**3GPP TSG- Meeting #**

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

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| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In RAN4#110-bis the following CRs were endorsed for the performance part of NR\_BWP\_wor:   * R4-2406356 (TC set 1&2) DraftCR on test cases for L1 and intra-frequency measurement without gap for option B-1-1 * R4-2406357 Draft CR on test cases for intra-frequency measurements without gaps for option C * R4-2406358 Draft CR on test cases for L1 measurements for option A * R4-2406359 Draft CR on test configurations for BWP operation without restriction * R4-2406360 draft CR to 38.133 Test case of L1-RSRP, L1-SINR for Option C * R4-2406361 draftCR on TC set 4 for BWP without restriction * R4-2406362 Draft CR to Rel-18 TS 38.133: on test case of L1-RSRP, L1-SINR for option C   In RAN4#111 the following CRs were endorsed for the performance part of NR\_BWP\_wor:   * R4-2407518 (TC set 1&2) DraftCR on test cases for L1 and intra-frequency measurement without gap for option B-1-1 * R4-2408276 Draft CR on test cases for intra-frequency measurements without gaps for option C * R4-2410367 Draft CR on test configurations for BWP operation without restriction * R4-2410368 Draft CR to 38.133 Test case of L1-RSRP, L1-SINR for Option C * R4-2409259 draftCR on HO TCs for option C * R4-2410369 Draft CR to Rel-18 TS 38.133: on test case of L1-RSRP, L1-SINR for option C | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduce test cases for options A, B-1-1 and C | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Test cases for options A, B-1-1 and C are missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.3.10, A.3.11, A.3.11A, A.4.5.1.X, A.4.6.1.X, A.4.6.4.X, A.5.5.1.X, A.5.6.1.X, A.5.6.3.X, A.6.3.1.X, A.6.5.1.X, A.6.6.1.X, A.6.6.4.X, A.7.3.1.X A.7.5.1.X, A.7.6.1.X, A.7.6.3.X | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

## A.3.10 SSB Configurations

### A.3.10.1 SSB Configurations for FR1

**--- Unchanged clauses omitted ---**

#### A.3.10.1.9 SSB pattern 9 in FR1: SSB allocation for SSB SCS=15 kHz in 10 MHz

Table A.3.10.1.9-1: SSB.9 FR1: SSB Pattern 9 for SSB SCS=15 kHz in 10 MHz channel

|  |  |
| --- | --- |
| **SSB Parameters** | **Values** |
| Channel bandwidth | 10 MHz |
| SSB SCS | 15 kHz |
| SSB periodicity (TSSB) | 80 ms |
| Number of SSBs per SS-burst | 1 |
| SS/PBCH block index | 0 |
| Symbol numbers containing SSB Note 2 | 2-5 |
| Slot numbers containing SSB Note 2 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

#### A.3.10.1.10 SSB pattern 10 in FR1: SSB allocation for SSB SCS=30 kHz in 40 MHz

Table A.3.10.1.10-1: SSB.10 FR1: SSB Pattern 10 for SSB SCS=30 kHz in 40 MHz channel

|  |  |
| --- | --- |
| **SSB Parameters** | **Values** |
| Channel bandwidth | 40 MHz |
| SSB SCS | 30 kHz |
| SSB periodicity (TSSB) | 80 ms |
| Number of SSBs per SS-burst | 1 |
| SS/PBCH block index | 0 |
| Symbol numbers containing SSB Note 3 | 4-7 or 2-5 Note 2 |
| Slot numbers containing SSB Note 3 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbols 4-7 is chosen, if the SSB pattern Case B should be used for the current band as indicated by Table 5.4.3.3-1 of TS 38.104 [13]; Otherwise, symbol 2-5 is chosen.  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves | |

A.3.10.1.11 SSB pattern 11 in FR1: SSB allocation for SSB SCS=15 kHz in 10 MHz

**Table A.3.10.1.11-1: SSB.11 FR1: SSB Pattern 11 for SSB SCS=15 kHz in 10 MHz channel**

|  |  |  |
| --- | --- | --- |
| **SSB Parameters** | **Values** | |
| Channel bandwidth | 10 MHz | |
| SSB SCS | 15 kHz | |
| SSB periodicity (TSSB) | 80 ms | |
| Number of SSBs per SS-burst | 2 | |
| SS/PBCH block index | 0 | 1 |
| Symbol numbers containing SSB Note 2 | 2-5 | 8-11 |
| Slot numbers containing SSB Note 2 | 0 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |

A.3.10.1.12 SSB pattern 12 in FR1: SSB allocation for SSB SCS=30 kHz in 40 MHz

Table A.3.10.1.12-1: SSB.12 FR1: SSB Pattern 12 for SSB SCS=30 kHz in 20 MHz channel

|  |  |  |
| --- | --- | --- |
| **SSB Parameters** | **Values** | |
| Channel bandwidth | 20 MHz | |
| SSB SCS | 30 kHz | |
| SSB periodicity (TSSB) | 80 ms | |
| Number of SSBs per SS-burst | 2 | |
| SS/PBCH block index | 0 | 1 |
| Symbol numbers containing SSB Note 3 | 4-7 or 2-5 Note 2 | 8-11 |
| Slot numbers containing SSB Note 3 | 0 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | |
| RB numbers containing SSB within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: Symbols 4-7 is chosen, if the SSB pattern Case B should be used for the current band as indicated by Table 5.4.3.3-1 of TS 38.104 [13]; Otherwise, symbol 2-5 is chosen.  Note 3: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |

### A.3.10.2 SSB Configurations for FR2

**--- Unchanged clauses omitted ---**

#### A.3.10.2.19 SSB pattern 17 in FR2: SSB allocation for SSB SCS=120 kHz in 100 MHz

Table A.3.10B.2.2-1: SSB.17 FR2: SSB Pattern 17 for SSB SCS = 120 kHz in 100 MHz channel with 1 SSB per SS-burst

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 100 MHz |
| SSB SCS | 120 kHz |
| SSB periodicity (TSSB) | 40 ms |
| Number of SSBs per SS-burst | 1 |
| SS/PBCH block index | 0 |
| Symbol numbers containing SSBs Note 2 | 4-7 |
| Slot numbers containing SSB Note 2 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

#### A.3.10.2.20 SSB pattern 18 in FR2: SSB allocation for SSB SCS=240 kHz in 100 MHz

Table A.3.10.2.20-1: SSB.18 FR2: SSB Pattern 18 for SSB SCS = 240 kHz in 100 MHz channel with 1 SSB per SS-burst

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 100 MHz |
| SSB SCS | 240 kHz |
| SSB periodicity (TSSB) | 40 ms |
| Number of SSBs per SS-burst | 1 |
| SS/PBCH block index | 0 |
| Symbol numbers containing SSBs Note 2 | 8-11 |
| Slot numbers containing SSB Note 2 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

#### A.3.10.2.21 SSB pattern 19 in FR2: SSB allocation for SSB SCS=120 kHz in 100 MHz

Table A.3.10.2.21-1: SSB.19 FR2: SSB Pattern 19 for SSB SCS = 120 kHz in 100 MHz channel with 2 SSBs per SS-burst

|  |  |  |
| --- | --- | --- |
| SSB Parameters | Values | |
| Channel bandwidth | 100 MHz | |
| SSB SCS | 120 kHz | |
| SSB periodicity (TSSB) | 80 ms | |
| Number of SSBs per SS-burst | 2 | |
| SS/PBCH block index | 0 | 1 |
| Symbol numbers containing SSBs Note 2 | 4-7 | 8-11 |
| Slot numbers containing SSB Note 2 | 0 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 | |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |

#### A.3.10.2.22 SSB pattern 20 in FR2: SSB allocation for SSB SCS=240 kHz in 100 MHz

Table A.3.10.2.22-1: SSB.20 FR2: SSB Pattern 20 for SSB SCS = 240 kHz in 100 MHz channel with 2 SSBs per SS-burst

|  |  |  |
| --- | --- | --- |
| **SSB Parameters** | **Values** | |
| Channel bandwidth | 100 MHz | |
| SSB SCS | 240 kHz | |
| SSB periodicity (TSSB) | 80 ms | |
| Number of SSBs per SS-burst | 2 | |
| SS/PBCH block index | 0 | 1 |
| Symbol numbers containing SSBs Note 2 | 8-11 | 12-13, 0-1 |
| Slot numbers containing SSB Note 2 | 0 | 0, 1 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+39)Note 1 | |
| Note 1: RBs containing SSB can be configured in any frequency location within the associated bandwidth part except the RBs for allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |

#### A.3.10.2.23 SSB pattern 21 in FR2: SSB allocation for SSB SCS=120 kHz in 100 MHz

Table A.3.10.2.23-1: SSB.21 FR2: SSB Pattern 21 for SSB SCS = 120 kHz in 100 MHz channel with 1 SSB per SS-burst

|  |  |
| --- | --- |
| SSB Parameters | Values |
| Channel bandwidth | 100 MHz |
| SSB SCS | 120 kHz |
| SSB periodicity (TSSB) | 40 ms |
| Number of SSBs per SS-burst | 1 |
| SS/PBCH block index | 1 |
| Symbol numbers containing SSBs Note 2 | 8-11 |
| Slot numbers containing SSB Note 2 | 0 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+19)Note 1 |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | |

#### A.3.10.2.24 SSB pattern 22 in FR2: SSB allocation for SSB SCS=240 kHz in 100 MHz

Table A.3.10.2.24-1: SSB.22 FR2: SSB Pattern 22 for SSB SCS = 240 kHz in 100 MHz channel with 1 SSB per SS-burst

|  |  |  |
| --- | --- | --- |
| SSB Parameters | Values | |
| Channel bandwidth | 100 MHz | |
| SSB SCS | 240 kHz | |
| SSB periodicity (TSSB) | 40 ms | |
| Number of SSBs per SS-burst | 1 | |
| SS/PBCH block index | 1 | |
| Symbol numbers containing SSBs Note 2 | 12-13 | 0-1 |
| Slot numbers containing SSB Note 2 | 0 | 1 |
| SFN containing SSB | SFN mod (max(TSSB,10ms)/10ms) = 0 | |
| RB numbers containing SSBs within channel BW | (RBJ, RBJ+1,.…, RBJ+39)Note 1 | |
| Note 1: RBs containing SSB can be configured in any frequency location within the cell bandwidth according to the allowed synchronization raster defined in TS 38.104 [13].  Note 2: These values have been derived from other parameters for information purposes (as per TS 38.213 [3]). They are not settable parameters themselves. | | |

<End of Change 1>

<Start of Change 2>

## A.3.11 SMTC Configurations

**--- Unchanged clauses omitted ---**

### A.3.11.10 SMTC pattern 10: SMTC period = 80 ms with SMTC duration = 1 ms

Table A.3.11.10-1: SMTC.10: SMTC Pattern 10 for SMTC period = 80 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 80 ms |
| SMTC offset | 0 ms |
| SMTC duration | 1 ms |

### A.3.11.11 SMTC pattern 11: SMTC period = 80 ms with SMTC duration = 5 ms

Table A.3.11.11-1: SMTC.11: SMTC Pattern 11 for SMTC period = 80 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 80 ms |
| SMTC offset | 5 ms |
| SMTC duration | 5 ms |

<End of Change 2>

<Start of Change 3>

## A.3.11A SMTC Configurations for RedCap

### A.3.11A.0 Introduction

The SMTC configuration for RedCap can also be used in test case for non-RedCap.

