -56.28 | | -87.00 + ΔBG\_offset | |
| 3 | | dBm/38.16 MHz | | -51.53 | | -80.90 + ΔBG\_offset | |
|  | | | 1~3 | | dB | | 10 | | -2.2 | |
| 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 | | | | | | | | | | |

Table 6.7.4.1.1.5-2: L1-RSRP absolute accuracy requirements for the reported values for test configurations 1 and 2

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 1) | 62 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 31 |
| Bands NR\_FDD\_FR1\_B | 31 |
| Bands NR\_TDD\_FR1\_C | 32 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 32 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 33 |
| Bands NR\_FDD\_FR1\_G | 34 |
| Bands NR\_FDD\_FR1\_H | 34 |
| Highest reported value (Cell 1) | 82 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 44 |
| Bands NR\_FDD\_FR1\_B | 45 |
| Bands NR\_TDD\_FR1\_C | 45 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 46 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 46 |
| Bands NR\_FDD\_FR1\_G | 47 |
| Bands NR\_FDD\_FR1\_H | 48 |
| Extreme Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 1) | 61 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 30 |
| Bands NR\_FDD\_FR1\_B | 30 |
| Bands NR\_TDD\_FR1\_C | 31 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 31 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 32 |
| Bands NR\_FDD\_FR1\_G | 33 |
| Bands NR\_FDD\_FR1\_H | 33 |
| Highest reported value (Cell 1) | 83 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 45 |
| Bands NR\_FDD\_FR1\_B | 46 |
| Bands NR\_TDD\_FR1\_C | 46 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 47 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 47 |
| Bands NR\_FDD\_FR1\_G | 48 |
| Bands NR\_FDD\_FR1\_H | 49 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2. | | | |

Table 6.7.4.1.1.5-3: L1-RSRP absolute accuracy requirements for the reported values for test configuration 3

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 1) | 63 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 34 |
| Bands NR\_FDD\_FR1\_B | 34 |
| Bands NR\_TDD\_FR1\_C | 35 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 35 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 36 |
| Bands NR\_FDD\_FR1\_G | 37 |
| Bands NR\_FDD\_FR1\_H | 37 |
| Highest reported value (Cell 1) | 84 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 47 |
| Bands NR\_FDD\_FR1\_B | 48 |
| Bands NR\_TDD\_FR1\_C | 48 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 49 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 49 |
| Bands NR\_FDD\_FR1\_G | 50 |
| Bands NR\_FDD\_FR1\_H | 51 |
| Extreme Conditions | Test 1  All bands | Test 2 | |
| Lowest reported value (Cell 1) | 62 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 33 |
| Bands NR\_FDD\_FR1\_B | 33 |
| Bands NR\_TDD\_FR1\_C | 34 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 34 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 35 |
| Bands NR\_FDD\_FR1\_G | 36 |
| Bands NR\_FDD\_FR1\_H | 36 |
| Highest reported value (Cell 1) | 85 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 48 |
| Bands NR\_FDD\_FR1\_B | 49 |
| Bands NR\_TDD\_FR1\_C | 49 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 50 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 50 |
| Bands NR\_FDD\_FR1\_G | 51 |
| Bands NR\_FDD\_FR1\_H | 52 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2 | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.4.1.2 NR SA FR1 SSB based L1-RSRP relative measurement accuracy

6.7.4.1.2.1 Test purpose

The purpose of this test is to verify that the SSB based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.4.1.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.1.

6.7.4.1.2.4 Test description

6.7.4.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.1.2.4.1-1.

Table 6.7.4.1.2.4.1-1: NR SA FR1 SSB based L1-RSRP relative measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.4.1.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.4.1.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.4.1.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.1.2.4.1-2.

Table 6.7.4.1.2.4.1-2: Initial conditions for SSB based L1-RSRP relative accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.4.1.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.4.1.2.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for SSB-based L1-RSRP measurements. The UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.1.2.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.4.1.2.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.4.1.2.4.1-2.

2. Set the parameters according to T1 in Table 6.7.4.1.2.5-1.

3. The UE shall start sending L1-RSRP report including results of both SSB#0 and SSB#1 every 80 slots.

4. The SS shall check the L1-RSRP reported values of SSB#0 and SSB#1 in the periodic L1-RSRP reports. The DIFF-RSRP value of SSB#0 or SSB#1 reported by the UE is compared to the expected DIFF-. If the DIFF-RSRP value is within the limits in Table 6.7.4.1.2.5-2, the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-RSRP report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.4.1.2.5-1 as appropriate and repeat steps 3-5.

6.7.4.1.2.4.3 Message contents

Message contents are same as in Clause 6.7.4.1.1.4.3.

6.7.4.1.2.5 Test requirement

Table 6.7.4.1.2.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-RSRP measurement report for each of the tests in Table 6.7.4.1.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.4.1.2.5-2.

Table 6.7.4.1.2.5-1: Same as Table 6.7.4.1.1.5-1

Table 6.7.4.1.2.5-2: L1-RSRP relative accuracy requirements for the reported values

|  |  |  |
| --- | --- | --- |
|  | Test 1 | Test 2 |
|  | All bands | All bands |
| Normal Conditions | | |
| Lowest DIFF RSRP reported value | 0 | 0 |
| Highest DIFF RSRP reported value | +3 | +3 |
| Extreme Conditions | | |
| Lowest DIFF RSRP reported value | 0 | 0 |
| Highest DIFF RSRP reported value | +4 | +4 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.4.2 CSI-RS based L1-RSRP measurements

##### 6.7.4.2.1 NR SA FR1 CSI-RS based L1-RSRP absolute measurement accuracy

6.7.4.2.1.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP absolute measurement accuracy is within the specified limits for all bands.

6.7.4.2.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.2.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.2.

6.7.4.2.1.4 Test description

6.7.4.2.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.2.1.4.1-1.

Table 6.7.4.2.1.4.1-1: NR SA FR1 CSI-RS based L1-RSRP absolute measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.4.2.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.4.2.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.4.2.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.2.1.4.1-2.

Table 6.7.4.2.1.4.1-2: Initial conditions for CSI-RS based L1-RSRP absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.4.2.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.4.2.1.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-RSRP measurements. The UE is configured to perform RLM and BFD measurement based on the SSB. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.2.1.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.4.2.1.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.4.2.1.4.1-2.

2. Set the parameters according to T1 in Table 6.7.4.2.1.5-1.

3. The UE shall start sending L1-RSRP report including results of both CSI-RS#0 and CSI-RS#1 every 80 slots.

4. The SS shall check the L1-RSRP reported values of CSI-RS#0 or CSI-RS#1 in the periodic L1-RSRP reports. If the value for the strongestCSI-RS is within the limits in Table 6.7.4.2.1.5-2 or Table 6.7.4.2.1.5-3 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-RSRP report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.4.2.1.5-1 as appropriate and repeat steps 3-5.

6.7.4.2.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.4.2.1.4.3-1: Common Exception messages EN-DC CSI-RS-based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6-2 with conditions PERIODIC and CSI-RSRP  Table H.3.6-3 with conditions CSI-RS and PERIODIC  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.4.2.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSB. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.4.2.1.5 Test requirement

Table 6.7.4.2.1.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-RSRP measurement report for each of the tests in Table 6.7.4.2.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.4.2.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.4.2.1.5-3 for test configuration 3.

Table 6.7.4.2.1.5-1: L1-RSRP test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Config** | **Unit** | **Test 1** | **Test 2** |
| SSB GSCN | | 1~3 |  | freq1 | freq1 |
| Duplex mode | | 1 |  | FDD | FDD |
| 2 | TDD | TDD |
| 3 | TDD | TDD |
| TDD Configuration | | 1 |  | N/A | N/A |
| 2 | TDDConf.1.1 | TDDConf.1.1 |
| 3 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 FDD |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 FDD |
| 2 | CR.1.1 TDD | CR.1.1 TDD |
| 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration | | 1 |  | SSB.3 FR1 | SSB.3 FR1 |
| 2 | SSB.3 FR1 | SSB.3 FR1 |
| 3 | SSB.4 FR1 | SSB.4 FR1 |
| OCNG Patterns | | 1~3 |  | OP.1 | OP.1 |
| TRS configuration | | 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| 2 | TRS.1.1 TDD | TRS.1.1 TDD |
| 3 | TRS.1.2 TDD | TRS.1.2 TDD |
| 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 | SMTC.1 |
| CSI-RS | | 1,4 |  | CSI-RS 1.2 FDD | CSI-RS 1.2 FDD |
| 2,5 | CSI-RS 1.2 TDD | CSI-RS 1.2 TDD |
| 3,6 | CSI-RS 2.2 TDD | CSI-RS 2.2 FDD |
| reportConfigType | | 1~3 |  | periodic | periodic |
| reportQuantity | | 1~3 |  | cri-RSRP | cri-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 | Depending on band group | 1,2 | dBm/15kHz | -94.65 | -117+ ΔBG\_offset |
| 3 | -96.00 | 117+ ΔBG\_offset |
| Note2 | 1,2 | dBm/CSI-RS SCS | -94.65 | -117+ ΔBG\_offset |
| 3 | -93.00 | -114+ ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| CSI-RSRP Note3 | Depending on band group | 1,2 | dBm/CSI-RS SCS | -84.65 | -119.2 + ΔBG\_offset |
| 3 | -83.00 | -116.2 + ΔBG\_offset |
| Io Note3 | Depending on band group | 1,2 | dBm/9.36 MHz | -56.28 | -87.00 + ΔBG\_offset |
| 3 | dBm/38.16 MHz | -51.53 | -80.90 + ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| 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 | | | | | |

Table 6.7.4.2.1.5-2: Same as Table 6.7.4.1.1.5-2

Table 6.7.4.2.1.5-3: Same as Table 6.7.4.1.1.5-3

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.4.2.2 NR SA FR1 CSI-RS based L1-RSRP relative measurement accuracy

6.7.4.2.2.1 Test purpose

The purpose of this test is to verify that the CSI-RS based L1-RSRP relative measurement accuracy is within the specified limits for all bands.

6.7.4.2.2.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards.

6.7.4.2.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.4.0.4.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.4.2.

6.7.4.2.2.4 Test description

6.7.4.2.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.4.2.2.4.1-1.

Table 6.7.4.2.2.4.1-1: NR SA FR1 CSI-RS based L1-RSRP relative measurement accuracy supported test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.4.2.2-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD |
| 6.7.4.2.2-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD |
| 6.7.4.2.2-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.4.2.2.4.1-2.

Table 6.7.4.2.2.4.1-2: Initial conditions for CSI-RS based L1-RSRP relative accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.4.2.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.4.2.2.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-RSRP measurements. The UE is configured to perform RLM and BFD measurement based on the SSB. The connection setup is done according to the settings in Annex C.1.1.

6.7.4.2.2.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.4.2.2.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.4.2.2.4.1-2.

2. Set the parameters according to T1 in Table 6.7.4.2.2.5-1.

3. The UE shall start sending L1-RSRP report including results of both CSI-RS#0 and CSI-RS#1 every 80 slots.

4. The SS shall check the L1-RSRP reported values of CSI-RS#0 and CSI-RS#1 in the periodic L1-RSRP reports. The DIFF-RSRP value of CSI-RS#0 or CSI-RS#1 reported by the UE is compared to the expected DIFF-. If the DIFF-RSRP value is within the limits in Table 6.7.4.2.2.5-2, the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-RSRP report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.4.2.2.5-1 as appropriate and repeat steps 3-5.

6.7.4.2.2.4.3 Message contents

Message contents are same as in Clause 6.7.4.2.1.4.3.

6.7.4.2.2.5 Test requirement

Table 6.7.4.2.2.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-RSRP measurement report for each of the tests in Table 6.7.4.2.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.4.2.2.5-2.

Table 6.7.4.2.2.5-1: Same as Table 6.7.4.2.1.5-1

Table 6.7.4.2.2.5-2: Same as Table 6.7.4.1.2.5-2

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.5 E-UTRAN RSRP

#### 6.7.5.0 Minimum conformance requirements

##### 6.7.5.0.1 E-UTRAN RSRP absolute accuracy

The measurement period of E-UTRA RSRP in RRC\_CONNECTED state is specified in clause 9.4.2 and 9.4.3 of TS 38.133 [6].

The accuracy requirements of E-UTRA RSRP measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RSRP Accuracy Requirements in clause 9.1.3 of TS 36.133 [23]:

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

The accuracy requirements in Table 6.7.5.0.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 [27] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 of TS 36.133 [23] for a corresponding Band.

Table 6.7.5.0.1-1: RSRP Inter frequency absolute accuracy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | |
| Normal condition | Extreme condition | Ês/Iot | Io Note 1 range | | | |
| E-UTRA operating band groups Note 3 | Minimum Io | | Maximum Io |
| dB | dB | dB |  | dBm/15kHz Note 2 | dBm/BWChannel | dBm/BWChannel |
| ±4.5 | ±9 | ≥-6 dB | FDD\_A, TDD\_A | -121 | N/A | -70 |
| FDD\_B1, FDD\_B2 | -120.5 | N/A | -70 |
| FDD\_C, TDD\_C | -120 | N/A | -70 |
| FDD\_D | -119.5 | N/A | -70 |
| FDD\_E, TDD\_E | -119 | N/A | -70 |
| FDD\_F | -118.5 | N/A | -70 |
| FDD\_G | -118 | N/A | -70 |
| FDD\_H | -117.5 | N/A | -70 |
| FDD\_N | -114.5 | N/A | -70 |
| ±8 | ±11 | ≥-6 dB | FDD\_A, TDD\_A, FDD\_B1, FDD\_B2, FDD\_C, TDD\_C, FDD\_D, FDD\_E, TDD\_E, FDD\_F, FDD\_G, FDD\_H, FDD\_N | N/A | -70 | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3 of TS 36.133 [23].  NOTE 3: E-UTRA operating band groups are as defined in Section 3.5 of TS 36.133 [23]. | | | | | | |

The reporting range and mapping specified for RSRP measurements in clause 9.1.4 of TS 36.133 [23] shall apply:

The reporting range of RSRP is defined from -156 dBm to -44 dBm with 1 dB resolution.