### A.3.11A.1 SMTC pattern 1 for RedCap: SMTC period = 40 ms with SMTC duration = 1 ms

Table A.3.11A.1-1: SMTC.1 RedCap: SMTC Pattern 1 for SMTC period = 40 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 40 ms |
| SMTC offset | 0 ms |
| SMTC duration | 1 ms |

### A.3.11A.2 SMTC pattern 2 for RedCap: SMTC period = 80 ms with SMTC duration = 1 ms

Table A.3.11A.2-1: SMTC.2 RedCap: SMTC Pattern 2 for SMTC period = 80 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 80 ms |
| SMTC offset | 0 ms |
| SMTC duration | 1 ms |

### A.3.11A.3 SMTC pattern 3 for RedCap: SMTC period = 40 ms with SMTC duration = 1 ms

Table A.3.11A.3-1: SMTC.3 RedCap: SMTC Pattern 3 for SMTC period = 40 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 40 ms |
| SMTC offset | 20 ms |
| SMTC duration | 1 ms |

### A.3.11A.4 SMTC pattern 4 for RedCap: SMTC period = 80 ms with SMTC duration = 5 ms

Table A.3.11A.4-1: SMTC.4 RedCap: SMTC Pattern 4 for SMTC period = 80 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 80 ms |
| SMTC offset | 0 ms |
| SMTC duration | 5 ms |

<End of Change 3>

<Start of Change 4>

### A.4.5.1 Radio link Monitoring

**--- Unchanged clauses omitted ---**

#### A.4.5.1.X EN-DC Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with CSI-RS-based RLM in non-DRX mode when CD-SSB is outside active BWP

##### A.4.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used and when CD-SSB is outside active BWP. This test will partly verify the FR1 PSCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.4.5.1.5.

The test environment is the same as in A.4.5.1.5 with following exceptions in Table A.4.5.1.5.1-2.

The value of parameter “DL dedicated BWP configuration” is DLBWP.1.2. The value of parameter “UL dedicated BWP configuration” is ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as for A.4.5.1.5.2.

<End of Change 4>

# <Start of Change 5>

#### A.4.5.1.X Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with SSB-based RLM RS in non-DRX mode when CD-SSB is outside active BWP

##### A.4.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when CD-SSB is outside active BWP. This test will partly verify the FR1 PSCell radio link monitoring requirements in clause 8.1.

The test environment is the same as in A.4.5.1.1 with following exceptions in Table A.4.5.1.1.1-2.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| DL dedicated BWP configuration | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.1.2 |
| UL dedicated BWP configuration | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.1.2 |

##### A.4.5.1.X.2 Test Requirements

The test requirements are the same as in A.4.5.1.1.2.

# <End of Change 5>

# <Start of Change 6>

#### A.4.5.1.x EN-DC Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with SSB-based RLM RS in non-DRX mode for UE supporting [FG 53-3]

##### A.4.5.1.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell for UE supporting FG 53-3. This test will partly verify the FR1 PSCell radio link monitoring requirements in clause 8.1.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.4.5.1.x.1-1. The test parameters are given in Tables A.4.5.1.x.1-2, A.4.5.1.x.1-3, and A.4.5.1.x.1-4 below. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.4.5.1.x.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.4.5.1.x.1-1: Supported test configurations for FR1 PSCell for UE supporting FG 53-3

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.4.5.1.x.1-2: General test parameters for FR1 out-of-sync testing in non-DRX mode for UE supporting FG 53-3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active E-UTRA PCell | | |  | Cell 1 |
| E-UTRA RF Channel Number | | |  | 1 |
| Active PSCell | | |  | Cell 2 |
| RF Channel Number | | |  | 2 |
| Duplex mode | | Config 1, 4 |  | FDD |
|  | | Config 2, 3, 5, 6 |  | TDD |
| BWchannel | | Config 1, 4 | MHz | 10: NRB,c = 52 |
|  | | Config 2, 5 |  | 10: NRB,c = 52 |
|  | | Config 3, 6 |  | 20: NRB,c = 51 |
| DL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | [DLBWP.1.x] |
| UL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | [ULBWP.1.x] |
| TDD Configuration | | Config 1, 4 |  | Not Applicable |
|  | | Config 2, 5 |  | TDDConf.1.1 |
|  | | Config 3, 6 |  | TDDConf.2.1 |
| CORESET | | Config 1, 4 |  | CR.1.1 FDD |
| Reference Channel | | Config 2, 5 |  | CR.1.1 TDD |
|  | | Config 3, 6 |  | CR.2.1 TDD |
| SSB Configuration | | Config 1, 4 |  | SSB.1 FR1 |
|  | | Config 2, 5 |  | SSB.1 FR1 |
|  | | Config 3, 6 |  | [SSB.x FR1 |
| NCD-SSB Configuration | | Config 1 |  | [SSB.9 FR1] |
| Config 2 | [SSB.9 FR1] |
| Config 3 | [SSB.10 FR1] |
| SMTC | | Config 1, 2, 4, 5 |  | SMTC.1 |
| Configuration | | Config 3, 6 |  | [SMTC.x] |
| PDSCH/PDCCH | | Config 1, 2, 4, 5 |  | 15 kHz |
| subcarrier spacing | | Config 3, 6 |  | 30 kHz |
| PRACH Configuration | | Config 1, 2, 4, 5 |  | Table A.3.8.2.1-1 |
|  | | Config 3, 6 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync | DCI format | |  | 1-0 |
| transmission parameters | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS for CSI | | Config 1, 4 |  | CSI-RS.1.1 FDD |
| reporting | | Config 2, 5 |  | CSI-RS.1.1 TDD |
|  | | Config 3, 6 |  | CSI-RS.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 |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.48 |
| T3 | | | s | 0.48 |
| D1 | | | s | 0.44 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | |

Table A.4.5.1.x.1-3: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode for UE supporting FG 53-3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | |
|  | |  | T1 | | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB | 0 | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | |
| SNR on | Config 1, 4 | dB | 1 | -7 | | -15 |
| RLM-RS | Config 2, 5 |  | 1 | -7 | | -15 |
|  | Config 3, 6 |  | 1 | -7 | | -15 |
|  | Config 1, 4 | dBm/15 kHz | -98 | | | |
|  | Config 2, 5 |  | -98 | | | |
|  | Config 3, 6 |  | -98 | | | |
|  | Config 1, 4 | dBm/SCS | -98 | | | |
|  | Config 2, 5 |  | -98 | | | |
|  | Config 3, 6 |  | -95 | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs. | | | | | | |

Table A.4.5.1.x.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
|  | Value |
| gapOffset | 0 |
| Note 1: E-UTRAN PCell and PSCell are SFN-synchronous and frame boundary aligned. (Ensure that RLM RS is partially overlapped with measurement gap). | |

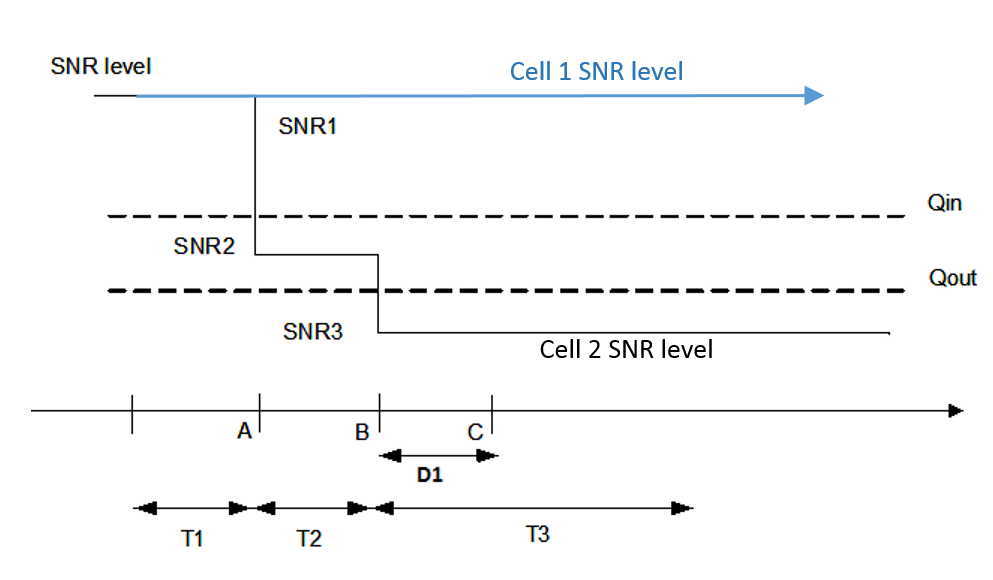
****

Figure A.4.5.1.x.1-1: SNR variation for out-of-sync testing

##### A.4.5.1.x.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal in Cell 2 no later than time point C (D1 second after the start of the time duration T3).

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

# <End of Change 6>

# <Start of Change 7>

#### A.4.6.1.X EN-DC event triggered reporting tests without gap under non-DRX when CD-SSB is outside active BWP

##### A.4.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of an event when CD-SSB is outside active BWP. This test will partly verify the intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2.