The mapping of measured quantity is defined in Table 6.7.5.0.1-2. The range in the signalling may be larger than the guaranteed accuracy range.

Table 6.7.5.0.1-2: RSRP measurement report mapping

|  |  |  |
| --- | --- | --- |
| Reported value | Measured quantity value | Unit |
| RSRP\_-17 | RSRP< -156 | dBm |
| RSRP\_-16 | -156 ≤ RSRP< -155 | dBm |
| … | … | … |
| RSRP\_-03 | -143 ≤ RSRP< -142 | dBm |
| RSRP\_-02 | -142 ≤ RSRP< -141 | dBm |
| RSRP\_-01 | -141 ≤ RSRP< -140 | dBm |
| RSRP\_00 | RSRP < -140 | dBm |
| RSRP\_01 | -140 ≤ RSRP < -139 | dBm |
| RSRP\_02 | -139 ≤ RSRP < -138 | dBm |
| … | … | … |
| RSRP\_95 | -46 ≤ RSRP < -45 | dBm |
| RSRP\_96 | -45 ≤ RSRP < -44 | dBm |
| RSRP\_97 | -44 ≤ RSRP | dBm |

#### 6.7.5.1 NR SA FR1 – E-UTRAN RSRP absolute measurement accuracy

6.7.5.1.1 Test purpose

The purpose of this test is to verify that the inter-RAT E-UTRAN RSRP absolute measurement accuracy is within the specified limits for all bands, when the serving cell is NR FR1 and the target cell is E-UTRA.

6.7.5.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards supporting E-UTRA.

6.7.5.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.5.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.5.1.

6.7.5.1.4 Test description

6.7.5.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.5.1.4.1-1.

Table 6.7.5.1.4.1-1: test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.5.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: FDD |
| 6.7.5.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.5.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.5.1-4 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: TDD |
| 6.7.5.1-5 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: TDD |
| 6.7.5.1-6 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.5.1.4.1-2.

Table 6.7.5.1.4.1-2: initial conditions

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.5.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.7.2 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.7.3 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.5.1.4.3.

2. There are two carriers and two cells specified in the test, where NR Cell 1 is the NR PCell on the NR carrier and Cell 2 is the E-UTRA neighbour cell on the E-UTRA carrier and the target for the measurements.

6.7.5.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.5.1.5-1 and Table 6.7.5.1.5-2 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the RSRP reported values in the periodic MeasurementReport. The RSRP value of Cell 2 reported by the UE is compared to the expected RSRP. If the value is outside the limits in Table 6.7.5.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.5.1.5-2 as appropriate and repeat steps 5-7.

6.7.5.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.5.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-RAT and GAP NEEDED  Table H.3.1-3  Table H.3.1-3a  Table H.3.1-7 with condition INTER-RAT  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.5.1.4.3-1A: MeasConfig (Test procedure step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation path: Table H.3.1-2 with condition INTER-RAT and GAP NEEDED | | | |
| Information Element | Value/Remark | Comment | Condition |
| measConfig ::= SEQUENCE { |  |  |  |
| reportConfigToAddModList SEQUENCE(SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod { | 2 entries |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigE-UTRA-DEFAULT(Periodical) | Table 6.7.5.1.4.3-2 |  |
| } |  |  |  |
| } |  |  |  |
| ReportConfigToAddMod[2] SEQUENCE { |  | entry 2 |  |
| reportConfigId | 2 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigInterRAT-EVENT | Table 6.7.5.1.4.3-1B |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| measIdToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod { | 2 entries |  |  |
| MeasIdToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measId | 1 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 1 |  |  |
| } |  |  |  |
| MeasIdToAddMod[2] SEQUENCE { |  | entry 2 |  |
| measId | 2 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.5.1.4.3-1B: ReportConfigInterRAT-EVENT (Table 6.7.5.1.4.3-1A)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14] Table 4.6.3-141 with condition EVENT\_B1 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT ::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| eventTriggered SEQUENCE { |  |  |  |
| eventId CHOICE { |  |  |  |
| eventB1 SEQUENCE { |  |  |  |
| b1-ThresholdEUTRACHOICE { |  |  |  |
| rsrp | 97 | Set threshold to -44dBm to ensure measId 2 will never be triggered |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.5.1.4.3-2: ReportConfigE-UTRA-DEFAULT(Periodical)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-141 with Condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  |  |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrq | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.5.1.5 Test requirement

Table 6.7.5.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Tables 6.7.5.1.5-1 and 6.7.5.1.5-2 shall meet the corresponding absolute accuracy requirements in Table 6.7.5.1.5-3.

Table 6.7.5.1.5-1: NR Cell specific test parameters for SA Inter-RAT E-UTRAN RSRP test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 |
| NR RF channel number | |  | 1 |
| Duplex mode | Config 1, 4 |  | FDD |
| Config 2, 3, 5, 6 |  | TDD |
| TDD Configuration | Config 1, 4 |  | N/A |
| Config 2, 5 | TDDConf.1.1 |
| Config 3, 6 | TDDConf.2.1 |
| BWchannel | Config 1, 4 | MHz | 10: NRB,c = 52 (FDD) |
| Config 2, 5 | 10: NRB,c = 52 (TDD) |
| Config 3, 6 | 40: NRB,c = 106 (TDD) |
| Gap pattern Id | |  | 0 |
| PDSCH reference measurement channel | Config 1, 4 |  | SR.1.1 FDD |
| Config 2, 5 | SR.1.1 TDD |
| Config 3, 6 | SR.2.1 TDD |
| RMSI CORSET reference channel | Config 1, 4 |  | CR.1.1 FDD |
| Config 2, 5 | CR.1.1 TDD |
| Config 3, 6 | CR.2.1 TDD |
| Dedicated CORSET reference channel | Config 1, 4 |  | CCR.1.1 FDD |
| Config 2, 5 | CCR.1.1 TDD |
| Config 3, 6 | CCR.2.1 TDD |
| CSI-RS for tracking | Config 1, 4 |  | TRS.1.1 FDD |
| Config 2, 5 | TRS.1.1 TDD |
| Config 3, 6 | TRS.1.2 TDD |
| BWP configurations | Initial DL BWP |  | DLBWP.0.1 |
| Dedicated DL BWP |  | DLBWP.1.1 |
| Initial UL BWP |  | ULBWP.0.1 |
| Dedicated UL BWP |  | ULBWP.1.1 |
| OCNG patternNote1 | |  | OP.1 |
| SMTC configuration | |  | SMTC.1 |
| SSB configuration | Config 1, 2, 4, 5 |  | SSB.1 FR1 |
| Config 3, 6 | SSB.2 FR1 |
| 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\_DMRS | |
| EPRE ratio of OCNG DMRS to SSS | |
| EPRE ratio of OCNG to OCNG DMRS | |
| *Noc*Note2 | | dBm/15 kHz | -104 |
| *Noc*Note2 | Config 1, 2, 4, 5 | dBm/SCS | -104 |
| Config 3, 6 | -101 |
| Ês/Noc | | dB | 17 |
| Ês/IotNote3 | | dB | 17 |
| SS-RSRPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| SSB\_RPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| IoNote3 | Config 1, 2, 4, 5 | dBm/9.36 MHz | -58.96 |
| Config 3, 6 | dBm/38.16 MHz | -52.87 |
| Propagation condition | |  | AWGN |
| Antenna Configuration and Correlation Matrix | |  | 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | |

Table 6.7.5.1.5-2: E-UTRAN Cell specific test parameters for SA Inter-RAT E-UTRAN RSRP test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | |
| Test 1 | Test 2 |
| E-UTRA RF channel number | |  | 1 | |
| Duplex mode | Config 1, 2, 3 |  | FDD | |
| Config 4, 5, 6 | TDD | |
| TDD special subframe configurationNote1 | Config 1, 2, 3 |  | N/A | |
| Config 4, 5, 6 | 6 | |
| TDD uplink-downlink configurationNote1 | Config 1, 2, 3 |  | N/A | |
| Config 4, 5, 6 | 1 | |
| BWchannel | | MHz | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 | |  | - | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 | Config 1, 2, 3 |  | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
| Config 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 | Config 1, 2, 3 |  | 5 MHz: OP.19 FDD  10 MHz: OP.6 FDD  20 MHz: OP.14 FDD | |
| Config 4, 5, 6 | 5 MHz: OP.10 TDD  10 MHz: OP.2 TDD  20 MHz: OP.8 TDD | |
| PBCH\_RA | | dB | 0 | |
| PBCH\_RB | |
| PSS\_RA | |
| SSS\_RA | |
| PCFICH\_RB | |
| PHICH\_RA | |
| PHICH\_RB | |
| PDCCH\_RA | |
| PDCCH\_RB | |
| PDSCH\_RA | |
| PDSCH\_RB | |
| OCNG\_RANote3 | |
| OCNG\_RBNote3 | |
| NocNote4 | Depending on band group | dBm/15kHz | -91.65 | -117 + ΔBG\_offset |
| Ês/Noc | | dB | 10 | -3.2 |
| Ês/IotNote5 | | dB | 10 | -3.2 |
| RSRPNote5 | Depending on band group | dBm/15kHz | -81.65 | -120.2+ ΔBG\_offset |
| SCH\_RPNote5 | Depending on band group | dBm/15kHz | -81.65 | -120.2+ ΔBG\_offset |
| IoNote5 | Depending on band group | dBm/Ch BW | -53.45 + 10log(NRB,c/50) | -87.52+ ΔBG\_offset + 10log(NRB,c/50) |
| Propagation Condition | |  | AWGN | |
| Antenna Configuration and Correlation Matrix | |  | 1x2 | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [23] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: 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 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: E-UTRA operating band groups are as defined in clause 3.5 of TS 36.133 [23].  Note 7: Void  Note 8: Void.  Note 9: Void  Note 10: Void  Note 11: ΔBG\_offset for LTE band group is defined in TS 36.521-3 [26] clause 3.5.1, Table 3.5.1-1A. | | | | |

Table 6.7.5.1.5-3: SS-RSRP Intra frequency absolute accuracy requirements for the reported values

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2 | | |
| Lowest reported value (Cell 2) | 48 | FDD\_A, TDD\_A | 14 | |
| FDD\_B | 15 | |
| TDD\_C | 15 | |
| FDD\_D, TDD\_D | 16 | |
| FDD\_E, TDD\_E | 16 | |
| FDD\_G | 17 | |
| FDD\_H | 18 | |
| Highest reported value (Cell 2) | 70 | FDD\_A, TDD\_A | 27 | |
| FDD\_B | 27 | |
| TDD\_C | 28 | |
| FDD\_D, TDD\_D | 28 | |
| FDD\_E, TDD\_E | 29 | |
| FDD\_G | 30 | |
| FDD\_H | 30 | |
| Extreme Conditions | Test 1  All bands | Test 2 | | |
| Lowest reported value (Cell 2) | 46 | FDD\_A, TDD\_A | 11 | |
| FDD\_B | 11 | |
| TDD\_C | 12 | |
| FDD\_D, TDD\_D | 12 | |
| FDD\_E, TDD\_E | 13 | |
| FDD\_G | 14 | |
| FDD\_H | 14 | |
| Highest reported value (Cell 2) | 72 | FDD\_A, TDD\_A | 30 | |
| FDD\_B | 31 | |
| TDD\_C | 31 | |
| FDD\_D, TDD\_D | 32 | |
| FDD\_E, TDD\_E | 32 | |
| FDD\_G | 33 | |
| FDD\_H | 34 | |
| Note 1: E-UTRA operating band groups are as defined in TS 36.521-3 [26] clause 3.5.1 | | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.6 E-UTRAN RSRQ

#### 6.7.6.0 Minimum conformance requirements

##### 6.7.6.0.1 E-UTRAN RSRQ absolute accuracy

The measurement period of E-UTRA RSRQ in RRC\_CONNECTED state is specified in clause 9.4.2 and 9.4.3 on TS 38.133 [6].

The accuracy requirements of E-UTRA RSRQ measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RSRQ Accuracy Requirements in clause 9.1.6 of TS 36.133 [23]:

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

The accuracy requirements in Table 6.7.6.0.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 [27] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.3 of TS 36.133 [23] for a corresponding Band

Table 6.7.6.0.1-1: RSRQ Inter frequency absolute accuracy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | Ês/Iot | Io Note 1 range | | |
| E-UTRA operating band groups Note 4 | Minimum Io | Maximum Io |
| dB | dB | dB |  | dBm/15kHz Note 3 | dBm/BWChannel |
| ±2.5 | ±4 | ≥-3 dB | FDD\_A, TDD\_A | -121 | -50 |
| FDD\_B1, FDD\_B2 | -120.5 | -50 |
| FDD\_C, TDD\_C | -120 | -50 |
| FDD\_D | -119.5 | -50 |
| FDD\_E, TDD\_E | -119 | -50 |
| FDD\_F | -118.5 | -50 |
| FDD\_G | -118 | -50 |
| FDD\_H | -117.5 | -50 |
| FDD\_N | -114.5 | -50 |
| ±3.5 | ±4 | ≥-6 dB | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3 of TS 36.133 [23].  NOTE 4: E-UTRA operating band groups are as defined in Section 3.5 of TS 36.133 [23]. | | | | | |

The reporting range and mapping specified for RSRQ measurements in clause 9.1.7 of TS 36.133 [23] shall apply:

The reporting range of RSRQ is defined from -34 dB to 2.5 dB with 0.5 dB resolution.

The mapping of measured quantity is defined in table 6.7.6.0.1-2. The range in the signalling may be larger than the guaranteed accuracy range.

Table 6.7.6.0.1-2: RSRQ measurement report mapping

|  |  |  |
| --- | --- | --- |
| Reported value | Measured quantity value | Unit |
| RSRQ\_-30 | RSRQ < -34 | dB |
| RSRQ\_-29 | -34 ≤ RSRQ < -33.5 | dB |
| … | … | … |
| RSRQ\_-02 | -20.5 ≤ RSRQ < -20 | dB |
| RSRQ\_-01 | -20 ≤ RSRQ < -19.5 | dB |
| RSRQ\_00 | RSRQ < -19.5 | dB |
| RSRQ\_01 | -19.5 ≤ RSRQ < -19 | dB |
| RSRQ\_02 | -19 ≤ RSRQ < -18.5 | dB |
| … | … | … |
| RSRQ\_32 | -4 ≤ RSRQ < -3.5 | dB |
| RSRQ\_33 | -3.5 ≤ RSRQ < -3 | dB |
| RSRQ\_34 | -3 ≤ RSRQ | dB |
| RSRQ\_35 | -3 ≤ RSRQ < -2.5 | dB |
| RSRQ\_36 | -2.5 ≤ RSRQ < -2 | dB |
| … | … | … |
| RSRQ\_45 | 2 ≤ RSRQ < 2.5 | dB |
| RSRQ\_46 | 2.5 ≤ RSRQ | dB |

Note: The ranges from RSRQ\_-30 to RSRQ\_-01 and from RSRQ\_35 to RSRQ\_46 apply for the UE who can support extended RSRQ range.

#### 6.7.6.1 NR SA FR1 – E-UTRAN RSRQ absolute measurement accuracy

6.7.6.1.1 Test purpose

The purpose of this test is to verify that the inter-RAT E-UTRAN RSRQ absolute measurement accuracy is within the specified limits for all bands, when the serving cell is NR FR1 and the target cell is E-UTRA.

6.7.6.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards supporting E-UTRA.

6.7.6.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.6.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.6.1.

6.7.6.1.4 Test description

6.7.6.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.6.1.4.1-1.

Table 6.7.6.1.4.1-1: test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.6.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: FDD |
| 6.7.6.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.6.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.6.1-4 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: TDD |
| 6.7.6.1-5 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: TDD |
| 6.7.6.1-6 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.6.1.4.1-2.

Table 6.7.6.1.4.1-2: initial conditions

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.6.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.7.2 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.7.3 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.6.1.4.3.

2. There are two carriers and two cells specified in the test, where NR Cell 1 is the NR PCell on the NR carrier and Cell 2 is the E-UTRA neighbour cell on the E-UTRA carrier and the target for the measurements.

6.7.6.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.6.1.5-1 and Table 6.7.6.1.5-2 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the RSRQ reported values in the periodic MeasurementReport. The RSRQ value of Cell 2 reported by the UE is compared to the expected RSRQ. If the value is outside the limits in Table 6.7.6.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.6.1.5-2 as appropriate and repeat steps 5-7.

6.7.6.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.6.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-RAT and GAP NEEDED  Table H.3.1-3  Table H.3.1-3a  Table H.3.1-7 with condition INTER-RAT  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.6.1.4.3-1A: MeasConfig (Test procedure step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation path: Table H.3.1-2 with condition INTER-RAT and GAP NEEDED | | | |
| Information Element | Value/Remark | Comment | Condition |
| measConfig ::= SEQUENCE { |  |  |  |
| reportConfigToAddModList SEQUENCE(SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod { | 2 entries |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigE-UTRA-DEFAULT(Periodical) | Table 6.7.6.1.4.3-2 |  |
| } |  |  |  |
| } |  |  |  |
| ReportConfigToAddMod[2] SEQUENCE { |  | entry 2 |  |
| reportConfigId | 2 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigInterRAT-EVENT | Table 6.7.6.1.4.3-1B |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| measIdToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod { | 2 entries |  |  |
| MeasIdToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measId | 1 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 1 |  |  |
| } |  |  |  |
| MeasIdToAddMod[2] SEQUENCE { |  | entry 2 |  |
| measId | 2 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.6.1.4.3-1B: ReportConfigInterRAT-EVENT (Table 6.7.6.1.4.3-1A)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14] Table 4.6.3-141 with condition EVENT\_B1 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT ::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| eventTriggered SEQUENCE { |  |  |  |
| eventId CHOICE { |  |  |  |
| eventB1 SEQUENCE { |  |  |  |
| b1-ThresholdEUTRACHOICE { |  |  |  |
| rsrq | 34 | Set threshold to -3dB to ensure measId 2 will never be triggered |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.6.1.4.3-2: ReportConfigE-UTRA-DEFAULT(Periodical)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-141 with Condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  |  |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.6.1.5 Test requirement

Table 6.7.6.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Tables 6.7.6.1.5-1 and 6.7.6.1.5-2 shall meet the corresponding absolute accuracy requirements in Table 6.7.6.1.5-3.

Table 6.7.6.1.5-1: NR Cell specific test parameters for SA Inter-RAT E-UTRAN RSRQ test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 |
| NR RF channel number | |  | 1 |
| Duplex mode | Config 1, 4 |  | FDD |
| Config 2, 3, 5, 6 |  | TDD |
| TDD Configuration | Config 1, 4 |  | N/A |
| Config 2, 5 | TDDConf.1.1 |
| Config 3, 6 | TDDConf.2.1 |
| BWchannel | Config 1, 4 | MHz | 10: NRB,c = 52 (FDD) |
| Config 2, 5 | 10: NRB,c = 52 (TDD) |
| Config 3, 6 | 40: NRB,c = 106 (TDD) |
| Gap pattern Id | |  | 0 |
| PDSCH reference measurement channel | Config 1, 4 |  | SR.1.1 FDD |
| Config 2, 5 | SR.1.1 TDD |
| Config 3, 6 | SR.2.1 TDD |
| RMSI CORSET reference channel | Config 1, 4 |  | CR.1.1 FDD |
| Config 2, 5 | CR.1.1 TDD |
| Config 3, 6 | CR.2.1 TDD |
| Dedicated CORSET reference channel | Config 1, 4 |  | CCR.1.1 FDD |
| Config 2, 5 | CCR.1.1 TDD |
| Config 3, 6 | CCR.2.1 TDD |
| CSI-RS for tracking | Config 1, 4 |  | TRS.1.1 FDD |
| Config 2, 5 | TRS.1.1 TDD |
| Config 3, 6 | TRS.1.2 TDD |
| BWP configurations | Initial DL BWP |  | DLBWP.0.1 |
| Dedicated DL BWP |  | DLBWP.1.1 |
| Initial UL BWP |  | ULBWP.0.1 |
| Dedicated UL BWP |  | ULBWP.1.1 |
| OCNG patternNote1 | |  | OP.1 |
| SMTC configuration | |  | SMTC.1 |
| SSB configuration | Config 1, 2, 4, 5 |  | SSB.1 FR1 |
| Config 3, 6 | SSB.2 FR1 |
| 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\_DMRS | |
| EPRE ratio of OCNG DMRS to SSS | |
| EPRE ratio of OCNG to OCNG DMRS | |
| *Noc*Note2 | | dBm/15 kHz | -104 |
| *Noc*Note2 | Config 1, 2, 4, 5 | dBm/SCS | -104 |
| Config 3, 6 | -101 |
| Ês/Noc | | dB | 17 |
| Ês/IotNote3 | | dB | 17 |
| SS-RSRPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| SSB\_RPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| IoNote3 | Config 1, 2, 4, 5 | dBm/9.36 MHz | -58.96 |
| Config 3, 6 | dBm/38.16 MHz | -52.87 |
| Propagation condition | |  | AWGN |
| Antenna Configuration and Correlation Matrix | |  | 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | |

Table 6.7.6.1.5-2: E-UTRAN Cell specific test parameters for SA Inter-RAT E-UTRAN RSRQ test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | | |
| Test 1 | Test 2 | Test 3 |
| E-UTRA RF channel number | |  | 1 | | |
| Duplex mode | Config 1, 2, 3 |  | FDD | | |
| Config 4, 5, 6 | TDD | | |
| TDD special subframe configurationNote1 | Config 1, 2, 3 |  | N/A | | |
| Config 4, 5, 6 | 6 | | |
| TDD uplink-downlink configurationNote1 | Config 1, 2, 3 |  | N/A | | |
| Config 4, 5, 6 | 1 | | |
| BWchannel | | MHz | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 | |  | - | | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 | Config 1, 2, 3 |  | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | | |
| Config 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | | |
| OCNG PatternsNote2 | Config 1, 2, 3 |  | 5 MHz: OP.19 FDD  10 MHz: OP.6 FDD  20 MHz: OP.14 FDD | | |
| Config 4, 5, 6 | 5 MHz: OP.10 TDD  10 MHz: OP.2 TDD  20 MHz: OP.8 TDD | | |
| PBCH\_RA | | dB | 0 | | |
| PBCH\_RB | |
| PSS\_RA | |
| SSS\_RA | |
| PCFICH\_RB | |
| PHICH\_RA | |
| PHICH\_RB | |
| PDCCH\_RA | |
| PDCCH\_RB | |
| PDSCH\_RA | |
| PDSCH\_RB | |
| OCNG\_RANote3 | |
| OCNG\_RBNote3 | |
| NocNote4 | Depending on band group | dBm/15kHz | -83 | -104.70 | -119.5+ ΔBG\_offset |
| Ês/Noc | | dB | -1.75 | -3.2 | -3.2 |
| Ês/IotNote5 | | dB | -1.75 | -3.2 | -3.2 |
| RSRPNote5 | Depending on band group | dBm/15kHz | -84.75 | -107.90 | -122.7+ ΔBG\_offset |
| RSRQNote5 | Depending on band group | dB | -14.76 | -15.69 | -15.69 |
| IoNote5 | Depending on band group | dBm/Ch BW | -53 + 10log(NRB,c /50) | -75.22 + 10log(NRB,c /50) | -90.02+ ΔBG\_offset + 10log(NRB,c /50) |
| Propagation Condition | |  | AWGN | | |
| Antenna Configuration and Correlation Matrix | |  | 1x2 | | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [23] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: 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 5: Ês/Iot, RSRP, RSRQ and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: E-UTRA operating band groups are as defined in clause 3.5 of TS 36.133 [23].  Note 7: Void  Note 8: Void  Note 9: Void  Note 10: Void  Note 11: ΔBG\_offset for LTE band group is defined in TS 36.521-3 [26] clause 3.5.1, Table 3.5.1-1A. | | | | | |

Table 6.7.6.1.5-3: SS-RSRQ Intra frequency absolute accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3  All bands |
| Lowest reported value (Cell 2) | 4 | 0 | 0 |
| Highest reported value (Cell 2) | 16 | 16 | 16 |
| Extreme Conditions | Test 1  All bands | Test 2  All bands | Test 3  All bands |
| Lowest reported value (Cell 2) | 1 | 0 | 0 |
| Highest reported value (Cell 2) | 19 | 17 | 17 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.7 E-UTRAN RS-SINR

#### 6.7.7.0 Minimum conformance requirements

##### 6.7.7.0.1 E-UTRAN RS-SINR absolute accuracy

The measurement period of E-UTRA RS-SINR in RRC\_CONNECTED state is specified in clause 9.4.2 and 9.4.3 of TS 38.133 [6].

The accuracy requirements of E-UTRA RS-SINR measurements in RRC\_CONNECTED state and the corresponding side conditions shall be the same as the inter-frequency RS-SINR Accuracy Requirements in clause 9.1.17.3 of TS 36.133 [23]:

The reporting range and mapping for E-UTRA RS-SINR measurements shall be the same as specified for RS-SINR measurements in clause 9.1.17.1 of TS 36.133 [23]:

The requirements for absolute accuracy of intra-frequency RS-SINR in this clause apply to a cell on the same frequency as that of the serving cell.

The accuracy requirements in Table 6.7.7.0.1-1 are valid under the following conditions:

Cell specific reference signals are transmitted either from one, two or four antenna ports.

Conditions defined in 36.101 [27] Clause 7.3 for reference sensitivity are fulfilled.

RSRP|dBm according to Annex B.3.18 of TS 36.133 [23] for a corresponding Band.

Table 6.7.7.0.1-1: Intra-frequency RS-SINR absolute accuracy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | |
| Normal condition | Extreme condition | Ês/Iot | Io Note 1 range | | |
| E-UTRA operating band groups Note 4 | Minimum Io | Maximum Io |
| dB | dB | dB |  | dBm/15kHz Note 3 | dBm/BWChannel |
| ±3.0 | ±4 | ≥-3 dB Note 5 | FDD\_A, TDD\_A | -121 | -50 |
| FDD\_B1, FDD\_B2 | -120.5 | -50 |
| FDD\_C, TDD\_C | -120 | -50 |
| FDD\_D | -119.5 | -50 |
| FDD\_E, TDD\_E | -119 | -50 |
| FDD\_F | -118.5 | -50 |
| FDD\_G | -118 | -50 |
| FDD\_H | -117.5 | -50 |
| FDD\_N | -114.5 | -50 |
| ±3.5 | ±4 | ≥-6 dB | Note 2 | Note 2 | Note 2 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: The same bands and the same Io conditions for each band apply for this requirement as for the corresponding highest accuracy requirement.  NOTE 3: The condition level is increased by ∆>0, when applicable, as described in Sections B.4.2 and B.4.3 of TS 36.133 [23].  NOTE 4: E-UTRA operating band groups are as defined in Section 3.5 of TS 36.133 [23].  NOTE 5: The requirements apply for Ês/Iot ≤ 25 dB. | | | | | |

The reporting range of RS-SINR measurement is defined from -23 dB to 40 dB with 0.5 dB resolution.

The mapping of the measured quantity is defined in table 6.7.7.0.1-2. The range in the signalling may be larger than the guaranteed accuracy range.

Table 6.7.7.0.1-2: RS-SINR measurement report mapping

|  |  |  |
| --- | --- | --- |
| Reported Value | Measured Quantity Value | Unit |
| RS-SINR\_000 | RS-SINR < -23 | dB |
| RS-SINR\_001 | -23 ≤ RS-SINR < -22.5 | dB |
| … | … | … |
| RS-SINR\_126 | 39.5 ≤ RS-SINR < 40 | dB |
| RS-SINR\_127 | 40 ≤ RS-SINR | dB |

#### 6.7.7.1 NR SA FR1 – E-UTRAN RS-SINR absolute measurement accuracy

6.7.7.1.1 Test purpose

The purpose of this test is to verify that the inter-RAT E-UTRAN RS-SINR absolute measurement accuracy is within the specified limits for all bands, when the serving cell is NR FR1 and the target cell is E-UTRA.