The test environment is the same as in A.4.6.1.1 with following exceptions in Table A.4.6.1.1.2-3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Cell 2 | | Cell 3 | |
|  |  | configuration | T1 | T2 | T1 | T2 |
| Initial BWP configuration |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 ULBWP.0.1 | | - | |
| Active DL BWP configuration |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.2 | | - | |
| Active UL BWP configuration |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.2 | | - | |

##### A.4.6.1.X.2 Test Requirements

The test requirements are the same as in A.4.6.1.1.3.

# <End of Change 7>

<Start of Change 8>

#### A.4.6.1.X EN-DC event triggered reporting tests without gap under non-DRX with NCD-SSB

##### A.4.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements when NCD-SSB is configured in clause 9.2.5.1 and 9.2.5.2.

##### A.4.6.1.X.2 Test parameters

Three cells are deployed in the test, which are E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR1 neighbour cell (Cell 3) on the same frequency as the PSCell. The test parameters for PSCell are given in Table A.4.6.1.X.2-1, A.4.6.1.X.2-2, A.4.6.1.X.2-3 below and the test parameters and applicability for the E-UTRAN cell are defined in A.3.7.2. The CD-SSB is configured outside active DL BWP and NCD-SSB is configured fully within active DL BWP of FR1 PSCell. In the measurement control information, a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

Table A.4.6.1.X.2-1: Supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: Target NR Cell 3 has the same SCS, BW and duplex mode as NR serving Cell 2 | |

Table A.4.6.1.X.2-2: General test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | Comment |
|  |  | configuration |  |  |
| Active cell |  | 1, 2, 3, 4, 5, 6 | E-UTRAN Cell 1 and NR Cell 2 |  |
| Neighbour cell |  | 1, 2, 3, 4, 5, 6 | NR Cell 3 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3, 4, 5, 6 | 1: Cell 1  2: Cell 2 and Cell 3 |  |
| SSB configuration |  | 1, 4 | SSB.1 FR1 |  |
|  |  | 2, 5 | SSB.1 FR1 |  |
|  |  | 3, 6 | SSB.2 FR1 |  |
| NCD-SSB configuration |  | 1, 4 | SSB.9 FR1 |  |
|  |  | 2, 5 | SSB.9 FR1 |  |
|  |  | 3, 6 | SSB.10 FR1 |  |
| SMTC configuration |  | 1, 4 | SMTC.2 |  |
|  |  | 2, 5 | SMTC.1 |  |
|  |  | 3, 6 | SMTC.1 |  |
| A3-Offset | dB | 1, 2, 3, 4, 5, 6 | -4.5 |  |
| CP length |  | 1, 2, 3, 4, 5, 6 | Normal |  |
| Hysteresis | dB | 1, 2, 3, 4, 5, 6 | 0 |  |
| Time To Trigger | s | 1, 2, 3, 4, 5, 6 | 0 |  |
| Filter coefficient |  | 1, 2, 3, 4, 5, 6 | 0 | L3 filtering is not used |
| DRX |  | 1, 2, 3, 4, 5, 6 | N/A | OFF |
| Time offset between PCell and PSCell |  | 1, 2, 3, 4, 5, 6 | 3 μs | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | 1, 4 | 3 ms | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | 2, 5 | 3 μs | Synchronous cells |
|  |  | 3, 6 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3, 4, 5, 6 | 5 |  |
| T2 | s | 1, 2, 3, 4, 5, 6 | 5 |  |

Table A.4.6.1.X.2-3: NR Cell specific test parameters for EN-DC intra-frequency event triggered reporting without gap for PSCell in FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Cell 2 | | Cell 3 | |
|  |  | configuration | T1 | T2 | T1 | T2 |
| TDD |  | 1, 4 | N/A | | N/A | |
| configuration |  | 2, 5 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3, 6 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC |  | 1, 4 | SR.1.1 FDD | | N/A | |
| configuration |  | 2, 5 | SR.1.1 TDD | |  | |
|  |  | 3, 6 | SR.2.1 TDD | |  | |
| RMSI CORESET |  | 1, 4 | CR.1.1 FDD | | N/A | |
| RMC |  | 2, 5 | CR.1.1 TDD | | N/A | |
| configuration |  | 3, 6 | CR.2.1 TDD | | N/A | |
| Dedicated |  | 1, 4 | CCR.1.1 FDD | | N/A | |
| CORESET RMC |  | 2, 5 | CCR.1.1 TDD | | N/A | |
| configuration |  | 3, 6 | CCR.2.1 TDD | | N/A | |
| OCNG Patterns |  | 1, 2, 3, 4, 5, 6 | OP.1 | | OP.1 | |
| TRS |  | 1, 4 | TRS.1.1 FDD | | N/A | |
| configuration |  | 2, 5 | TRS.1.1 TDD | | N/A | |
|  |  | 3, 6 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2, 3, 4, 5, 6 | SSB | | SSB | |
| Note 2 | dBm/SCS | 1, 4 | -98 | | | |
|  |  | 2, 5 | -98 | | | |
|  |  | 3, 6 | -95 | | | |
| Note 2 | dBm/15 kHz | 1, 4 | -98 | | | |
|  |  | 2, 5 |  | | | |
|  |  | 3, 6 |  | | | |
|  | dB | 1, 4 | 4 | -1.46 | -Infinity | -1.46 |
|  |  | 2, 5 |  |  |  |  |
|  |  | 3, 6 |  |  |  |  |
|  | dB | 1, 4 | 4 | 4 | -Infinity | 4 |
|  |  | 2, 5 |  |  |  |  |
|  |  | 3, 6 |  |  |  |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1, 4 | -94 | -94 | -Infinity | -94 |
|  |  | 2, 5 | -94 | -94 | -Infinity | -94 |
|  |  | 3, 6 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1, 4 | -64.60 | -62.25 | -64.60 | -62.25 |
|  | dBm/9.36 MHz | 2, 5 | -64.60 | -62.25 | -64.60 | -62.25 |
|  | dBm/38.16 MHz | 3, 6 | -58.50 | -56.16 | -58.50 | -56.16 |
| Propagation Condition |  | 1, 2, 3, 4, 5, 6 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.4.6.1.X.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 800 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

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

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

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

# <End of Change 8>

<Start of Change 9>

### A.4.6.4 L1-RSRP measurement for beam reporting

**--- Unchanged clauses omitted ---**

#### A.4.6.4.X CSI-RS based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.4.6.4.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells in Table A.4.6.4.3.1-1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.4.6.4.3.

The test environment is the same as in A.4.6.4.3.2 with following exceptions in Table Table A.4.6.4.3.2-1.

The value of parameter “Dedicated BWP configuration” is DLBWP.1.2 and ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.6.6.4.3.3.

<End of Change 9>

# <Start of Change 10>

#### A.4.6.4.X SSB based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.4.6.4.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.4.6.4.1.1-1.

The test environment is the same as in A.4.6.4.1 with following exceptions in Table A.4.6.4.1.2-1.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| Dedicated BWP configuration | 1~6 |  | DLBWP.1.2 ULBWP.1.2 |

##### A.4.6.4.X.2 Test Requirements

The test requirements are the same as in A.4.6.4.1.3.

# <End of Change 10>

<Start of Change 11>

#### A.4.6.4.x SSB based L1-RSRP measurement for UE supporting NCD-SSB based L1 measurement outside active BWP when DRX is not used

##### A.4.6.4.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.4.6.4.x.1-1.

Table A.4.6.4.x.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

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

##### A.4.6.4.x.2 Test parameters

There are two cells in the test, E-UTRAN PCell (Cell 1) and FR1 PSCell (Cell 2). The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 are given in Table A.4.6.4.x.2-1 and Table A.4.6.4.x.2-2 below.

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

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

Table A.4.6.4.x.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~6 |  | freq1 |
| Duplex mode | 1,4 |  | FDD |
|  | 2,5 |  | TDD |
|  | 3,6 |  | TDD |
| TDD Configuration | 1,4 |  | N/A |
|  | 2,5 |  | TDDConf.1.1 |
|  | 3,6 |  | TDDConf.2.1 |
| BWchannel | 1,4 | MHz | 10: NRB,c = 52 |
|  | 2,5 |  | 10: NRB,c = 52 |
|  | 3,6 |  | 40: NRB,c = 106 |
| PDSCH Reference measurement | 1,4 |  | SR.1.1 FDD |
| channel | 2,5 |  | SR.1.1 TDD |
|  | 3,6 |  | SR.2.1 TDD |
| RMSI CORESET Reference | 1,4 |  | CR.1.1 FDD |
| Channel | 2,5 |  | CR.1.1 TDD |
|  | 3,6 |  | CR.2.1 TDD |
| Dedicated CORESET Reference | 1,4 |  | CCR.1.1 FDD |
| Channel | 2,5 |  | CCR.1.1 TDD |
|  | 3,6 |  | CCR.2.1 TDD |
| CD-SSB configuration | 1,4 |  | SSB.3 FR1 |
|  | 2,5 |  | SSB.3 FR1 |
|  | 3,6 |  | SSB.4 FR1 |
| NCD-SSB configuration | 1,4 |  | [SSB.9 FR1] |
| 2,5 |  | [SSB.9 FR1] |
| 3,6 |  | [SSB.10 FR1] |
| OCNG Patterns | 1~6 |  | OP.1 |
| Initial BWP Configuration | 1~6 |  | DLBWP.0.1 ULBWP.0.1 |
| Dedicated BWP configuration | 1~6 |  | [DLBWP.1.1 RedCap]  [ULBWP.1.1 RedCap] |
| SMTC configuration | 1~6 |  | [SMTC.2 RedCap] |
| TRS Configuration | 1,4 |  | TRS.1.1 FDD |
|  | 2,5 |  | TRS.1.1 TDD |
|  | 3,6 |  | TRS.1.2 TDD |
| DRX configuration | 1~6 |  | Off |
| reportConfigType | 1~6 |  | periodic |
| reportQuantity | 1~6 |  | ssb-Index-RSRP |
| Number of reported RS | 1~6 |  | 2 |
| L1-RSRP reporting period | 1~6 | slot | 80 |
| T1 | 1~6 | s | 5 |
| T2 | 1~6 | s | 1 |
| EPRE ratio of PSS to SSS |  |  |  |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | 1~6 | dB | 0 |
| 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 | 1~6 |  | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | |

Table A.4.6.4.x.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Note2 | 1~6 | dBm/15kHz | -94.65 | | | |
| Note2 | 1,2,4,5 | dBm/SSB SCS | -94.65 | | | |
|  | 3,6 |  | -91.65 | | | |
|  | 1~6 | dB | 0 | 0 | -Infinity | 3 |
| SSB RSRP Note3 | 1,2,4,5 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.65 |
|  | 3,6 |  | -91.65 | -91.65 | -Infinity | -88.65 |
| Io Note3 | 1,2,4,5 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.93 |
|  | 3,6 | dBm/38.16 MHz | -57.59 | -57.59 | -60.61 | -55.84 |
|  | 1~6 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.4.6.4.x.3 Test Requirements

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

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

# <End of Change 11>

<Start of Change 12>

### A.5.5.1 Radio link Monitoring

**--- Unchanged clauses omitted ---**

#### A.5.5.1.X EN-DC Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with CSI-RS-based RLM in non-DRX mode when CD-SSB is outside active BWP

##### A.5.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PSCell when no DRX is used and when CD-SSB is outside active BWP. This test will partly verify the FR2 TDD PSCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.5.5.1.5.