6.7.7.1.2 Test applicability

This test applies to all types of NR UE from Release 15 onwards supporting E-UTRA and *rs-SINR-MeasEUTRA*.

6.7.7.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.7.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.7.1.

6.7.7.1.1.4 Test description

6.7.7.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.7.1.4.1-1.

Table 6.7.7.1.4.1-1: test configurations

|  |  |
| --- | --- |
| Test Case ID | Description |
| 6.7.7.1-1 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: FDD |
| 6.7.7.1-2 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.7.1-3 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: FDD |
| 6.7.7.1-4 | NR: 15 kHz SSB SCS, 10MHz bandwidth, FDD, E-UTRAN: TDD |
| 6.7.7.1-5 | NR: 15 kHz SSB SCS, 10MHz bandwidth, TDD, E-UTRAN: TDD |
| 6.7.7.1-6 | NR: 30 kHz SSB SCS, 40MHz bandwidth, TDD, E-UTRAN: TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.7.1.4.1-2.

Table 6.7.7.1.4.1-2: initial conditions

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-2 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.7.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.7.2 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.7.3 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.7.1.4.3.

2. There are two carriers and two cells specified in the test, where NR Cell 1 is the NR PCell on the NR carrier and Cell 2 is the E-UTRA neighbour cell on the E-UTRA carrier and the target for the measurements.

6.7.7.1.4.2 Test procedure

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR*, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to Table 6.7.7.1.5-1 and Table 6.7.7.1.5-2 as appropriate.

3. The SS shall transmit an RRCReconfiguration message on Cell 1.

4. The UE shall transmit an RRCReconfigurationComplete message.

5. The UE shall transmit periodically MeasurementReport messages.

6. After 10s wait from Step 3, the SS shall check the RS-SINR reported values in the periodic MeasurementReport. The RS-SINR value of Cell 2 reported by the UE is compared to the expected RS-SINR. If the value is outside the limits in Table 6.7.7.1.5-2 or the UE fails to report the measurement value for Cell 2, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the MeasurementReport messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each sub-test in Table 6.7.7.1.5-2 as appropriate and repeat steps 5-7.

6.7.7.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.7.1.4.3-1: Common Exception messages

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2 with condition INTER-RAT and GAP NEEDED  Table H.3.1-3  Table H.3.1-3a  Table H.3.1-7 with condition INTER-RAT  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.7.1.4.3-1A: MeasConfig (Test procedure step 3)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation path: Table H.3.1-2 with condition INTER-RAT and GAP NEEDED | | | |
| Information Element | Value/Remark | Comment | Condition |
| measConfig ::= SEQUENCE { |  |  |  |
| reportConfigToAddModList SEQUENCE(SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod { | 2 entries |  |  |
| ReportConfigToAddMod[1] SEQUENCE { |  | entry 1 |  |
| reportConfigId | 1 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigE-UTRA-DEFAULT(Periodical) | Table 6.7.7.1.4.3-2 |  |
| } |  |  |  |
| } |  |  |  |
| ReportConfigToAddMod[2] SEQUENCE { |  | entry 2 |  |
| reportConfigId | 2 |  |  |
| reportConfig CHOICE { |  |  |  |
| reportConfigInterRAT | ReportConfigInterRAT-EVENT | Table 6.7.7.1.4.3-1B |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| measIdToAddModList SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasIdToAddMod { | 2 entries |  |  |
| MeasIdToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measId | 1 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 1 |  |  |
| } |  |  |  |
| MeasIdToAddMod[2] SEQUENCE { |  | entry 2 |  |
| measId | 2 |  |  |
| measObjectId | 2 |  |  |
| reportConfigId | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.7.1.4.3-1B: ReportConfigInterRAT-EVENT (Table 6.7.7.1.4.3-1A)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14] Table 4.6.3-141 with condition EVENT\_B1 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT ::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| eventTriggered SEQUENCE { |  |  |  |
| eventId CHOICE { |  |  |  |
| eventB1 SEQUENCE { |  |  |  |
| b1-ThresholdEUTRACHOICE { |  |  |  |
| sinr | 127 | Set threshold to 40dB to ensure measId 2 will never be triggered |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.7.1.4.3-2: ReportConfigE-UTRA-DEFAULT(Periodical)

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: 38.508-1 [14] Table 4.6.3-141 with Condition PERIODICAL | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigInterRAT::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| periodical SEQUENCE { |  |  |  |
| reportQuantityCell SEQUENCE { |  |  |  |
| rsrp | false |  |  |
| rsrq | false |  |  |
| sinr | true |  |  |
| } |  |  |  |
| maxReportCells | 2 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.7.1.5 Test requirement

Table 6.7.7.1.5-1 defines the primary level settings including test tolerances for all tests.

Each SS-RSRP measurement report for each of the tests in Tables 6.7.7.1.5-1 and 6.7.7.1.5-2 shall meet the corresponding absolute accuracy requirements in Table 6.7.7.1.5-3.

Table 6.7.7.1.5-1: NR Cell specific test parameters for SA Inter-RAT E-UTRAN RS-SINR test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 |
| NR RF channel number | |  | 1 |
| Duplex mode | Config 1, 4 |  | FDD |
| Config 2, 3, 5, 6 |  | TDD |
| TDD Configuration | Config 1, 4 |  | N/A |
| Config 2, 5 | TDDConf.1.1 |
| Config 3, 6 | TDDConf.2.1 |
| BWchannel | Config 1, 4 | MHz | 10: NRB,c = 52 (FDD) |
| Config 2, 5 | 10: NRB,c = 52 (TDD) |
| Config 3, 6 | 40: NRB,c = 106 (TDD) |
| Gap pattern Id | |  | 0 |
| PDSCH reference measurement channel | Config 1, 4 |  | SR.1.1 FDD |
| Config 2, 5 | SR.1.1 TDD |
| Config 3, 6 | SR.2.1 TDD |
| RMSI CORSET reference channel | Config 1, 4 |  | CR.1.1 FDD |
| Config 2, 5 | CR.1.1 TDD |
| Config 3, 6 | CR.2.1 TDD |
| Dedicated CORSET reference channel | Config 1, 4 |  | CCR.1.1 FDD |
| Config 2, 5 | CCR.1.1 TDD |
| Config 3, 6 | CCR.2.1 TDD |
| CSI-RS for tracking | Config 1, 4 |  | TRS.1.1 FDD |
| Config 2, 5 | TRS.1.1 TDD |
| Config 3, 6 | TRS.1.2 TDD |
| BWP configurations | Initial DL BWP |  | DLBWP.0.1 |
| Dedicated DL BWP |  | DLBWP.1.1 |
| Initial UL BWP |  | ULBWP.0.1 |
| Dedicated UL BWP |  | ULBWP.1.1 |
| OCNG patternNote1 | |  | OP.1 |
| SMTC configuration | |  | SMTC.1 |
| SSB configuration | Config 1, 2, 4, 5 |  | SSB.1 FR1 |
| Config 3, 6 | SSB.2 FR1 |
| 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\_DMRS | |
| EPRE ratio of OCNG DMRS to SSS | |
| EPRE ratio of OCNG to OCNG DMRS | |
| *Noc*Note2 | | dBm/15 kHz | -104 |
| *Noc*Note2 | Config 1, 2, 4, 5 | dBm/SCS | -104 |
| Config 3, 6 | -101 |
| Ês/Noc | | dB | 17 |
| Ês/IotNote3 | | dB | 17 |
| SS-RSRPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| SSB\_RPNote3 | Config 1, 2, 4, 5 | dBm/SCS | -87 |
| Config 3, 6 | -84 |
| IoNote3 | Config 1, 2, 4, 5 | dBm/9.36 MHz | -58.96 |
| Config 3, 6 | dBm/38.16 MHz | -52.87 |
| Propagation condition | |  | AWGN |
| Antenna Configuration and Correlation Matrix | |  | 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: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | |

Table 6.7.7.1.5-2: E-UTRAN Cell specific test parameters for SA Inter-RAT E-UTRAN RS-SINR test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | | |
| Test 1 | Test 2 | Test 3 |
| E-UTRA RF channel number | |  | 1 | | |
| Duplex mode | Config 1, 2, 3 |  | FDD | | |
| Config 4, 5, 6 | TDD | | |
| TDD special subframe configurationNote1 | Config 1, 2, 3 |  | N/A | | |
| Config 4, 5, 6 | 6 | | |
| TDD uplink-downlink configurationNote1 | Config 1, 2, 3 |  | N/A | | |
| Config 4, 5, 6 | 1 | | |
| BWchannel | | MHz | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 | |  | - | | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 | Config 1, 2, 3 |  | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | | |
| Config 4, 5, 6 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | | |
| OCNG PatternsNote2 | Config 1, 2, 3 |  | 5 MHz: OP.19 FDD  10 MHz: OP.6 FDD  20 MHz: OP.14 FDD | | |
| Config 4, 5, 6 | 5 MHz: OP.10 TDD  10 MHz: OP.2 TDD  20 MHz: OP.8 TDD | | |
| PBCH\_RA | | dB | 0 | | |
| PBCH\_RB | |
| PSS\_RA | |
| SSS\_RA | |
| PCFICH\_RB | |
| PHICH\_RA | |
| PHICH\_RB | |
| PDCCH\_RA | |
| PDCCH\_RB | |
| PDSCH\_RA | |
| PDSCH\_RB | |
| OCNG\_RANote3 | |
| OCNG\_RBNote3 | |
| Noc1Note4 | Depending on band group | dBm/15kHz | -88 | -108.50 | -119.5+ ΔBG\_offset |
| CRS Ês/Noc1 | | dB | -1.75 | 20.0 | -3.2 |
| CRS Ês/IotNote5 | | dB | -1.75 | 20.0 | -3.2 |
| RSRPNote5 | Depending on band group | dBm/15kHz | -89.75 | -88.50 | -122.7+ ΔBG\_offset |
| RS-SINRNote5 | | dB | -1.75 | 20 | -3.2 |
| IoNote5 | Depending on band group | dBm/Ch BW | -58.00 + 10log(NRB,c /50) | -60.68 + 10log(NRB,c /50) | -90.02+ ΔBG\_offset + 10log(NRB,c /50) |
| Propagation Condition | |  | AWGN | | |
| Antenna Configuration and Correlation Matrix | |  | 1x2 | | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [24].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [23] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over CRS subcarriers and time and shall be modelled as AWGN of appropriate power for Noc1 to be fulfilled.  Note 4a: Void  Note 5: CRS Ês/Iot, RSRP, RS-SINR and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: E-UTRA operating band groups are as defined in clause 3.5 of TS 36.133 [23].  Note 7: Void  Note 8: Void  Note 9: Void  Note 10: Void  Note 11: ΔBG\_offset for LTE band group is defined in TS 36.521-3 [26] clause 3.5.1, Table 3.5.1-1A. | | | | | |

Table 6.7.7.1.5-3: RS-SINR Intra frequency absolute accuracy requirements for the reported values

|  |  |  |  |
| --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3  All bands |
| Lowest reported value (Cell 2) | 35 | 79 | 32 |
| Highest reported value (Cell 2) | 51 | 94 | 49 |
| Extreme Conditions | Test 1  All bands | Test 2  All bands | Test 3  All bands |
| Lowest reported value (Cell 2) | 33 | 77 | 31 |
| Highest reported value (Cell 2) | 53 | 96 | 50 |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.8 CLI Measurementss

#### 6.7.8.0 Minimum conformance requirements

##### 6.7.8.0.1 Minimum conformance requirements for SRS-RSRP accuracy

Same as in clause 4.7.6.0.1.

##### 6.7.8.0.2 Minimum conformance requirements for CLI-RSSI measurement accuracy with FR1 serving cell

Same as in clause 4.7.6.0.2.

### 6.7.8.1 NR SA FR1 SRS-RSRP measurement accuracy

##### 6.7.8.1.1 Test purpose

The purpose of this test is to verify that the SRS-RSRP measurement accuracy is within the specified limits. This test will verify the SRS-RSRP measurement requirements in clause 6.7.8.0.

##### 6.7.8.1.2 Test applicability

This test applies to all types of NR UE release 16 and forward, supporting standalone NR and CLI-based SRS-RSRP measurements.

##### 6.7.8.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.8.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.8.1.

##### 6.7.8.1.4 Test description

In this set of test cases there is one cell in the test, FR1 PCell (Cell 1). The test parameters for the Cell 1 are given in Table 6.7.8.1.5-1 below. The test parameter for the (virtual) neighbor cell UE transmitting SRS are given in Table 6.7.8.1.5-2. The SRS resource configuration is given in Table 6.7.8.1.5-3.

6.7.8.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.8.1.4.1-1.

Table 6.7.8.1.4.1-1: Supported test configurations for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |
| --- | --- |
| Config | Description |
| 6.7.8.1-1 | 15kHz SRS SCS, 10 MHz bandwidth, TDD duplex mode |
| 6.7.8.1-2 | 30kHz SRS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.8.1.4.1-2.

Table 6.7.8.1.4.1-2: Initial conditions for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.8.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 2 and φ1 = 5 Hz | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 2 and φ1,1 = 5 Hz, φ1,2 = 10 Hz, φ1,3 = 15 Hz |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | - Without LTE link | |  |



1. Message contents are defined in clause 6.7.8.1.4.3.

2. Cell 1 is the NR serving cell (PCell). The power levels and settings for Cell 1 are set according to Annex C.1.2 and C.1.3. Virtual UE 1 is the target for SRS-RSRP measurements.

3. The test parameters are given in Table 6.7.8.1.4.1-3

6.7.8.1.4.2 Test procedure

Before the test UE is configured to perform SRS-RSRP measurement. During the test, the test system transmits SRS resources for measurement in the DL slots according to the SRS resource configuration in Table 6.7.8.1.5-3. There is no measurement gap configured in the test. During the test, the test system does not transmit PDCCH/PDSCH/OCNG on SRS symbol to be transmitted and on 1 data symbol before SRS to be transmitted.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity *NR* SA, Connected without release *On* and Test Mode *On* according to TS 38.508-1 [14] clause 4.5.

2. Set the parameters according to the corresponding Test in Table 6.7.8.1.5-1 as appropriate.

3. The SS shall transmit an *RRCReconfiguration* message configuring a CLI measurement object with periodic reporting, as specified in section 6.7.8.1.4.3.

4. The UE shall transmit an *RRCReconfigurationComplete* message.

5. The UE shall transmit periodically *MeasurementReport* messages.

6. After 10s wait from Step 5, the SS shall check the SRS-RSRP reported values in the periodic *MeasurementReport*. The reported SRS-RSRP value of the neighbor virtual UE is compared to the expected SRS-RSRP as specified in Table 6.7.8.1.5-4 and Table 6.7.8.1.5-5 for Test 1 and Test 2, correspondingly. If the reported value is outside the limits specified in such tables, the number of failed iterations is increased by one. Otherwise, the number of passed iterations is increased by one.

7. The SS shall continue checking the *MeasurementReport* messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

8. Set the parameters according to each Test in Table 6.7.8.1.5-1 as appropriate and repeat steps 2-7.

6.7.8.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clauses 4.6.1 and 7.3 with the following exceptions:

Table 6.7.8.1.4.3-1: Common Exception messages for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.1-1  Table H.3.1-2  Table H.3.1-5 |

Table 6.7.8.1.4.3-2: *MeasObjectToAddModList* for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-77 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectToAddModList::= SEQUENCE (SIZE (1..maxNrofMeasId)) OF MeasObjectToAddMod { | 1 entry |  |  |
| MeasObjectToAddMod[1] SEQUENCE { |  | entry 1 |  |
| measObjectId | 1 |  |  |
| measObject CHOICE { |  |  |  |
| measObjectCLI-r16 | MeasObjectCLI-r16 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.8.1.4.3-3: *MeasObjectCLI-r16* for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-76 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasObjectCLI-r16 ::= SEQUENCE { |  |  |  |
| cli-ResourceConfig-r16 SEQUENCE { |  |  |  |
| srs-ResourceConfig-r16 CHOICE { |  |  |  |
| setup SEQUENCE { |  |  |  |
| SRS-ResourceListConfigCLI-r16 SEQUENCE { | 1 entry |  |  |
| srs-Resource-r16 | SRSConf.1 | entry 1 | Config 1 |
|  | SRSConf.2 | entry 1 | Config 2 |
| srs-SCS-r16 | kHz15 |  | Config 1 |
|  | kHz30 |  | Config 2 |
| refServCellIndex-r16 | 0 | PCell |  |
| refBWP-r16 | 0 | BWP-0 |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.8.1.4.3-4: *ReportConfigNR* for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-142 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| ReportConfigNR ::= SEQUENCE { |  |  |  |
| reportType CHOICE { |  |  |  |
| cli-Periodical-r16 SEQUENCE { |  |  |  |
| reportInterval-r16 | ms240 |  |  |
| reportAmount-r16 | infinity |  |  |
| reportQuantityCLI-r16 | srs-rsrp |  |  |
| maxReportCLI-r16 | 1 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

Table 6.7.8.1.4.3-5: *MeasResultCLI-r16* for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-79 and TS 38.331 [13], clause 6.3.2 | | | |
| Information Element | Value/remark | Comment | Condition |
| MeasResultCLI-r16 ::= SEQUENCE { |  |  |  |
| measResultsListSRS-r16 CHOICE { |  |  |  |
| srs-ResourceId-r16 | SRS-ResourceId |  |  |
| srs-RSRP-Result-r16 | SRS-RSRP-Range-r16 | INTEGER (0..98) |  |
| } |  |  |  |
| } |  |  |  |

##### 6.7.8.1.5 Test requirement

Table 6.7.8.1.5-1 and Table 6.7.8.1.5-2 define the primary level settings including test tolerances for NR SA FR1 SRS-RSRP measurement accuracy. Table 6.7.8.1.5-3 defines the SRS resource configurations. Table 6.7.8.1.5-4 and Table 6.7.8.1.5-5 define the absolute accuracy requirements for Tests 1, 2 and 3 for configurations 1 and 2, correspondingly.

Table 6.7.8.1.5-1: NR Cell specific test parameters for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | Test 2 | Test 3 |
| SSB GSCN | | 1~2 |  | freq1 | freq1 | freq1 |
| Duplex mode | | 1~2 |  | TDD | TDD | TDD |
| TDD configuration | | 1 |  | TDDConf.1.1 | TDDConf.1.1 | TDDConf.1.1 |
|  | | 2 |  | TDDConf.2.1 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 | 10: NRB,c = 52 |
|  | | 2 |  | 40: NRB,c = 106 | 40: NRB,c = 106 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 TDD | SR.1.1 TDD | SR.1.1 TDD |
|  | | 2 |  | SR.2.1 TDD | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 TDD | CR.1.1 TDD | CR.1.1 TDD |
|  | | 2 |  | CR.2.1 TDD | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 TDD | CCR.1.1 TDD | CCR.1.1 TDD |
|  | | 2 |  | CCR.2.1 TDD | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration | | 1 |  | SSB.1 FR1 | SSB.1 FR1 | SSB.1 FR1 |
|  | | 2 |  | SSB.2 FR1 | SSB.2 FR1 | SSB.2 FR1 |
| OCNG Patterns | | 1~2 |  | OP.1 | OP.1 | OP.1 |
| TRS configuration | | 1 |  | TRS.1.1 TDD | TRS.1.1 TDD | TRS.1.1 TDD |
|  | | 2 |  | TRS.1.2 TDD | TRS.1.2 TDD | TRS.1.2 TDD |
| Initial BWP Configuration | | 1~2 |  | DLBWP.0.1  ULBWP.0.1 | 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 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | | 1~2 |  | SMTC.1 | SMTC.1 | SMTC.1 |
| Time offset between DL from serving cell and SRS from test system | | 1~2 | μs | 17.67 | 17.67 | 17.67 |
| EPRE ratio of PSS to SSS | | 1~2 | dB | 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\_TDD\_FR1\_A NOTE 3 | 1 | dBm/15kHz | -106 | -88 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
|  | NR\_TDD\_FR1\_A NOTE 5 | 2 |  | Not applicableNote 4 | -91 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
| Note2 | NR\_TDD\_FR1\_A NOTE 3 | 1 | dBm/SRS SCS | -106 | -88 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
|  | NR\_TDD\_FR1\_A NOTE 3 | 2 |  | Not applicableNote 4 | -88 | -111 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -110 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -109.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -109 |
| Note 1: OCNG shall be used such that 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: 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  Note 4: Test 1 is not used when testing with 30kHz SSB SCS | | | | | | |

Table 6.7.8.1.5-2: Neighbor UE specific test parameters for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | Test 2 | Test 3 |
| Note2 | NR\_TDD\_FR1\_A NOTE 5 | 1 | dBm/15kHz | -106 | -88 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
|  | NR\_TDD\_FR1\_A NOTE 5 | 2 |  | Not applicableNote 6 | -91 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
| Note2 | NR\_TDD\_FR1\_A NOTE 5 | 1 | dBm/SRS SCS | -106 | -88 | -114 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -113 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -112.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -112 |
|  | NR\_TDD\_FR1\_A NOTE 5 | 2 |  | Not applicableNote 6 | -88 | -111 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -110 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -109.5 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -109 |
| on SRS | NR\_TDD\_FR1\_A NOTE 5 | 1 | dB | 1.5 | 1.5 | 1.75 |
| NR\_TDD\_FR1\_C | 1.5 |
| NR\_TDD\_FR1\_D | 1.5 |
| NR\_TDD\_FR1\_E | 1.5 |
| NR\_TDD\_FR1\_A NOTE 5 | 2 | Not applicableNote 6 | 1.5 | 2.25 |
| NR\_TDD\_FR1\_C | 1.5 |
| NR\_TDD\_FR1\_D | 1.5 |
| NR\_TDD\_FR1\_E | 1.5 |
| SRS RSRP Note3 | NR\_TDD\_FR1\_A NOTE 5 | 1 | dBm/SRS SCS | -104.5 | -86.5 | -112.25 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -111.5 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -111 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -110.5 |
|  | NR\_TDD\_FR1\_A NOTE 5 | 2 |  | Not applicableNote 6 | -86.49 | -108.74 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -108.49 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -107.99 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -107.49 |
| Io Note3 | NR\_TDD\_FR1\_A NOTE 5 | 1 | dBm/9.36 MHz | -74.42 | -56.42 | -82.28 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -81.42 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -80.92 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -80.42 |
|  | NR\_TDD\_FR1\_A NOTE 5 | 2 | dBm/38.16 MHz | Not applicableNote 6 | -54.80 | -77.49 |
|  | NR\_TDD\_FR1\_C |  |  |  |  | -76.80 |
|  | NR\_TDD\_FR1\_D |  |  |  |  | -76.30 |
|  | NR\_TDD\_FR1\_E |  |  |  |  | -75.80 |
| on SRS | NR\_TDD\_FR1\_A NOTE 5 | 1 | dB | 1.5 | 1.5 | 1.75 |
| NR\_TDD\_FR1\_C | 1.5 |
| NR\_TDD\_FR1\_D | 1.5 |
| NR\_TDD\_FR1\_E | 1.5 |
| NR\_TDD\_FR1\_A NOTE 5 | 2 | Not applicableNote 6 | 1.5 | 2.25 |
| NR\_TDD\_FR1\_C | 1.5 |
| NR\_TDD\_FR1\_D | 1.5 |
| NR\_TDD\_FR1\_E | 1.5 |
| Propagation condition | | 1~2 |  | AWGN | AWGN | AWGN |
| Antenna configuration | | 1~2 |  | 1x2 | 1x2 | 1x2 |
| SRS configuration | | 1 |  | SRSConf.1 | SRSConf.1 | SRSConf.1 |
|  | | 2 |  | SRSConf.2 | SRSConf.2 | SRSConf.2 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of the test.  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  Note 6: Test 1 is not used when testing with 30kHz SSB SCS  Note 7: For Test 3, values are specified based on NR\_TDD\_FR1\_X but they apply also to the FDD band group counterpart, NR\_FDD\_FR1\_X. Informatively, test parameters are defined based on band group A and then add ΔBG\_offset , which is the band group dependent component defined in clause 3A.4, Table 3A.4.1-2. | | | | | | |

Table 6.7.8.1.5-3: SRS configurations for NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |
| --- | --- | --- | --- |
|  | Field | SRSConf.1 | SRSConf.2 |
| SRS-ResourceSet | srs-ResourceSetId | 0 | 0 |
|  | 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 | 12 | 12 |
|  | freqHopping  b-SRS | 0 | 0 |
|  | freqHopping  b-hop | 0 | 0 |
|  | groupOrSequenceHopping | Neither | Neither |
|  | resourceType | Periodic | Periodic |
|  | periodicityAndOffset-p | sl20, 9 | sl40, 19 |
|  | sequenceId | 0 | 0 |

Table 6.7.8.1.5-4: Absolute accuracy requirements for the reported values for test configuration 1 of NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest SRS-RSRP reported value | 30 | 45 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 23 |
| Bands NR\_TDD\_FR1\_C | 23 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 24 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 24 |
| Highest SRS-RSRP reported value | 41 | 62 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 33 |
| Bands NR\_TDD\_FR1\_C | 34 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 34 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 35 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2 | | | | |

Table 6.7.8.1.5-5: Absolute accuracy requirements for the reported values for test configuration 2 of NR SA FR1 SRS-RSRP measurement accuracy

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Normal Conditions | Test 1  All bands | Test 2  All bands | Test 3 | |
| Lowest SRS-RSRP reported value | N/A Note 2 | 44 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 26 |
| Bands NR\_TDD\_FR1\_C | 26 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 26 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 27 |
| Highest SRS-RSRP reported value | N/A Note 2 | 63 | Bands NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A | 37 |
| Bands NR\_TDD\_FR1\_C | 37 |
| Bands NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | 38 |
| Bands NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | 38 |
| Note 1: NR operating band groups are defined in clause 3A.4, Table 3A.4.1-2  Note 2: Test 1 is not used when testing with 30kHz SSB SCS | | | | |

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

### 6.7.9 L1-SINR measurement for beam reporting

#### 6.7.9.0 Minimum conformance requirements

##### 6.7.9.0.1 Minimum conformance requirements for CSI-RS based CMR and no dedicated IMR configured and CSI-RS resource set with repetition off

The UE shall be capable of performing L1-SINR measurements with the CSI-RS configured as CMR and no dedicated resource configured as IMR for L1-SINR computation, and the UE physical layer shall be capable of reporting L1-SINR measured over the measurement period of TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only.

The value of TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only is defined in Table 6.7.9.0.1-1 for FR1 and in Table 6.7.9.0.1-2 for FR2, where

For the value of M,

- For periodic and semi-persistent CSI-RS resources as CMR, M=1 if higher layer parameter *timeRestrictionForChannelMeasurement* is configured, and M=3 otherwise;

- For aperiodic CSI-RS resources as CMR, M=1.

For the value of N in FR2

- For periodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply if *qcl-InfoPeriodicCSI-RS* is configured for all the resources in the resource set and for each resource one RS has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For periodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / Nres\_per\_set), where Nres\_per\_set is number of resources in the resource set. The requirements apply provided *qcl-InfoPeriodicCSI-RS* is configured for all resources in the resource set.

- For semi-persistent CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set and for each resource has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For semi-persistent CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / Nres\_per\_set), where Nres\_per\_set is number of resources in the resource set. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set.

- For aperiodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided *qcl-info* is configured for all resources in the resource set and for each resource has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For aperiodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=1. UE is not required to meet the accuracy requirements in clause 10.1.28.1 and 10.1.28.3 of TS 38.133 [6] if number of resources in the resource set is smaller than *maxNumberRxBeam*. The requirements apply provided *qcl-info* is configured for all resources in the resource set.

For the value of P in FR1,

- P=, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CSI-RS; and

- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CSI-RS.