The test environment is the same as in A.5.5.1.5.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.5.5.1.5.2.

<End of Change 12>

# <Start of Change 13>

#### A.5.5.1.X Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with SSB-based RLM RS in non-DRX mode when CD-SSB is outside active BWP

##### A.5.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell when CD-SSB is outside active BWP. This test will partly verify the FR2 radio link monitoring requirements in clause 8.1.

The test environment is the same as in A.5.5.1.1 with following exceptions in Table A.5.5.1.1.1-2.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** |
| **Test 1** |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.5 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.5 |

##### A.5.5.1.X.2 Test Requirements

The test requirements are the same as in A.5.5.1.1.2.

# <End of Change 13>

# <Start of Change 14>

#### A.5.5.1.x EN-DC Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with SSB-based RLM RS in non-DRX mode for UE supporting [FG 53-3]

##### A.5.5.1.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PSCell for UE supporting FG 53-3. This test will partly verify the FR2 radio link monitoring requirements in clause 8.1.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.5.5.1.x.1-1. The test parameters are given in Tables A.5.5.1.x.1-2, A.5.5.1.x.1-3, and A. 5.5.1.x.1-4 below. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-2. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.5.5.1.x.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states, and Figure A.5.5.1.x.1-2 shows the Time multiplexed downlink transmissions from each Angle of Arrival. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.5.5.1.x.1-1: Supported test configurations for FR2 PSCell for UE supporting FG 53-3

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD LTE PCell, NR 120 KHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | TDD LTE PCell, NR 120 KHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR2 | |

Table A.5.5.1.x.1-2: General test parameters for FR2 out-of-sync testing in non-DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** |
| **Test 1** |
| Active E-UTRA PCell | | |  | Cell 1 |
| E-UTRA RF Channel Number | | |  | 1 |
| Active PSCell | | |  | Cell 2 |
| RF Channel Number | | |  | 2 |
| Duplex mode | | Config 1, 2 |  | TDD |
| BWchannel | | Config 1, 2 |  | 100: NRB,c = 66 |
| Data RBs allocated | | Config 1, 2 |  | 24 |
| DL initial BWP configuration | | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2 |  | [DLBWP.1.x] |
| UL initial BWP configuration | | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2 |  | [ULBWP.1.x] |
| TDD Configuration | | Config 1, 2 |  | TDDConf.3.1 |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.3.1 TDD |
| Dedicated CORESET Reference Channel | | Config 1, 2 |  | CCR.3.4 TDD |
| SSB Configuration | | Config 1, 2 |  | [SSB.x FR2] |
| NCD-SSB Configuration | | Config 1 |  | [SSB.x FR2] |
| SMTC Configuration | | Config 1, 2 |  | [SMTC.x] |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 120 KHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.3.1 |
| SSB index assigned as RLM RS | | Config 1, 2 |  | 0,1 |
| OCNG parameters | | |  | OP.5 |
| CP length | | |  | Normal |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
| Number of Control OFDM symbols | |  | 2 |
| Aggregation level | | CCE | 8 |
| Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
| Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
| DMRS precoder granularity | |  | REG bundle size |
| REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS for CSI reporting | | Config 1, 2 |  | CSI-RS.3.1 TDD |
| reportConfigType | | |  | periodic |
| reportQuantity | | |  | cri-RI-PMI-CQI |
| CSI reporting periodicity | | | slot | 40 |
| CSI reporting offset | | | slot | 4 |
| TCI states for PDCCH/PDSCH | | |  | TCI.State.2 |
| CSI-RS for tracking | | Config 1, 2 |  | TRS.2.1 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 9.68 |
| T3 | | | s | 9.68 |
| D1 | | | s | 9.64 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | |

Table A.5.5.1.x.1-3: OTA related cell specific test parameters for FR2 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | | |
|  | |  | T1 | T2 | T3 | T1 | T2 | T3 |
| AoA setup | |  | Setup 3 defined in A.3.15 | | | | | |
|  | |  | AoA1 | | | AoA2 | | |
| Assumption for UE beamsNote 5 | |  | Rough | | | Rough | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |  | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | |  | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |  | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | Not sent | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |  | | |
| ssb-Index 0 SNR | Config 1, 2 | dB | 2Note 6 | -6Note 6 | -15 |  | | |
| ssb-Index 1 SNR | Config 1, 2 |  | Not sent | | | 2Note 6 | -15 | -15 |
|  | Config 1, 2 | dBm/ 15kHz | -92.1 | | | -92.1 | | |
| Time multiplexing of the downlink transmissions from each AoA | |  | Defined in Figure A.5.5.1.1.1-2 | | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | | | TDL-A 30ns 75Hz | | |
| Note 1: OCNG shall be used such that a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6.  Note 5: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 6: This value allows up to 1dB degradation from applied SNR to UE baseband | | | | | | | | |

Table A.5.5.1.x.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
|  | Value |
| gapOffset | 0 |
| Note 1: E-UTRAN PCell and PSCell are SFN-synchronous and frame boundary aligned. (Ensure that RLM RS is partially overlapped with measurement gap). | |

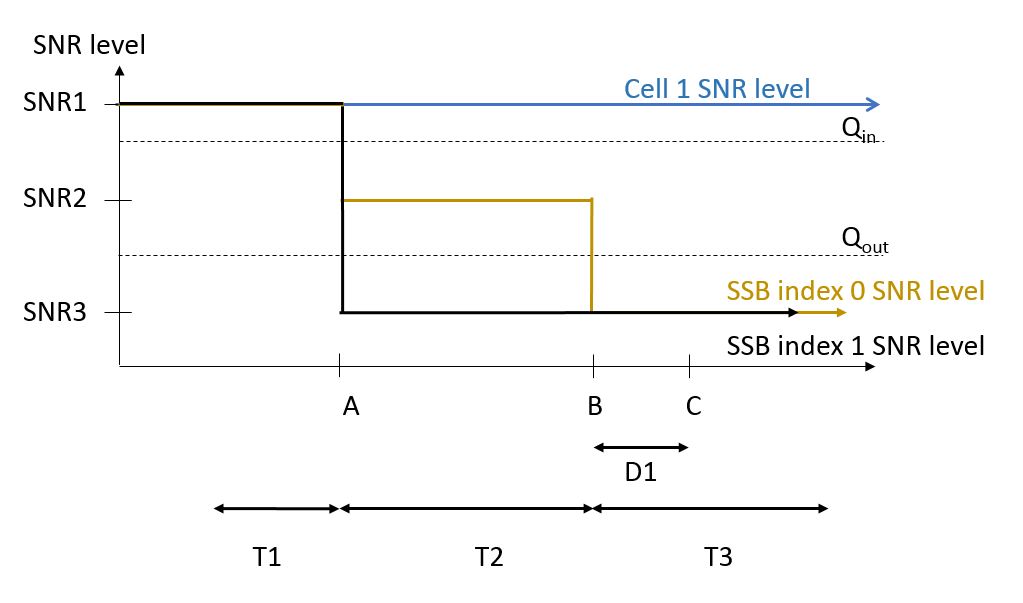


Figure A.5.5.1.x.1-1: SNR variation for out-of-sync testing



Figure A.5.5.1.x.1-2: Time multiplexed downlink transmissions

##### A.5.5.1.x.2 Test Requirements

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal in Cell 2 no later than time point C (D1 second after the start of the time duration T3).

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

# <End of Change 14>

# <Start of Change 15>

#### A.5.6.1.X EN-DC event triggered reporting test without gap under non-DRX when CD-SSB is outside active BWP

##### A.5.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of an event when CD-SSB is outside active BWP. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.5.6.1.1.1-1.

The test environment is the same as in A.5.6.1.1 with following exceptions in Table A.5.6.1.1.1-3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Intial BWP configuration |  | 1~4 | DLBWP.0.1  ULBWP.0.1 | | - | |
| Active DL BWP configuration |  | 1~4 | DLBWP.1.5 | | - | |
| Active UL BWP configuration |  | 1~4 | ULBWP.1.5 | | - | |

##### A.5.6.1.X.2 Test Requirements

The test requirements are the same as in A.5.6.1.1.2.

# <End of Change 15>

<Start of Change 16>

#### A.5.6.1.X EN-DC event triggered reporting test without gap under non-DRX

##### A.5.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.5.6.1.X.1-1.

Table A.5.6.1. X.1-1: supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE TDD, 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | |

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 and Cell 3 are given in Table A.5.6.1.X.1-2, A.5.6.1.X.1-3 and A.5.6.1.X.1-4 below.

The CD-SSB is configured outside active DL BWP and NCD-SSB is configured fully within active DL BWP of FR2 PSCell. In the measurement control information, a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of cell 3.