For the value of P in FR2,

- P=1, when CSI-RS is not overlapped with measurement gap and also not overlapped with SMTC occasion.

- P=, when CSI-RS is partially overlapped with measurement gap and CSI-RS is not overlapped with SMTC occasion (TCSI-RS < MGRP)

- P=, when CSI-RS is not overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod).

- P=3, when CSI-RS is not overlapped with measurement gap and CSI-RS is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod).

- P=, when CSI-RS is partially overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is not overlapped with measurement gap and

- TSMTCperiod ≠ MGRP or

- TSMTCperiod = MGRP and TCSI-RS < 0.5\*TSMTCperiod

- P=, when CSI-RS is partially overlapped with measurement gap and CSI-RS is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is not overlapped with measurement gap and TSMTCperiod = MGRP and TCSI-RS = 0.5\*TSMTCperiod

- P=, when CSI-RS is partially overlapped with measurement gap (TCSI-RS < MGRP) and CSI-RS is partially overlapped with SMTC occasion (TCSI-RS < TSMTCperiod) and SMTC occasion is partially or fully overlapped with measurement gap.

- P=, when CSI-RS is partially overlapped with measurement gap and CSI-RS is fully overlapped with SMTC occasion (TCSI-RS = TSMTCperiod) and SMTC occasion is partially overlapped with measurement gap (TSMTCperiod < MGRP)

Where:

TSMTCperiod = the configured SMTC1 period or SMTC2 period if configured.

TCSI-RS = the periodicity of CSI-RS configured for L1-SINR measurement

If the high layer in TS 38.331 [2] signalling of *smtc2* is configured, TSMTCperiod corresponds to the value of higher layer parameter *smtc2*; Otherwise TSMTCperiod corresponds to the value of higher layer parameter *smtc1*.

Note: The overlap between CSI-RS for L1-SINR measurement and SMTC means that CSI-RS for L1-SINR measurement is within the SMTC window duration.

Longer evaluation period would be expected if the combination of CSI-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

Table 6.7.9.0.1-1: Measurement period TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only for FR1

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only (ms) |
| non-DRX | max(TReport, ceil(M\*P)\*TCSI-RS) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P)\*max(TDRX,TCSI-RS)) |
| DRX cycle > 320ms | ceil(M\*P)\*TDRX |
| Note 1: TCSI-RS is the periodicity of CSI-RS configured for L1-SINR measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: the requirements are applicable provided that the CSI-RS resource configured for L1-SINR measurement is transmitted with Density = 3. | |

Table 6.7.9.0.1-2: Measurement period TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only for FR2

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_Only (ms) |
| non-DRX | max(TReport, ceil(M\*P\*N)\*TCSI-RS) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P\*N)\*max(TDRX,TCSI-RS)) |
| DRX cycle > 320ms | ceil(M\*P\*N)\*TDRX |
| Note 1: TCSI-RS is the periodicity of CSI-RS configured for L1-SINR measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: the requirements are applicable provided that the CSI-RS resource configured for L1-SINR measurement is transmitted with Density = 3. | |

The accuracy requirements in Table 6.7.9.0.1-3 are valid under the following conditions:

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

- Conditions for L1-SINR measurements are fulfilled according to Annex B.2.8.1 for a corresponding Band for each relevant CSI-RS based CMR.

- The bandwidth of CSI-RS as CMR is 48 PRBs and the density is 3.

- AWGN radio propagation conditions.

The performance with larger bandwidth of CSI-RS as CMR is equal to or better than the accuracy requirements in Table 6.7.9.0.1-3.

Table 6.7.9.0.1-3: L1-SINR absolute accuracy for CSI-RS based CMR only in FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | |
| Normal condition | Extreme condition | CSI-RS  CMR  Ês/Iot | Io Note 1 range | | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSCSI-RS | | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | -115 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 | N/A | -50 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | -114 | N/A | -50 |
| ±5.5 | ±6.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | -112 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | |

The normative reference for this requirement is TS 38.133 [6] clauses 9.8.4.1 and 10.1.27.1.

##### 6.7.9.0.2 Minimum conformance requirements for SSB based CMR and dedicated IMR

The UE shall be capable of performing L1-SINR measurements with the SSB configured as CMR and dedicated resource configured as IMR for L1-SINR computation, in which the NZP-CSI-RS or CSI-IM resource configured as dedicated IMR shall be 1-to-1 mapped to SSB configured as CMR, with the same periodicity. The UE physical layer shall be capable of reporting L1-SINR measured over the measurement period of TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR.

The requirements in this clause are not applicable if NZP-CSI-RS or CSI-IM resource configured as dedicated IMR is scheduled with different periodicity as SSB configured as CMR.

The value of TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR is defined in Table 6.7.9.0.2-1 for FR1 and in Table 6.7.9.0.2-2 for FR2, where

For the value of M

- For periodic or semi-persistent NZP CSI-RS or CSI-IM resource as dedicated IMR, M=1 if the higher layer parameters *timeRestrictionForChannelMeasurements* and/or *timeRestrictionForInterferenceMeasurements* are configured, and M=3 otherwise;

For the value of N in FR2

- N = 8.

P is defined as the maximum value between PCMR and PIMR, i.e., P = max(PCMR, PIMR), where

- the value of PCMR shall be derived in the same way as the value of P used for SSB based L1-RSRP measurement in clause 9.5.4.1 of TS 38.133 [6], in which the occasions and period of the SSB for CMR shall be used instead.

- the value of PIMR shall be derived in the same way as the value of P used for CSI-RS based L1-RSRP measurement in clause 9.5.4.2 of TS 38.133 [6], in which the occasions and period of the NZP CSI-RS for NZP-IMR or CSI-IM for ZP-IMR shall be used instead.

Longer evaluation period would be expected if the combination of SSB, SMTC occasion and measurement gap configurations does not meet pervious conditions.

For L1-SINR measurement with SSB as CMR and CSI-RS or CSI-IM as IMR, the requirement shall apply if the CSI-RS is configured as IMR with repetition field as “repetition = OFF” or CSI-IM is configured as IMR.

For L1-SINR measurement with SSB as CMR and CSI-RS/CSI-IM as IMR, no requirement shall apply if SSB occasions for CMR or CSI-RS/CSI-IM occasions for IMR are fully overlapped with the configured measurement gap

Table 6.7.9.0.2-1: Measurement period TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR for FR1

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR (ms) |
| non-DRX | max(TReport, ceil(M\*P)\*TSSB) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P)\*max(TDRX,TSSB)) |
| DRX cycle > 320ms | ceil(M\*P)\*TDRX |
| Note 1: TSSB = ssb-periodicityServingCell is the periodicity of the SSB-Index configured for L1-SINR channel measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: The requirements are applicable provided that the CSI-RS resource configured for interference measurement shall be 1-to-1 mapped to SSB configured for channel measurement, with the same periodicity. | |

Table 6.7.9.0.2-2: Measurement period TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR for FR2

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_SSB\_CMR\_IMR (ms) |
| non-DRX | max(TReport, ceil(M\*P\*N)\*TSSB) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P\*N)\*max(TDRX,TSSB)) |
| DRX cycle > 320ms | ceil(1.5\*M\*P\*N)\*TDRX |
| Note 1: TSSB = ssb-periodicityServingCell is the periodicity of the SSB-Index configured for L1-SINR measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: The requirements are applicable provided that the CSI-RS resource configured for interference measurement shall be 1-to-1 mapped to SSB configured for channel measurement, with the same periodicity. | |

The accuracy requirements in Tables 6.7.9.0.2-3 and 6.7.9.0.2-4 are valid under the following conditions:

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

- Conditions for L1-SINR measurements are fulfilled according to Annex B.2.8.2 for a corresponding Band for each relevant SSB based CMR and IMR.

- The bandwidth of NZP-IMR and ZP-IMR is 48 PRBs and the density is 3.

- AWGN radio propagation conditions.

The performance with larger bandwidth of NZP-IMR and ZP-IMR is equal to or better than the accuracy requirements in Tables 6.7.9.0.2-3 and 6.7.9.0.2-4.

Table 6.7.9.0.2-3: L1-SINR absolute accuracy for SSB based CMR and NZP-IMR in FR1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | | |
| Normal condition | Extreme condition | SSB-  CMR  Ês/Iot | NZP-IMR  Ês/Iot | | Io Note 1 range | | | | |
|  |  |  | |  | NR operating band groups Note 2 | Minimum Io | | | Maximum Io |
| dB | dB | dB | | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  | |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | N/A | -50 |
|  |  |  | |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -50 |
|  |  |  | |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -50 |
| ±4.0 | ±5.0 | ≥0 | | ≥0 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -50 |
|  |  |  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -50 |
|  |  |  | |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -50 |
|  |  |  | |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -50 |
|  |  |  | |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | | |

Table 6.7.9.0.2-4: L1-SINR absolute accuracy for SSB based CMR and ZP-IMR in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | |
| Normal condition | Extreme condition | SSB-  CMR  Ês/Iot | Io Note 1 range | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSSSB | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSSSB = 15 kHz | SCSSSB = 30 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | N/A | -50 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | N/A | -50 |
| ±4.5 | ±5.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | |

The normative reference for this requirement is TS 38.133 [6] clauses 9.8.4.2 and 10.1.27.2.

##### 6.7.9.0.3 Minimum conformance requirements for CSI-RS based CMR and dedicated IMR

The UE shall be capable of performing L1-SINR measurements with the CSI-RS resource configured as CMR and dedicated resource configured as IMR for L1-SINR computation, in which the NZP-CSI-RS or CSI-IM resource configured as dedicated IMR shall be 1-to-1 mapped to CSI-RS resource configured as CMR, with the same periodicity. The UE physical layer shall be capable of reporting L1-SINR measured over the measurement period of TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR.

The requirements in this clause are not applicable if NZP-CSI-RS or CSI-IM resource configured as dedicated IMR is scheduled with different periodicity as CSI-RS resource configured as CMR.

The value of TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR is defined in Table 6.7.9.0.3-1 for FR1 and in Table 6.7.9.0.3-2 for FR2, where

For the value of M,

- M=1 shall be applied if

- aperiodic NZP-CSI-RS as CMR or dedicated IMR, or

- aperiodic CSI-IMR as dedicated IMR, or

- periodic and semi-persistent NZP-CSI-RS as CMR or dedicated IMR and the higher layer parameters *timeRestrictionForChannelMeasurement* and/or *timeRestrictionForInterferenceMeasurements* are configured, or

- periodic and semi-persistent CSI-IM as dedicated IMR and the higher layer parameters *timeRestrictionForChannelMeasurement* and/or *timeRestrictionForInterferenceMeasurements* are configured;

- M=3 otherwise.

For the value of N in FR2

- For periodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply if *qcl-InfoPeriodicCSI-RS* is configured for all the resources in the resource set and for each resource one RS has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For periodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / Nres\_per\_set), where Nres\_per\_set is number of resources in the resource set. The requirements apply provided *qcl-InfoPeriodicCSI-RS* is configured for all resources in the resource set.

- For semi-persistent CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set and for each resource has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For semi-persistent CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=ceil(*maxNumberRxBeam* / Nres\_per\_set), where Nres\_per\_set is number of resources in the resource set. The requirements apply provided TCI state is provided for all resources in the resource set in the MAC CE activating the resource set.

- For aperiodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to OFF, N=1. The requirements apply provided *qcl-info* is configured for all resources in the resource set and for each resource has QCL-TypeD with

- SSB for L1-RSRP or L1-SINR measurement, or

- another CSI-RS in resource set configured with repetition ON.

- For aperiodic CSI-RS resources as CMR in a resource set configured with higher layer parameter *repetition* set to ON, N=1. UE is not required to meet the accuracy requirements in clause 10.1.28.1 and 10.1.28.3 of TS 38.133 [6] if number of resources in the resource set is smaller than *maxNumberRxBeam*. The requirements apply provided *qcl-info* is configured for all resources in the resource set.

P is defined as the maximum value between PCMR and PIMR, i.e., P = max(PCMR, PIMR), where

- The value of PCMR and PIMR shall be derived in the same way as the value of P used for CSI-RS based L1-RSRP measurement in clause 9.5.4.2 of TS 38.133 [6], in which the occasions and period of the CSI-RS for CMR and NZP CSI-RS for NZP-IMR or CSI-IM for ZP-IMR shall be used instead respectively.

Longer evaluation period would be expected if the combination of CSI-RS, SMTC occasion and measurement gap configurations does not meet pervious conditions.

For L1-SINR measurement with CSI-RS as CMR and CSI-RS as IMR, the requirement shall apply only if CSI-RS resources as CMR and IMR are configured with the same repetition field and the number of CSI-RS resources in the resource sets for CMR and IMR are same.

For L1-SINR measurement with CSI-RS as CMR and CSI-IM as IMR, the requirement shall apply only if the number of CSI-RS resources in the resource set for CMR and the number of CSI-IM resources in the resource set for IMR are same.

For L1-SINR measurement with CSI-RS as CMR and CSI-RS/CSI-IM as IMR, no requirement shall apply if CSI-RS occasions for CMR or CSI-RS/CSI-IM occasions for IMR are fully overlapped with the configured measurement gap.

Table 6.7.9.0.3-1: Measurement period TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR for FR1

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR (ms) |
| non-DRX | max(TReport, ceil(M\*P)\*TCSI-RS) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P)\*max(TDRX,TCSI-RS)) |
| DRX cycle > 320ms | ceil(M\*P)\*TDRX |
| Note 1: TCSI-RS is the periodicity of CSI-RS configured for L1-SINR measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: the requirements are applicable provided that the CSI-RS resource configured for L1-SINR measurement is transmitted with Density = 3.  Note 3: The requirements are applicable provided that the CSI-RS resource configured for interference measurement shall be 1-to-1 mapped to CSI-RS configured for channel measurement, with the same periodicity. | |

Table 6.7.9.0.3-2: Measurement period TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR for FR2

|  |  |
| --- | --- |
| Configuration | TL1-SINR\_Measurement\_Period\_CSI-RS\_CMR\_IMR (ms) |
| non-DRX | max(TReport, ceil(M\*P\*N)\*TCSI-RS) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*M\*P\*N)\*max(TDRX,TCSI-RS)) |
| DRX cycle > 320ms | ceil(M\*P\*N)\*TDRX |
| Note 1: TCSI-RS is the periodicity of CSI-RS configured for L1-SINR measurement. TDRX is the DRX cycle length. TReport is configured periodicity for reporting.  Note 2: the requirements are applicable provided that the CSI-RS resource configured for L1-SINR measurement is transmitted with Density = 3.  Note 3: The requirements are applicable provided that the CSI-RS resource configured for interference measurement shall be 1-to-1 mapped to CSI-RS configured for channel measurement, with the same periodicity. | |

The accuracy requirements in Tables 6.7.9.0.3-3 and 6.7.9.0.3-4 are valid under the following conditions:

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

- Conditions for L1-SINR measurements are fulfilled according to Annex B.2.8.3 for a corresponding Band for each relevant CSI-RS based CMR and IMR.

- The bandwidth of CSI-RS as CMR, NZP-IMR and ZP-IMR is 48 PRBs and the density is 3.

- AWGN radio propagation conditions.

The performance with larger bandwidth of CSI-RS as CMR, NZP-IMR and ZP-IMR is equal to or better than the accuracy requirements in Tables 6.7.9.0.3-3 and 6.7.9.0.3-4.

Table 6.7.9.0.3-3: L1-SINR absolute accuracy for CSI-RS based CMR and NZP-IMR in FR1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | | |
| Normal condition | Extreme condition | CSI-RS CMR Ês/Iot | NZP-IMR  Ês/Iot | Io Note 1 range | | | | | |
|  |  |  |  | NR operating band groups Note 2 | Minimum Io | | | | Maximum Io |
| dB | dB | dB | dB |  | dBm / SCSCSI-RS | | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  |  | SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |  |  |
|  |  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A,  NR\_SDL\_FR1\_A | -121 | -118 | -115 | N/A | -50 |
|  |  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 | N/A | -50 |
|  |  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | -114 | N/A | -50 |
| ±4.0 | ±5.0 | ≥0 | ≥0 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 | N/A | -50 |
|  |  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 | N/A | -50 |
|  |  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 | N/A | -50 |
|  |  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | -112 | N/A | -50 |
|  |  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | | |

Table 6.7.9.0.3-4: L1-SINR absolute accuracy for CSI-RS based CMR and ZP-IMR in FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Accuracy | | Conditions | | | | | | |
| Normal condition | Extreme condition | CSI-RS CMR Ês/Iot | Io Note 1 range | | | | | |
|  |  |  | NR operating band groups Note 2 | Minimum Io | | | | Maximum Io |
| dB | dB | dB |  | dBm / SCSCSI-RS | | | dBm/BWChannel | dBm/BWChannel |
|  |  |  |  | SCSCSI-RS = 15 kHz | SCSCSI-RS = 30 kHz | SCSCSI-RS = 60 kHz |  |  |
|  |  |  | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -121 | -118 | -115 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_B | -120.5 | -117.5 | -114.5 | N/A | -50 |
|  |  |  | NR\_TDD\_FR1\_C | -120 | -117 | -114 | N/A | -50 |
| ±4.5 | ±5.5 | ≥-3 | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -119.5 | -116.5 | -113.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -119 | -116 | -113 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_F | -118.5 | -115.5 | -112.5 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_G | -118 | -115 | -112 | N/A | -50 |
|  |  |  | NR\_FDD\_FR1\_H | -117.5 | -114.5 | -111.5 | N/A | -50 |
| NOTE 1: Io is assumed to have constant EPRE across the bandwidth.  NOTE 2: NR operating band groups in FR1 are as defined in clause 3.5.2. | | | | | | | | |

The normative reference for this requirement is TS 38.133 [6] clauses 9.8.4.3 and 10.1.27.3.

#### 6.7.9.1 NR SA FR1 CSI-RS based CMR and no dedicated IMR configured and CSI-RS resource set with repetition off L1-SINR measurement

##### 6.7.9.1.1 NR SA FR1 CSI-RS based CMR and no dedicated IMR configured and CSI-RS resource set with repetition off L1-SINR absolute measurement accuracy

6.7.9.1.1.1 Test purpose

The purpose of this test is to verify that the L1-SINR measurement accuracy is within the specified limits.

6.7.9.1.1.2 Test applicability

This test applies to all types of NR UE from Release 16 onwards. Applicability requires support of L1-SINR measurements.

6.7.9.1.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.9.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.9.1.

6.7.9.1.1.4 Test description

6.7.9.1.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.9.1.1.4.1-1.

Table 6.7.9.1.1.4.1-1: Applicable NR configurations for FR1 L1-SINR test with CSI-RS based CMR and no dedicated IMR configured

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz CSI-RS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.9.1.1.4.1-2.

Table 6.7.9.1.1.4.1-2: Initial conditions for CSI-RS based L1-SINR absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.9.1.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.9.1.1.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-SINR measurements. The 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. The connection setup is done according to the settings in Annex C.1.1.

6.7.9.1.1.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.9.1.1.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.9.1.1.4.1-2.

2. Set the parameters according to T1 in Table 6.7.9.1.1.5-1.

3. The UE shall start sending L1-SINR report including results of both CSI-RS#0 and CSI-RS#1 every 80 slots.

4. The SS shall check the L1-SINR reported values of CSI-RS#0 and CSI-RS#1 in the periodic L1-RSRP reports. If the value for both CSI-RSs is within the limits in Table 6.7.9.1.1.5-2 or Table 6.7.9.1.1.5-3 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-SINR report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.9.1.1.5-1 as appropriate and repeat steps 3-5.

6.7.9.1.1.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.9.1.1.4.3-1: Common Exception messages NR SA CSI-RS-based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions PERIODIC and CSI-SINR  Table H.3.6A-2 with conditions CSI-RS and PERIODIC  Table H.3.6A-3 with condition PERIODIC  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.9.1.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSB. |  |
| } |  |  |  |
| } |  |  |  |

6.7.9.1.1.5 Test requirement

Table 6.7.9.1.1.5-1 defines the primary level settings excluding test tolerances for all tests.

Each L1-SINR measurement report for each of the tests in Table 6.7.9.1.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.9.1.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.9.1.1.5-3 for test configuration 3.

Table 6.7.9.1.1.5-1: FR1 CSI-RS based L1-SINR test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Config** | **Unit** | **Test 1** | **Test 2** |
| SSB GSCN | | 1~3 |  | freq1 | freq1 |
| Duplex mode | | 1 |  | FDD | FDD |
| 2 | TDD | TDD |
| 3 | TDD | TDD |
| TDD Configuration | | 1 |  | N/A | N/A |
| 2 | TDDConf.1.1 | TDDConf.1.1 |
| 3 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 FDD |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 FDD |
| 2 | CR.1.1 TDD | CR.1.1 TDD |
| 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration | | 1 |  | SSB.1 FR1 | SSB.1 FR1 |
| 2 | SSB.1 FR1 | SSB.1 FR1 |
| 3 | SSB.2 FR1 | SSB.2 FR1 |
| OCNG Patterns | | 1~3 |  | OP.1 | OP.1 |
| TRS configuration | | 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| 2 | TRS.1.1 TDD | TRS.1.1 TDD |
| 3 | TRS.1.2 TDD | TRS.1.2 TDD |
| 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 | SMTC.1 |
| CSI-RS | | 1 |  | CSI-RS 1.2 FDD | CSI-RS 1.2 FDD |
| 2 | CSI-RS 1.2 TDD | CSI-RS 1.2 TDD |
| 3 | CSI-RS 2.2 TDD | CSI-RS 2.2 FDD |
| reportConfigType | | 1~3 |  | periodic | periodic |
| reportQuantity-r16 | | 1~3 |  | cri-SINR-r16 | cri-SINR-r16 |
| nrofReportedRS | | 1~3 |  | 2 | 2 |
| L1-SINR 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 | | Depending on band group | 1,2 | dBm/15kHz | -94.65 | -117+ ΔBG\_offset |
| 3 | -96.00 | -117+ ΔBG\_offset |
| Note2 | | 1,2 | dBm/SSB SCS | -94.65 | -117+ ΔBG\_offset |
| 3 | -93.00 | -114+ ΔBG\_offset |
|  | | | 1~3 | dB | 10 | -2.2 |
| SSB RSRP Note3 | | Depending on band group | 1,2 | dBm/SSB SCS | -84.65 | -119.2 + ΔBG\_offset |
| 3 | -83.00 | -116.2 + ΔBG\_offset |
| Io Note3 | | Depending on band group | 1,2 | dBm/9.36 MHz | -56.28 | -87.00 + ΔBG\_offset |
| 3 | dBm/38.16 MHz | -51.53 | -80.90 + ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| 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. | | | | | |

Table 6.7.9.1.1.5-2: Same as Table Table 4.7.7.1.1.5-2

Table 6.7.9.1.1.5-3: Same as Table Table 4.7.7.1.1.5-3

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.9.1.2 NR SA FR1 CSI-RS based CMR and no dedicated IMR configured and CSI-RS resource set with repetition off L1-SINR relative measurement accuracy

6.7.9.1.2.1 Test purpose

The purpose of this test is to verify that the L1-SINR relative measurement accuracy is within the specified limits.

6.7.9.1.2.2 Test applicability

This test applies to all types of NR UE from Release 16 onwards. Applicability requires support of L1-SINR measurements.

6.7.9.1.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 4.7.7.0.1.

The normative reference for this requirement is TS 38.133 [6] clause A.4.7.7.1.

6.7.9.1.2.4 Test description

6.7.9.1.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.9.1.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.7.9.1.2.4.1-2.

Table 6.7.9.1.2.4.1-1: Applicable NR configurations for FR1 L1-SINR test with CSI-RS based CMR and no dedicated IMR configured

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz CSI-RS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

Table 6.7.9.1.2.4.1-2: Initial conditions for CSI-RS based L1-SINR absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.9.1.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.9.1.2.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based L1-SINR measurements. The 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. The connection setup is done according to the settings in Annex C.1.1.

6.7.9.1.2.4.2 Test procedure

The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.9.1.2.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.9.1.2.4.1-2.

2. Set the parameters according to T1 in Table 6.7.9.1.1.5-1.

3. The UE shall start sending L1-SINR report including results of both CSI-RS#0 and CSI-RS #1 every 80 slots.

4. The SS shall check the L1-SINR reported values of CSI-RS #0 and CSI-RS #1 in the periodic L1-SINR reports. The L1-SINR value for CSI-RS #1 is compared to the L1-SINR value for CSI-RS #0. If the difference is within the limits in Table 6.7.9.1.2.5-2 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-SINR report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.9.1.1.5-1 as appropriate and repeat steps 3-5.

6.7.9.1.2.4.3 Message contents

Same message contents as described in section 6.7.9.1.1.4.3

6.7.9.1.2.5 Test requirement

Table 6.7.9.1.1.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-SINR measurement report for each of the tests in Table 6.7.9.1.2.5-1 shall meet the corresponding relative accuracy requirements in Table 6.7.9.1.2.5-2.

Table 6.7.9.1.2.5-1: Same as Table 4.7.7.1.2.5-1

Table 6.7.9.1.2.5-2: Same as Table 4.7.7.1.2.5-2

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.9.2 NR SA FR1 SSB based CMR and dedicated IMR L1-SINR absolute measurement accuracy

6.7.9.2.1 Test purpose

The purpose of this test is to verify that the L1-SINR measurement accuracy is within the specified limits.

6.7.9.2.2 Test applicability

This test applies to all types of NR UE from Release 16 onwards. Applicability requires support for L1-SINR measurements on the NR PSCell.

6.7.9.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.9.0.2.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.9.2.

6.7.9.2.4 Test description

6.7.9.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.9.2.4.1-1.

Table 6.7.9.2.4.1-1: Applicable NR configurations for FR1 L1-SINR measurement test with SSB based CMR and CSI-RS based IMR

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

Configure the test equipment and the DUT according to the parameters in Table 6.7.9.2.4.1-2.

Table 6.7.9.2.4.1-2: Initial conditions for SSB based and CSI-RS based L1-SINR absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.9.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.9.2.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for SSB-based L1-RSRP measurements. The UE is configured one SSB resource set with two SSB resources and one CSI-RS resource set with two CSI-RS resource. UE is configured to perform RLM and BFD measurement based on the SSB resources 0 and 1. UE is configured to perform L1-SINR measurement based on the SSBs as CMR and the CSI-RS resources as IMR. The connection setup is done according to the settings in Annex C.1.2 and C.1.3.

6.7.9.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.9.2.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.9.2.4.1-2.

2. Set the parameters according to T1 in Table 6.7.9.2.5-1. SS transmits CSI-RS as IMR with a periodicity of 20 slots.

3. The UE shall start sending L1-SINR report including results of both SSB#0 and SSB#1 every 80 slots.

4. The SS shall check the L1-SINR reported values of SSB#0+CSI-IM#0 and SSB#1+CSI-IM#1 in the periodic L1-RSRP reports. If the value for both SSB#0+CSI-IM#0 and SSB#1+CSI-IM#1 is within the limits in Table 6.7.9.2.5-2 and Table 6.7.9.2.5-3 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-SINR report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.9.2.5-1 as appropriate and repeat steps 3-5.

6.7.9.2.4.3 Message contents

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.4.1.1.4.3-1: Common Exception messages NR SA SSB based L1-RSRP measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions PERIODIC and SS-SINR and CSI-RS\_IMR  Table H.3.6A-2 with conditions SSB and PERIODIC  Table H.3.6A-3 with condition PERIODIC  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.4.1.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| detectionResource CHOICE { |  |  |  |
| ssb-Index | 0 |  |  |
| } |  |  |  |
| } |  |  |  |
| } |  |  |  |

6.7.9.2.5 Test requirement

Table 6.7.9.2.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-RSRP measurement report for each of the tests in Table 6.7.9.2.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.9.2.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.9.2.5-3 for test configuration 3.