Table A.5.6.1.X.1-2: General test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap without DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Value | Comment |
| Active cell |  | 1~4 | E-UTRAN PCell (Cell 1)  PSCell (Cell 2) |  |
| Neighbour cell |  | 1~4 | Cell 3 | Cell to be identified. |
| RF Channel Number |  | 1~4 | 1: Cell 1  2: Cell 2 and Cell 3 | One TDD carrier frequency is used for the NR cells and one TDD or FDD carrier frequency is used for E-UTRAN cell. |
| SMTC configuration |  | 1~4 | SMTC.1 |  |
| A3-Offset | dB | 1~4 | -11 |  |
| CP length |  | 1~4 | Normal |  |
| Hysteresis | dB | 1~4 | 0 |  |
| Time To Trigger | s | 1~4 | 0 |  |
| Filter coefficient |  | 1~4 | 0 | L3 filtering is not used |
| DRX |  | 1~4 | OFF |  |
| Time offset between Cell 1 and Cell 2 |  | 1~4 | 3 μs | Synchronous EN-DC |
| Time offset between Cell 2 and Cell 3 |  | 1~4 | 3 μs | Synchronous cells |
| T1 | s | 1~4 | 5 |  |
| T2 | s | 1~4 | 5 |  |

Table A.5.6.1.X.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap without DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 |
| TDD configuration |  | 1~4 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 1~4 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1,2 | 24 | | 24 | |
| 3,4 | 48 | | 48 | |
| Intial BWP configuration |  | 1~4 | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1~4 | DLBWP.1.1 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1~4 | ULBWP.1.1 | | ULBWP.1.1 | |
| RLM-RS |  | 1~4 | SSB | | SSB | |
| PDSCH RMC configuration |  | 1,2 | SR.3.2 TDD | | N/A | |
| 3,4 | SR.3.3 TDD | |
| RMSI CORESET RMC configuration |  | 1,2 | CR.3.1 TDD | | N/A | |
| 3,4 | CR.3.2 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1,2 | CCR.3.1 TDD | | N/A | |
| 3,4 | CCR.3.7 TDD | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1~4 | 120 | | 120 | |
| OCNG Patterns |  | 1~4 | OP.5 | | N/A | |
| TRS configuration |  | 1~4 | TRS.2.1 TDD | | N/A | |
| PDSCH/PDCCH TCI state |  | 1~4 | TCI.State.2 | | N/A | |
| cellIndividualOffset | dB | 1~4 | N/A | | 16 | |
| SSB configuration |  | 1, 2 | SSB.3 FR2 | | SSB.7 FR2 | |
|  |  | 3, 4 | SSB.4 FR2 | | SSB.8 FR2 | |
| NCD-SSB configuration |  | 1, 2 | SSB.17 FR2 | | SSB.21 FR2 | |
|  |  | 3, 4 | SSB.18 FR2 | | SSB.22 FR2 | |
| Propagation Condition |  | 1~4 | No external noise (Note 1) | | No external noise (Note 1) | |
| Note 1: The downlink connection between the System Simulator and the UE is without Additive White Gaussian Noise, and has no fading or multipath effects as specified in TS 38.521-2 B.0 [40]. | | | | | | |

Table A.5.6.1.X.1-4: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 without gap without DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 |
| AoA setup |  | 1~4 | Setup 3 defined in A.3.15.3 | | | |
|  |  |  | **AoA1** | | **AoA2** | |
| Assumption for UE beamsNote 4 |  | 1~4 | Rough | | Rough | |
|  | dBm/SCS | 1, 2 | -89 | -89 | -Infinity | -89 |
|  |  | 3, 4 | -86 | -86 | -Infinity | -86 |
| BB Note 5 | dB | 1~4 | -0.12 | -0.12 | -Infinity | -0.12 |
| SSB\_RP | dBm/SCS | 1, 2 | -89 | -89 | -Infinity | -89 |
|  |  | 3, 4 | -86 | -86 | -Infinity | -86 |
|  | dBm/95.04MHz | 1,2 | -64.41 | -64.41 | -Infinity | -64.41 |
| 3,4 | -61.41 | -61.41 | -Infinity | -61.41 |
| Time multiplexing of the downlink transmissions from each AoA | | 1~4 | Defined in Figure A.5.6.1.1.1-1 | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Void  Note 3: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |



Figure A.5.6.1.1.1-1: Time multiplexed downlink transmissions (Config 1,2 example)

##### A.5.6.1.X.2 Test Requirements

In the test, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- 2.4s for a UE supporting power class 1,

- 1.44s for a UE supporting power class 2, 3 and 4

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

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

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

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

# <End of Change 16>

<Start of Change 17>

### A.5.6.3 L1-RSRP measurement for beam reporting

**--- Unchanged clauses omitted ---**

#### A.5.6.3.X CSI-RS based L1-RSRP measurement when DRX is not used and when CD-SSB is outside active BWP

##### A.5.6.3.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells in Table A.5.6.3.3.1-1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.5.6.3.3.

The test environment is the same as in A.5.6.3.3 with following exceptions in Table A.5.6.3.3.2-1.

The value of parameter “Dedicated BWP configuration” is DLBWP.1.2 and ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.5.6.3.3.3.

<End of Change 17>

# <Start of Change 18>

#### A.5.6.3.X SSB based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.5.6.3.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.5.6.3.1.1-1.

The test environment is the same as in A.5.6.3.1 with following exceptions in Table A.5.6.3.1.2-1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| Dedicated BWP configuration | 1~4 |  | DLBWP.1.5  ULBWP.1.5 |

##### A.5.6.3.X.2 Test Requirements

The test requirements are the same as in A.5.6.3.1.3.

# <End of Change 18>

<Start of Change 19>

#### A.5.6.3.x SSB based L1-RSRP measurement for UE supporting NCD-SSB based L1 measurement outside active BWP when DRX is not used

##### A.5.6.3.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.5.6.3.x.1.1-1.

The AoA setup for this test is Setup 1 as defined in clause A.3.15

Table A.5.6.3.x.1-1: Applicable NR configurations for FR2 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.5.6.3.x.2 Test parameters

There are two cells in the test, E-UTRAN PCell (Cell 1) and FR1 PSCell (Cell 2). The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 are given in Table A.5.6.3.x.2-1 and Table A.5.6.3.x.2-2 below.

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

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

Table A.5.6.3.x.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1~4 |  | freq1 |
| Duplex mode | 1~4 |  | TDD |
| TDD Configuration | 1~4 |  | TDDConf.3.1 |
| BWchannel | 1~4 | MHz | 100: NRB,c = 66 |
| Data RBs allocated | 1~4 |  | 66 |
| PDSCH Reference measurement channel | 1,2 |  | SR.3.2 TDD |
| 3,4 | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1,2 |  | CR.3.1 TDD |
| 3,4 | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1,2 |  | CCR.3.1 TDD |
| 3,4 | CCR.3.7 TDD |
| CD-SSB configuration | 1,2 |  | SSB.1 FR2 |
| 3,4 | SSB.2 FR2 |
| NCD-SSB configuration | 1,2 |  | SSB.x FR2 |
| 3,4 |  | SSB.y FR2 |
| OCNG Patterns | 1~4 |  | OP.1 |
| Initial BWP Configuration | 1~4 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~4 |  | [DLBWP.1.1 RedCap]  [ULBWP.1.1 RedCap] |
| SMTC configuration | 1~4 |  | [SMTC.2 RedCap] |
| TRS Configuration | 1~4 |  | TRS.2.1 TDD |
| PDCCH/PDSCH TCI Configuration | 1~4 |  | TCI.State.2 |
| DRX configuration | 1~4 |  | Off |
| reportConfigType | 1~4 |  | periodic |
| reportQuantity | 1~4 |  | ssb-Index-RSRP |
| Number of reported RS | 1~4 |  | 2 |
| L1-RSRP reporting period | 1~4 | slot | 320 |
| T1 | 1~4 | s | 5 |
| T2 | 1~4 | s | 2 |
| EPRE ratio of PSS to SSS | 1~4 | 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 | 1~4 |  | 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. | | | |

Table A.5.6.3.x.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Angle of arrival configuration |  |  | Setup 1 according to A.3.15.1 | | | |
| Assumption for UE beamsNote 4 | 1~4 |  | Rough | | | |
| Note2 | 1~4 | dBm/15kHz | -105 | | | |
| Note2 | 1,2 | dBm/SSB SCS | -96 | | | |
|  | 3,4 |  | -93 | | | |
|  | 1~4 | dB | 0 | 0 | -Infinity | 9 |
| SSB\_RP Note3 | 1,2 | dBm/SSB SCS | -96 | -96 | -Infinity | -87 |
|  | 3,4 |  | -93 | -93 | -Infinity | -84 |
| Io Note3 | 1,2 | dBm/95.04MHz | -63.97 | -63.97 | -66.98 | -57.47 |
|  | 3,4 |  | -63.97 | -63.97 | -66.98 | -57.47 |
|  | 1~4 | dB | 0 | 0 | -Infinity | 9 |
| 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: SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | |

##### A.5.6.3.x.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots. No later than X ms plus 320 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1, where X is

- [1680] for UE supporting power class 1

- [1200] for UE supporting power class 2,3 or 4.

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

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

# <End of Change 19>

<Start of Change 20>

A.6.3.1.X1 Intra-frequency handover from FR1 to FR1; known target cell configured with NCD-SSB

A.6.3.1.X1.1 Test Purpose and Environment

This test is to verify the requirement for the NR FR1-NR FR1 intra-frequency handover requirements specified in clause 6.1.1.2, when the target cell is configured with NCD-SSB.

A.6.3.1.X1.2 Test Parameters

Supported test configurations are shown in table A.6.3.1.X1.2-1. Both handover delay and interruption length are tested by using the parameters in table A.6.3.1.X1.2-2, and A.6.3.1.X1.2-3.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

Before the test starts,

- UE is connected to Cell 1 with active DL BWP and active UL BWP;

- UE is configured with *nonCellDefiningSSB-r17* under *BWP-DownlinkDedicated*, and NCD-SSB serves as the reference SSB for the serving cell, and is contained in the active DL BWP.

During T2, Cell 2 is switched ON, and transmits two SSBs, i.e. CD-SSB at SSB frequency 1 and NCD-SSB at SSB frequency 2. Before the test, UE is configured to measure SSB frequency 2. The test equipment shall send an RRC message implying handover to Cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

The start of T3 is defined as the end of the last TTI containing the RRC message implying handover. The handover command indicates the UE to handover to Cell 2 with *firstActiveDownlinkBWP-Id* configured to BWP-1. The UE then performs handover from Cell 1’s active DL-BWP associated with the NCD-SSB of Cell 1 to Cell 2’s BWP-1 which is associated with NCD-SSB of Cell 2.