Table 6.7.9.2.5-1: FR1 SSB based L1-SINR test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Config | Unit | Test 1 | Test 2 |
| SSB GSCN | | 1~3 |  | freq1 | freq1 |
| Duplex mode | | 1 |  | FDD | FDD |
| 2 | TDD | TDD |
| 3 | TDD | TDD |
| TDD Configuration | | 1 |  | N/A | N/A |
| 2 | TDDConf.1.1 | TDDConf.1.1 |
| 3 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 FDD |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 FDD |
| 2 | CR.1.1 TDD | CR.1.1 TDD |
| 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration | | 1 |  | SSB.3 FR1 | SSB.3 FR1 |
| 2 | SSB.3 FR1 | SSB.3 FR1 |
| 3 | SSB.4 FR1 | SSB.4 FR1 |
| CSI-RS configuration | | 1 |  | CSI-RS 1.1A FDD | CSI-RS 1.1A FDD |
| 2 | CSI-RS 1.1A TDD | CSI-RS 1.1A TDD |
| 3 | CSI-RS 2.1A TDD | CSI-RS 2.1A 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 |
| TRS configuration | | 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| 2 | TRS.1.1 TDD | TRS.1.1 TDD |
| 3 | TRS.1.2 TDD | TRS.1.2 TDD |
| Dedicated BWP configuration | | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | | 1~3 |  | SMTC.1 | SMTC.1 |
| reportConfigType | | 1~3 |  | periodic | periodic |
| reportQuantity-r16 | | 1~3 |  | ssb-Index-SINR-r16 | ssb-Index-SINR-r16 |
| Number of reported RS | | 1~3 |  | 2 | 2 |
| L1-SINR 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 | Depending on band group | 1,2 | dBm/15kHz | -94.65 | -117+ ΔBG\_offset |
| 3 | -96.00 | -117+ ΔBG\_offset |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | -117+ ΔBG\_offset |
| 3 | -93.00 | -114+ ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| SSB RSRP Note3 | Depending on band group | 1,2 | dBm/SSB SCS | -84.65 | -119.2 + ΔBG\_offset |
| 3 | -83.00 | -116.2 + ΔBG\_offset |
| Io Note3 | Depending on band group | 1,2 | dBm/9.36 MHz | -56.28 | -87.00 + ΔBG\_offset |
| 3 | dBm/38.16 MHz | -51.53 | -80.90 + ΔBG\_offset |
| 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. | | | | | |

Table 6.7.9.2.5-2: Same as Table 4.7.7.2.5-2

Table 6.7.9.2.5-3: Same as Table 4.7.7.2.5-3

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

#### 6.7.9.3 NR SA FR1 CSI-RS based CMR and dedicated IMR L1-SINR measurement accuracy

##### 6.7.9.3.1 NR SA FR1 CSI-RS based CMR and dedicated IMR L1-SINR absolute measurement accuracy

6.7.9.3.1.1 Test purpose

The purpose of this test is to verify that the L1-SINR measurement accuracy is within the specified limits.

6.7.9.3.1.2 Test applicability

This test applies to all types of NR UE from Release 16 onwards. Applicability requires support of L1-SINR measurements.

6.7.9.3.1.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.9.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.9.3.

6.7.9.3.1.4 Test description

6.7.9.3.1.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.9.3.1.4.1-1.

Table 6.7.9.3.1.4.1-1: Applicable NR configurations for FR1 L1-SINR measurement test with CSI-RS based CMR and CSI-IM based IMR

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz CSI-RS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.9.3.1.4.1-2.

Table 6.7.9.3.1.4.1-2: Initial conditions for CSI-RS based CMR and CSI-IM based IMR absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.9.3.1.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.9.3.1.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based CMR and CSI-IM based IMR measurements. The UE is configured one CSI-RS resource set with two CSI-RS resources and one CSI-IM resource set with two CSI-IM 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. UE is configured to perform L1-SINR measurement based on the configured CSI-RS as CMR and CSI-IM as IMR. The connection setup is done according to the settings in Annex C.1.1.

6.7.9.3.1.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.9.3.1.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.9.3.1.4.1-2.

2. Set the parameters according to T1 in Table 6.7.9.3.1.5-1. SS transmits CSI-RS as IMR with a periodicity of 20 slots.

3. The UE shall start sending L1-SINR report including results of both SSB#0 and SSB#1 every 80 slots.

4. The SS shall check the L1-SINR reported values of CSI-RS#0+CSI-IM#0 and CSI-RS#1+CSI-IM#1 in the periodic L1-SINR reports. If the value for both CSI-RSs is within the limits in Table 6.7.9.3.1.5-2 and Table 6.7.9.3.1.5-3 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-SINR report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.9.3.1.5-1 as appropriate and repeat steps 3-5.

6.7.9.3.1.4.3 Message contents

Same message content as in subclause 6.7.9.1.4.3 with the following exception:

Message contents are according to TS 38.508-1 [14] clause 7.3 with the following exceptions:

Table 6.7.9.3.1.4.3-1: Common Exception messages NR SA CSI-RS based CMR and dedicated IMR L1-SINR measurement

|  |  |
| --- | --- |
| Default Message Contents | |
| Common contents of system information blocks exceptions |  |
| Default RRC messages and information elements contents exceptions | Table H.3.6A-1 with conditions PERIODIC and CSI-SINR and CSI-IM\_IMR  Table H.3.6A-2 with conditions CSI-RS and PERIODIC  Table H.3.6A-3 with condition PERIODIC  Table 7.3.1-3 in TS 38.508-1 [14] with condition SMTC.1 |

Table 6.7.9.3.1.4.3-2: RadioLinkMonitoringConfig

|  |  |  |  |
| --- | --- | --- | --- |
| Derivation Path: TS 38.508-1 [14], Table 4.6.3-133 | | | |
| Information Element | Value/remark | Comment | Condition |
| RadioLinkMonitoringConfig ::= SEQUENCE { |  |  |  |
| failureDetectionResourcesToAddModList SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF SEQUENCE { | 1 entry |  |  |
| purpose | both | UE is configured to perform RLM and BFD based on the SSBs. |  |
| } |  |  |  |
| } |  |  |  |

6.7.9.3.1.5 Test requirement

Table 6.7.9.3.1.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-SINR measurement report for each of the tests in Table 6.7.9.3.1.5-1 shall meet the corresponding absolute accuracy requirements in Table 6.7.9.3.1.5-2 for test configurations 1 and 2, and the corresponding absolute accuracy requirements in Table 6.7.9.3.1.5-3 for test configuration 3.

Table 6.7.9.3.5-1: FR1 CSI-RS based L1-SINR test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Config** | **Unit** | **Test 1** | **Test 2** |
| SSB GSCN | | 1~3 |  | freq1 | freq1 |
| Duplex mode | | 1 |  | FDD | FDD |
| 2 | TDD | TDD |
| 3 | TDD | TDD |
| TDD Configuration | | 1 |  | N/A | N/A |
| 2 | TDDConf.1.1 | TDDConf.1.1 |
| 3 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | 1 | MHz | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | | 1 |  | SR.1.1 FDD | SR.1.1 FDD |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | 1 |  | CR.1.1 FDD | CR.1.1 FDD |
| 2 | CR.1.1 TDD | CR.1.1 TDD |
| 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| SSB configuration | | 1 |  | SSB.1 FR1 | SSB.1 FR1 |
| 2 | SSB.1 FR1 | SSB.1 FR1 |
| 3 | SSB.2 FR1 | SSB.2 FR1 |
| OCNG Patterns | | 1~3 |  | OP.1 | OP.1 |
| TRS configuration | | 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| 2 | TRS.1.1 TDD | TRS.1.1 TDD |
| 3 | TRS.1.2 TDD | TRS.1.2 TDD |
| 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 | SMTC.1 |
| CSI-RS | | 1 |  | CSI-RS 1.2 FDD | CSI-RS 1.2 FDD |
| 2 | CSI-RS 1.2 TDD | CSI-RS 1.2 TDD |
| 3 | CSI-RS 2.2 TDD | CSI-RS 2.2 FDD |
| reportConfigType | | 1~3 |  | periodic | periodic |
| reportQuantity-r16 | | 1~3 |  | cri-SINR-r16 | cri-SINR-r16 |
| nrofReportedRS | | 1~3 |  | 2 | 2 |
| L1-SINR 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 | Depending on band group | 1,2 | dBm/15kHz | -94.65 | -117+ ΔBG\_offset |
| 3 | -96.00 | -117+ ΔBG\_offset |
| Note2 | 1,2 | dBm/SSB SCS | -94.65 | -117+ ΔBG\_offset |
| 3 | -93.00 | -114+ ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| SSB RSRP Note3 | Depending on band group | 1,2 | dBm/SSB SCS | -84.65 | -119.2 + ΔBG\_offset |
| 3 | -83.00 | -116.2 + ΔBG\_offset |
| Io Note3 | Depending on band group | 1,2 | dBm/9.36 MHz | -56.28 | -87.00 + ΔBG\_offset |
| 3 | dBm/38.16 MHz | -51.53 | -80.90 + ΔBG\_offset |
|  | | 1~3 | dB | 10 | -2.2 |
| 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. | | | | | |

Table 6.7.9.3.5-2: Same as Table 4.7.7.3.5-2

Table 6.7.9.3.5-3: Same as Table 4.7.7.3.5-3

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.

##### 6.7.9.3.2 NR SA FR1 CSI-RS based CMR and dedicated IMR L1-SINR relative measurement accuracy

6.7.9.3.2.1 Test purpose

The purpose of this test is to verify that the L1-SINR relative measurement accuracy is within the specified limits.

6.7.9.3.2.2 Test applicability

This test applies to all types of NR UE from Release 16 onwards. Applicability requires support of L1-SINR measurements.

6.7.9.3.2.3 Minimum conformance requirements

The minimum conformance requirements are specified in clause 6.7.7.9.0.3.

The normative reference for this requirement is TS 38.133 [6] clause A.6.7.9.3.

6.7.9.3.2.4 Test description

6.7.9.3.2.4.1 Initial conditions

This test shall be tested using any of the test configurations in Table 6.7.9.3.2.4.1-1. Configure the test equipment and the DUT according to the parameters in Table 6.7.9.3.2.4.1-2.

Table 6.7.9.3.2.4.1-1: Applicable NR configurations for FR1 L1-SINR measurement test with CSI-RS based CMR and CSI-IM based IMR

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz CSI-RS SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz CSI-RS SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations in each supported band | |

Configure the test equipment and the DUT according to the parameters in Table 6.7.9.3.2.4.1-2.

Table 6.7.9.3.2.4.1-2: Initial conditions for CSI-RS based CMR and CSI-IM based IMR absolute accuracy in FR1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Value | | Comment |
| Test environment | NC, TL/VL, TL/VH, TH/VL, TH/VH | | As specified in TS 38.508-1 [14] clause 4.1. |
| Test frequencies | As specified in Annex E, Table E.4-1 and TS 38.508-1 [14] clause 4.3.1. | | |
| Channel bandwidth | As specified by the test configuration selected from Table 6.7.9.3.2.4.1-1. | | |
| Propagation conditions | AWGN | | As specified in Annex C.2.2. |
| Connection Diagram | TE Part 2Rx | A.3.1.8.2 with n = 1 | As specified in TS 38.508-1 [14] Annex A. |
| TE Part 4Rx | A.3.1.8.5 with n = 1 |
| DUT Part 2Rx | A.3.2.3.4 |
| DUT Part 4Rx | A.3.2.5.2 |
| Exceptions to connection diagram | N/A | |  |

1. Message contents are defined in clause 6.7.9.3.2.4.3.

2. Cell 1 is the NR FR1 cell. Cell 1 is the target for CSI-RS based CMR and CSI-IM based IMR measurements. The UE is configured one CSI-RS resource set with two CSI-RS resources and one CSI-IM resource set with two CSI-IM 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. UE is configured to perform L1-SINR measurement based on the configured CSI-RS as CMR and CSI-IM as IMR. The connection setup is done according to the settings in Annex C.1.1.

6.7.9.3.2.4.2 Test procedure

Prior to the start of the time duration T1, the UE shall be fully synchronized to PSCell. The UE shall be configured for periodic CSI reporting in PUCCH [format 2] with a reporting periodicity as mentioned in the above table 6.7.9.3.2.4.1-2.

1. Ensure the UE is in state RRC\_CONNECTED with generic procedure parameters Connectivity NR SA, Connected without release *On* and Test Mode *On,* according to TS 38.508-1 [14] clause 4.5 and general test parameters set according to Table 6.7.9.3.2.4.1-2.

2. Set the parameters according to T1 in Table 6.7.9.3.2.5-1.

3. The UE shall start sending L1-SINR report including results of both CSI-RS#0 and CSI-RS #1 every 80 slots.

4. The SS shall check the L1-SINR reported values of CSI-RS #0 and CSI-RS #1 in the periodic L1-SINR reports. The L1-SINR value for CSI-RS #1 is compared to the L1-SINR value for CSI-RS #0. If the difference is within the limits in Table 6.7.9.3.2.5-2 (depending on the test configuration), the number of passed iterations is increased by one, otherwise the number of failed iterations is increased by one.

5. The SS shall continue checking the L1-SINR report messages transmitted by the UE until the confidence level according to Table G.2.3-1 in Annex G is achieved.

6. Set the parameters according to each sub-test in Table 6.7.9.3.2.5-1 as appropriate and repeat steps 3-5.

6.7.9.3.2.4.3 Message contents

Same message contents as described in section 6.7.9.3.1.4.3

6.7.9.3.2.5 Test requirement

Table 6.7.9.3.2.5-1 defines the primary level settings including test tolerances for all tests.

Each L1-SINR measurement report for each of the tests in Table 6.7.9.3.2.5-1 shall meet the corresponding relative accuracy requirements in Table 6.7.9.3.2.5-2.

Table 6.7.9.3.2.5-1: Same as Table 6.7.9.3.1.5-1

Table 6.7.9.3.2.5-2: Same as Table 4.7.7.3.2.5-2

For the test to pass, the ratio of successful reported values in each test shall be more than 90% with a confidence level of 95%.