**Table A.6.3.1.X1.2-1: Intra-frequency handover from FR1 to FR1 test configurations**

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

**Table A.6.3.1.X1.2-2: General test parameters Intra-frequency handover from FR1 to FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| SMTC configuration | |  | SMTC.1 | For SSB frequency 2. |
| Measurement gap configuration | |  | MG pattern #0, offset = 39 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

**Table A.6.3.1.X1.2-3: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | | | | **Cell 2** | | |
|  | | |  | **T1** | **T2** | **T3** | | **T1** | **T2** | **T3** |
| NR RF Channel Number | | |  | 1 | | | | 1 | | |
| 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 | MHz | 10: NRB,c = 52 | | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | | | |
| DRx Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 FDD | | | | | | |
| measurement channel | | 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 | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.1 FDD | | | | | | |
|  | | Config 2 |  | TRS.1.1 TDD | | | | | | |
|  | | Config 3 |  | TRS.1.2 TDD | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | |
| SSB Configuration | | Config 1 |  | SSB.1 FR1 for CD-SSB  SSB.5 FR1 for NCD-SSB | | | SSB.1 FR1 for CD-SSB  SSB.5 FR1 for NCD-SSB | | | |
| Config 2 |  | SSB.1 FR1 for CD-SSB  SSB.1 FR1 for NCD-SSB | | | SSB.1 FR1 for CD-SSB  SSB.1 FR1 for NCD-SSB | | | |
| Config 3 |  | SSB.2 FR1 for CD-SSB  SSB.2 FR1 for NCD-SSB | | | SSB.2 FR1 for CD-SSB  SSB.2 FR1 for NCD-SSB | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
|  | | Config 3 |  | 30 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
|  | | Config 3 |  | 30 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.3 | | | DLBWP.1.2 Note 4 | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.3 | | | ULBWP.1.2 | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | |
| Note2 | Config 1,2 | | dBm/SCS | -98 | | | | | | |
|  | Config 3 | |  | -95 | | | | | | |
|  | | | dB | 8 | -3.3 | -3.3 | | -Infinity | 2.36 | 2.36 |
|  | | | dB | 8 | 8 | 8 | | -Infinity | 11 | 11 |
| SSB\_RP | Config 1,2 | | dBm/SCS | -90 | -90 | -90 | | -Infinity | -87 | -87 |
|  | Config 3 | | dBm/SCS | -87 | -87 | -87 | | -Infinity | -84 | -84 |
| IoNote3 | Config 1,2 | | dBm/  9.36MHz | -61.41 | -57.06 | -57.06 | | -61.41 | -57.06 | -57.06 |
|  | Config 3 | | dBm/  38.16MHz | -55.31 | -50.96 | -50.96 | | -55.31 | -50.96 | -50.96 |
| Propagation condition | | | - | AWGN | | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: The starting PRB index for dedicated DL BWP is selected such that NCD-SSB is within the BWP BW. | | | | | | | | | | |

A.6.3.1.X1.3 Test Requirements

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

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

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

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

Tinterrupt = 62 ms in the test. Tinterrupt is defined in clause 6.1.1.2.2.

This gives a total of 72 ms.

# <End of Change 20>

<Start of Change 21>

A.6.3.1.Z1 Inter-frequency handover from FR1 to FR1; known target cell configured with NCD-SSB

A.6.3.1.Z1.1 Test Purpose and Environment

This test is to verify the requirement for the NR FR1-NR FR1 inter-frequency handover requirements specified in clause 6.1.1.2, when the target cell is configured with NCD-SSB.

A.6.3.1.Z1.2 Test Parameters

Supported test configurations are shown in table A.6.3.1.Z1.2-1. Both handover delay and interruption length are tested by using the parameters in table A.6.3.1.Z1.2-2, and A.6.3.1.Z1.2-3.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

Before the test starts,

- UE is connected to Cell 1 with active DL BWP and active UL BWP;

- UE is not configured with *nonCellDefiningSSB-r17* under *BWP-DownlinkDedicated*, and CD-SSB serves as the reference SSB for the serving cell, and is contained in the active DL BWP.

During T2, Cell 2 is switched ON, and transmits two SSBs, i.e. CD-SSB at SSB frequency 1 and NCD-SSB at SSB frequency 2. Before the test, UE is configured to measure SSB frequency 1. The test equipment shall send an RRC message implying handover to Cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

The start of T3 is defined as the end of the last TTI containing the RRC message implying handover. The handover command indicates the UE to handover to Cell 2 with *firstActiveDownlinkBWP-Id* configured to BWP-1. The UE then performs handover from Cell 1’s active DL-BWP associated with the CD-SSB of Cell 1 to Cell 2’s BWP-1 which is associated with NCD-SSB of Cell 2.

**Table A.6.3.1.Z1.2-1: Inter-frequency handover from FR1 to FR1 test configurations**

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

**Table A.6.3.1.Z1.2-2: General test parameters Inter-frequency handover from FR1 to FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| SMTC configuration | |  | SMTC.1 | For SSB frequency 1. |
| Measurement gap configuration | |  | MG pattern #0, offset = 39 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

**Table A.6.3.1.Z1.2-3: Cell specific test parameters for NR FR1-FR1 Inter frequency handover test case**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | | | | **Cell 2** | | |
|  | | |  | **T1** | **T2** | **T3** | | **T1** | **T2** | **T3** |
| NR RF Channel Number | | |  | 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 | | Config 1 | MHz | 10: NRB,c = 52 | | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | | | |
| BWP BW | | Config 1 | MHz | 10: NRB,c = 52 | | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | | | |
| DRx Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 FDD | | | | | | |
| measurement channel | | 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 | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.1 FDD | | | | | | |
|  | | Config 2 |  | TRS.1.1 TDD | | | | | | |
|  | | Config 3 |  | TRS.1.2 TDD | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | |
| SSB Configuration | | Config 1 |  | SSB.1 FR1 | | | SSB.1 FR1 for CD-SSB  SSB.5 FR1 for NCD-SSB | | | |
| Config 2 |  | SSB.1 FR1 | | | SSB.1 FR1 for CD-SSB  SSB.1 FR1 for NCD-SSB | | | |
| Config 3 |  | SSB.2 FR2 | | | SSB.2 FR1 for CD-SSB  SSB.2 FR1 for NCD-SSB | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
|  | | Config 3 |  | 30 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | | |
|  | | Config 3 |  | 30 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.3 | | | DLBWP.1.2 Note 4 | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.3 | | | ULBWP.1.2 | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | |
| Note2 | Config 1,2 | | dBm/SCS | -98 | | | | | | |
|  | Config 3 | |  | -95 | | | | | | |
|  | | | dB | 4 | 4 | 4 | | -Infinity | 5 | 5 |
|  | | | dB | 4 | 4 | 4 | | -Infinity | 5 | 5 |
| SSB\_RP | Config 1,2 | | dBm/SCS | -94 | -94 | -94 | | -Infinity | -93 | -93 |
|  | Config 3 | | dBm/SCS | -91 | -91 | -91 | | -Infinity | -90 | -90 |
| IoNote3 | Config 1,2 | | dBm/  9.36MHz | -64.59 | -64.59 | -64.59 | | -70.05 | -63.85 | -63.85 |
|  | Config 3 | | dBm/  38.16MHz | -58.49 | -58.49 | -58.49 | | -63.94 | -57.75 | -57.75 |
| Propagation condition | | | - | AWGN | | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: The starting PRB index for dedicated DL BWP is selected such that NCD-SSB is within the BWP BW. | | | | | | | | | | |

A.6.3.1.Z1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 92 ms from the beginning of time period T3.

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

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

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

Tinterrupt = 82 ms in the test. Tinterrupt is defined in clause 6.1.1.2.2.

This gives a total of 92 ms.

# <End of Change 21>

<Start of Change 22>

### A.6.5.1 Radio link Monitoring

**--- Unchanged clauses omitted ---**

#### A.6.5.1.X Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in non-DRX mode when CD-SSB is outside active BWP

##### A.6.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when no DRX is used and when CD-SSB is outside active BWP. This test will partly verify the FR1 PCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.6.5.1.5.

The test environment is the same as in A.6.5.1.5 with following exceptions in Table A.6.5.1.5.1-2.

The value of parameter “DL dedicated BWP configuration” is DLBWP.1.2. The value of parameter “UL dedicated BWP configuration” is ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as for A.6.5.1.5.2.

<End of Change 22>

# <Start of Change 23>

#### A.6.5.1.X Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode when CD-SSB is outside active BWP

##### A.6.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when CD-SSB is outside active BWP. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1.

The test environment is the same as in A.6.5.1.1 with following exceptions in Table A.6.5.1.1.1-2.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Value |
|  | |  | Test 1 |
| DL dedicated BWP configuration | Config 1, 2, 3 |  | DLBWP.1.2 |
| UL dedicated BWP configuration | Config 1, 2, 3 |  | ULBWP.1.2 |

##### A.6.5.1.X.2 Test Requirements

The test requirements are the same as in A.6.5.1.1.2.

# <End of Change 23>

# <Start of Change 24>

#### A.6.5.1.x Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode for UE supporting [FG 53-3]

##### A.6.5.1.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell for UE supporting FG 53-3. This test will partly verify the FR1 radio link monitoring requirements in clause 8.1.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.6.5.1.x.1-1. The test parameters are given in Tables A.6.5.1.x.1-2, A.6.5.1.x.1-3, and A.6.5.1.x.1-4 below. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.6.5.1.x.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.6.5.1.x.1-1: Supported test configurations for FR1 PCell for UE supporting FG 53-3

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 3 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 20 MHz |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.6.5.1.x.1-2: General test parameters for FR1 out-of-sync testing in non-DRX mode for UE supporting FG 53-3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| Duplex mode | | Config 1 |  | FDD |
| Config 2, 3 |  | TDD |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 |
|  | | Config 2 |  | 10: NRB,c = 52 |
|  | | Config 3 |  | 20: NRB,c = 51 |
| DL initial BWP configuration | | Config 1, 2, 3 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3 |  | [DLBWP.1.x] |
| UL initial BWP configuration | | Config 1, 2, 3 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3 |  | [ULBWP.1.x] |
| TDD Configuration | | Config 1 |  | Not Applicable |
|  | | Config 2 |  | TDDConf.1.1 |
|  | | Config 3 |  | TDDConf.2.1 |
| 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.1.3 FDD |
|  | | Config 2 |  | CCR.1.3 TDD |
|  | | Config 3 |  | CCR.2.2 TDD |
| CD-SSB Configuration | | Config 1 |  | SSB.1 FR1 |
|  | | Config 2 |  | SSB.1 FR1 |
|  | | Config 3 |  | [SSB.x FR1] |
| NCD-SSB Configuration | | Config 1 |  | [SSB.9 FR1] |
| Config 2 |  | [SSB.9 FR1] |
| Config 3 |  | [SSB.10 FR1] |
| SMTC Configuration | | Config 1, 2 |  | SMTC.1 |
|  | | Config 3 |  | [SMTC.1] |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 15 kHz |
|  | | Config 3 |  | 30 kHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.2.1-1 |
|  | | Config 3 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
|  | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 |  | CSI-RS.1.1 FDD |
|  | | Config 2 |  | CSI-RS.1.1 TDD |
|  | | Config 3 |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1 |  | TRS.1.1 FDD |
|  | | Config 2 |  | TRS.1.1 TDD |
|  | | Config 3 |  | TRS.1.2 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.48 |
| T3 | | | s | 0.48 |
| D1 | | | s | 0.44 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.6.5.1.x.1-3: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in non-DRX mode for UE supporting FG 53-3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 |
|  | Config 2 |  | 1 | -7 | -15 |
|  | Config 3 |  | 1 | -7 | -15 |
|  | Config 1 | dBm/15kHz | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -98 | | |
|  | Config 1 | dBm/SCS | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -95 | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1.x.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. | | | | | |

Table A.6.5.1.x.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
|  | Value |
| gapOffset | 0 |
| Note: Ensure that RLM RS is partially overlapped with measurement gap | |

****

**Figure A.6.5.1.x.1-1: SNR variation for out-of-sync testing**

##### A.6.5.1.x.2 Test Requirements

The UE behaviour in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

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

# <End of Change 24>

# <Start of Change 25>

#### A.6.6.1.X SA event triggered reporting tests without gap under non-DRX when CD-SSB is outside active BWP

##### A.6.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of an event when CD-SSB is outside active BWP. This test will partly verify the intra-frequency cell search requirements in clauses 9.2.5.1 and 9.2.5.2.

The test environment is the same as in A.6.6.1.1 with following exceptions in Table Table A.6.6.1.1.2-3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | - | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | - | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | - | |

##### A.6.6.1.X.2 Test Requirements

The test requirements are the same as in A.6.6.1.1.3.

# <End of Change 25>

<Start of Change 26>

#### A.6.6.1.X SA event triggered reporting tests without gap under non-DRX with NCD-SSB

##### A.6.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements when NCD-SSB is configured in clauses 9.2.5.1 and 9.2.5.2.

##### A.6.6.1.X.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for PCell and neighbour cell are given in Table A.6.6.1.X.1-1 and A.6.6.1.X.1-2 below. The CD-SSB is configured outside active DL BWP and NCD-SSB is configured fully within active DL BWP of FR1 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. 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.

Table A.6.6.1.X.1.2-1: 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. | |

Table A.6.6.1.X.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 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 |  |
| CD-SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| NCD-SSB configuration |  | 1 | SSB.9 FR1 |  |
|  |  | 2 | SSB.9 FR1 |  |
|  |  | 3 | SSB.10 FR1 |  |
| SMTC configuration for NCD-SSB |  | 1 | SMTC.11 |  |
|  | 2 | SMTC.10 |  |
|  | 3 | SMTC.10 |  |
| 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 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 |  |
| Note 1: The starting PRB index of the CD-SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.  Note 2: The starting PRB index of the NCD-SSB can be the same as the starting PRB index for DL active BWP. | | | | |

Table A.6.6.1.X.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| 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.1.1 FDD | | N/A | |
|  | 2 | CCR.1.1 TDD | | N/A | |
|  | 3 | CCR.2.1 TDD | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| IInitial 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 | NCD-SSB | | NCD-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. | | | | | | |

##### A.6.6.1.X.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

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

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

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

<End of Change 26>

# <Start of Change 27>

#### A.6.6.4.X SSB based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.6.6.4.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.6.6.4.1.1-1.

The test environment is the same as in A.6.6.4.1 with following exceptions in Table A.6.6.4.1.2-1.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.2  ULBWP.1.2 |

##### A.6.6.4.X.2 Test Requirements

The test requirements are the same as in A.6.6.4.1.3.

# <End of Change 27>

<Start of Change 28>

### A.6.6.4 L1-RSRP measurement for beam reporting

**--- Unchanged clauses omitted ---**

#### A.6.6.4.X CSI-RS based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.6.6.4.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells in Table A.6.6.4.3.1-1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.6.6.4.3.

The test environment is the same as in A.6.6.4.3.2 with following exceptions in Table Table A.6.6.4.3.2-1.

The value of parameter “Dedicated BWP configuration” is DLBWP.1.2 and ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.6.6.4.3.3.

<End of Change 28>

# <Start of Change 29>

#### A.6.6.4.x SSB based L1-RSRP measurement for UE supporting NCD-SSB based L1 measurement outside active BWP when DRX is not used

##### A.6.6.4.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.6.6.4.x.1-1.

Table A.6.6.4.x.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, 20 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

##### A.6.6.4.x.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.6.6.4.x.2-1 and Table A.6.6.4.x.2-2 below.

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

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

Table A.6.6.4.x.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| 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 |
| CD-SSB configuration | 1 |  | SSB.3 FR1 |
|  | 2 |  | SSB.3 FR1 |
|  | 3 |  | SSB.4 FR1 |
| NCD-SSB configuration | 1 |  | [SSB.9 FR1] |
| 2 | [SSB.9 FR1] |
| 3 | [SSB.10 FR1] |
| OCNG Patterns | 1~3 |  | OP.1 |
| SMTC configuration for NCD-SSB | 1~3 |  | [SMTC.2 RedCap] |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | [DLBWP.1.1 RedCap]  [ULBWP.1.1 RedCap] |
| 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.  Note 2:NCD-SSB is configured within dedicated DL BWP. | | | |

Table A.6.6.4.x.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 |
| SSB RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -94.65 | -Infinity | -91.65 |
|  | 3 |  | -91.65 | -91.65 | -Infinity | -88.65 |
| Io Note3 | 1,2 | dBm/9.36 MHz | -63.69 | -63.69 | -66.70 | -61.93 |
|  | 3 | dBm/18.36 MHz | -60.77 | -60.77 | -63.78 | -59.01 |
|  | 1~3 | dB | 0 | 0 | -Infinity | 3 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |

##### A.6.6.4.x.3 Test Requirements

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

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.

# <End of Change 29>

<Start of Change 30>

A.7.3.1.X1 Intra-frequency handover from FR2 to FR2; known target cell configured with NCD-SSB

A.7.3.1.X1.1 Test Purpose and Environment

This test is to verify the requirement for the NR FR2-NR FR2 intra-frequency handover requirements specified in clause 6.1.1.4, when the target cell is configured with NCD-SSB.

A.7.3.1.X1.2 Test Parameters

Supported test configurations are shown in table A.7.3.1.X1.2-1. Both handover delay and interruption length are tested by using the parameters in table A.7.3.1.X1.2-2, and A.7.3.1.X1.2-3.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

Before the test starts,

- UE is connected to Cell 1 with active DL BWP and active UL BWP;

- UE is configured with *nonCellDefiningSSB-r17* under *BWP-DownlinkDedicated*, and NCD-SSB serves as the reference SSB for the serving cell, and is contained in the active DL BWP.

During T2, Cell 2 is switched ON, and transmits two SSBs, i.e. CD-SSB at SSB frequency 1 and NCD-SSB at SSB frequency 2. Before the test, UE is configured to measure SSB frequency 2. The test equipment shall send an RRC message implying handover to Cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

The start of T3 is defined as the end of the last TTI containing the RRC message implying handover. The handover command indicates the UE to handover to Cell 2 with *firstActiveDownlinkBWP-Id* configured to BWP-1. The UE then performs handover from Cell 1’s active DL-BWP associated with the NCD-SSB of Cell 1 to Cell 2’s BWP-1 which is associated with NCD-SSB of Cell 2.

**Table A.7.3.1.X1.2-1: Intra-frequency handover from FR2 to FR2 test configurations**

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

**Table A.7.3.1.X1.2-2: General test parameters Intra-frequency handover from FR2 to FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| SMTC configuration | |  | SMTC.1 | For SSB frequency 2. |
| Measurement gap configuration | |  | MG pattern #13, offset = 39 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

**Table A.7.3.1.X1.2-3: Cell specific test parameters for NR FR2-FR2 Intra frequency handover test case**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | | | | Cell 2 | | |
|  | |  | T1 | T2 | T3 | | T1 | T2 | T3 |
| Assumption for UE beamsNote 6 | |  | Rough | | | | Rough | | |
| AoA setup | |  | Setup 1 as defined in A.3.15 | | | | | | |
| NR RF Channel Number | |  | 1 | | | | 1 | | |
| Duplex mode | |  | TDD | | | | | | |
| TDD configuration | |  | TDDConf.3.1 | | | | | | |
| BWchannel | | MHz | 100: NRB,c = 66 | | | | | | |
| BWP BW | | MHz | 100: NRB,c = 66 | | | | | | |
| Data RBs allocated | |  | 66 | | | | | | |
| DRx Cycle | | ms | Not Applicable | | | | | | |
| PDSCH Reference measurement channel | |  | SR3.1 TDD | | | | | | |
| RMSI CORESET Reference Channel | |  | CR3.1 TDD | | | | | | |
| Control Channel RMC | |  | CCR.3.1 TDD | | | | | | |
| OCNG Patterns | |  | OP. 1 | | | | | | |
| SSB Configuration | |  | SSB. 3 FR2 for CD-SSB  SSB. 3 FR2 for NCD-SSB | | | SSB. 3 FR2 for CD-SSB  SSB. 3 FR2 for NCD-SSB | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 120 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 120 kHz | | | | | | |
| PRACH configuration | |  | FR2 PRACH configuration 1 | | | | | | |
| TRS configuration | |  | TRS.2.1 TDD | | | | | | |
| PDSCH/PDCCH TCI state | |  | TCI.State.2 | | | | | | |
| BWP configuraiton | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | Dedicated DL BWP |  | DLBWP.1.3 | | | DLBWP.1.2 Note 7 | | | |
|  | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | Dedicated UL BWP |  | ULBWP.1.3 | | | ULBWP.1.2 | | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  | | | |  | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  | | | |  | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PDSCH to PDSCH | |  |  | | | |  | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  | | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  | | | |  | | |
| Note2 | | dBm/15kHz | -104.7 | | | | -104.7 | | |
| Note2 |  | dBm/SCS | -95.7 | | | | -95.7 | | |
|  | | dB | 6 | -1.8 | -1.8 | | -Infinity | 0 | 0 |
|  | | dB | 6 | 6 | 6 | | -Infinity | 7 | 7 |
| IoNote3 | Config 1,2 | dBm/  BW | -59.7 | -56.7 | -56.7 | | -59.7 | -56.7 | -56.7 |
| Propagation condition | | - | AWGN | | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 7: The starting PRB index for dedicated DL BWP is selected such that NCD-SSB is within the BWP BW. | | | | | | | | | |

A.7.3.1.X1.3 Test Requirements

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

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

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

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

Tinterrupt = 62 ms in the test. Tinterrupt is defined in clause 6.1.1.4.2.

This gives a total of 72 ms.

# <End of Change 30>

<Start of Change 31>

A.7.3.1.Z1 Inter-frequency handover from FR2 to FR2; known target cell configured with NCD-SSB

A.7.3.1.Z1.1 Test Purpose and Environment

This test is to verify the requirement for the NR FR2-NR FR2 inter-frequency handover requirements specified in clause 6.1.1.4, when the target cell is configured with NCD-SSB.

A.7.3.1.Z1.2 Test Parameters

Supported test configurations are shown in table A.7.3.1.Z1.2-1. Both handover delay and interruption length are tested by using the parameters in table A.7.3.1.Z1.2-2, and A.7.3.1.Z1.2-3.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

Before the test starts,

- UE is connected to Cell 1 with active DL BWP and active UL BWP;

- UE is not configured with *nonCellDefiningSSB-r17* under *BWP-DownlinkDedicated*, and CD-SSB serves as the reference SSB for the serving cell, and is contained in the active DL BWP.

During T2, Cell 2 is switched ON, and transmits two SSBs, i.e. CD-SSB at SSB frequency 1 and NCD-SSB at SSB frequency 2. Before the test, UE is configured to measure SSB frequency 1. The test equipment shall send an RRC message implying handover to Cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3.

The start of T3 is defined as the end of the last TTI containing the RRC message implying handover. The handover command indicates the UE to handover to Cell 2 with *firstActiveDownlinkBWP-Id* configured to BWP-1. The UE then performs handover from Cell 1’s active DL-BWP associated with the CD-SSB of Cell 1 to Cell 2’s BWP-1 which is associated with NCD-SSB of Cell 2.

**Table A.7.3.1.Z1.2-1: Inter-frequency handover from FR2 to FR2 test configurations**

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

**Table A.7.3.1.Z1.2-2: General test parameters Inter-frequency handover from FR2 to FR2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 |  |
| Final condition | Active cell |  | Cell 2 |  |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| SMTC configuration | |  | SMTC.1 | For SSB frequency 1. |
| Measurement gap configuration | |  | MG pattern #13, offset = 39 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

**Table A.7.3.1.Z1.2-3: Cell specific test parameters for NR FR2-FR2 Inter frequency handover test case**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | | | | Cell 2 | | |
|  | |  | T1 | T2 | T3 | | T1 | T2 | T3 |
| Assumption for UE beamsNote 6 | |  | Rough | | | | Rough | | |
| AoA setup | |  | Setup 1as defined in A.3.15 | | | | | | |
| NR RF Channel Number | |  | **1** | | | | **2** | | |
| Duplex mode | |  | TDD | | | | | | |
| TDD configuration | |  | TDDConf.3.1 | | | | | | |
| BWchannel | | MHz | 100: NRB,c = 66 | | | | | | |
| BWP BW | | MHz | 100: NRB,c = 66 | | | | | | |
| Data RBs allocated | |  | 66 | | | | | | |
| DRx Cycle | | ms | Not Applicable | | | | | | |
| PDSCH Reference measurement channel | |  | SR3.1 TDD | | | | | | |
| RMSI CORESET Reference Channel | |  | CR3.1 TDD | | | | | | |
| Control Channel RMC | |  | CCR.3.1 TDD | | | | | | |
| OCNG Patterns | |  | OP. 1 | | | | | | |
| SSB Configuration | |  | SSB. 3 FR2 | | | SSB. 3 FR2 for CD-SSB  SSB. 3 FR2 for NCD-SSB | | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 120 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 120 kHz | | | | | | |
| PRACH configuration | |  | FR2 PRACH configuration 1 | | | | | | |
| TRS configuration | |  | TRS.2.1 TDD | | | | | | |
| PDSCH/PDCCH TCI state | |  | TCI.State.2 | | | | | | |
| BWP configuraiton | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | Dedicated DL BWP |  | DLBWP.1.3 | | | DLBWP.1.2 Note 7 | | | |
|  | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | Dedicated UL BWP |  | ULBWP.1.3 | | | ULBWP.1.2 | | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  | | | |  | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  | | | |  | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  | | | |  | | |
| EPRE ratio of PDSCH to PDSCH | |  |  | | | |  | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  | | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  | | | |  | | |
| Note2 | | dBm/15kHz | -104.7 | | | | -104.7 | | |
| Note2 |  | dBm/SCS | -95.7 | | | | -95.7 | | |
|  | | dB | 5 | 5 | 5 | | -Infinity | 5 | 5 |
|  | | dB | 5 | 5 | 5 | | -Infinity | 5 | 5 |
| IoNote3 | Config 1,2 | dBm/  BW | -60.5 | -60.5 | -60.5 | | -66.7 | -60.5 | -60.5 |
| Propagation condition | | - | AWGN | | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 7: The starting PRB index for dedicated DL BWP is selected such that NCD-SSB is within the BWP BW. | | | | | | | | | |

A.7.3.1.Z1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 92 ms from the beginning of time period T3.

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

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

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

Tinterrupt = 82 ms in the test. Tinterrupt is defined in clause 6.1.1.4.2.

This gives a total of 92 ms.

# <End of Change 31>

<Start of Change 32>

### A.7.5.1 Radio link Monitoring

**--- Unchanged clauses omitted ---**

#### A.7.5.1.X Radio Link Monitoring Out-of-sync Test for FR2 PCell configured with CSI-RS-based RLM in non-DRX mode when CD-SSB is outside active BWP

##### A.7.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync for the purpose of monitoring downlink CSI-RS based radio link quality of the PCell when no DRX is used and when CD-SSB is outside active BWP. This test will partly verify the FR2 PCell CSI-RS Out-of-sync radio link monitoring requirements in clause 8.1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.7.5.1.5.

The test environment is the same as in A.7.5.1.5.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.7.5.1.5.2.

<End of Change 32>

# <Start of Change 33>

#### A.7.5.1.X Radio Link Monitoring Out-of-sync Test for FR2 PCell configured with SSB-based RLM RS in non-DRX mode when CD-SSB is outside active BWP

##### A.7.5.1.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell when CD-SSB is outside active BWP. This test will partly verify the FR2 radio link monitoring requirements in clause 8.1.

The test environment is the same as in A.7.5.1.1 with following exceptions in Table A.7.5.1.1.1-2.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** |
| **Test 1** |
| DL dedicated BWP configuration | Config 1 |  | DLBWP.1.5 |
| UL dedicated BWP configuration | Config 1 |  | ULBWP.1.5 |

##### A.7.5.1.X.2 Test Requirements

The test requirements are the same as in A.7.5.1.1.2.

# <End of Change 33>

# <Start of Change 34>

#### A.7.5.1.x Radio Link Monitoring Out-of-sync Test for FR2 PCell configured with SSB-based RLM RS in non-DRX mode for UE supporting [FG 53-3]

##### A.7.5.1.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects the out of sync and in sync for the purpose of monitoring downlink radio link quality of the PCell. This test will partly verify the FR2 radio link monitoring requirements in clause 8.1.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.7.5.1.x .1-1. The test parameters are given in Tables A.7.5.1.x .1-2, A.7.5.1.x .1-3, and A.7.5.1.x .1-4 below. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.7.5.1.x .1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states, and Figure A.7.5.1.x .1-2 shows the Time multiplexed downlink transmissions from each Angle of Arrival. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In addition to RLM-RS radio link monitoring using SSB index 0 and SSB index 1, the UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.7.5.1.x .1-1: Supported test configurations for FR2 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD, SSB SCS 120 KHz, data SCS 120KHz, BW 100 MHz |

Table A.7.5.1.x .1-2: General test parameters for FR2 out-of-sync testing in non-DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** |
| **Test 1** |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| Duplex mode | | Config 1 |  | TDD |
| BWchannel | | Config 1 |  | 100: NRB,c = 66 |
| Data RBs allocated | | Config 1 |  | 24 |
| DL initial BWP configuration | | Config 1 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1 |  | [DLBWP.1.x] |
| UL initial BWP configuration | | Config 1 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1 |  | [ULBWP.1.x] |
| TDD Configuration | | Config 1 |  | TDDConf.3.1 |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.3.1 TDD |
| Dedicated CORESET Reference Channel | | Config 1 |  | CCR.3.4 TDD |
| CD-SSB Configuration | | Config 1 |  | SSB.1 FR2 |
| NCD-SSB Configuration | | Config 1 |  | [SSB.x FR2] |
| SMTC Configuration | | Config 1 |  | [SMTC.1] |
| PDSCH/PDCCH subcarrier spacing | | Config 1 |  | 120 KHz |
| PRACH Configuration | | Config 1 |  | Table A.3.8.3.4 |
| SSB index assigned as RLM RS | | Config 1 |  | 0,1 |
| OCNG parameters | | |  | OP.5 |
| CP length | | |  | Normal |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
| Number of Control OFDM symbols | |  | 2 |
| Aggregation level | | CCE | 8 |
| Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
| Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
| DMRS precoder granularity | |  | REG bundle size |
| REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS for CSI reporting | | Config 1 |  | CSI-RS.3.1 TDD |
| reportConfigType | | |  | periodic |
| reportQuantity | | |  | cri-RI-PMI-CQI |
| CSI reporting periodicity | | | slot | 40 |
| CSI reporting offset | | | slot | 4 |
| TCI states for PDCCH/PDSCH | | |  | TCI.State.2 |
| CSI-RS for tracking | | Config 1 |  | TRS.2.1 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 9.68 |
| T3 | | | s | 9.68 |
| D1 | | | s | 9.64 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.7.5.1.x .1-3: OTA related cell specific test parameters for FR2 (Cell 1) for out-of-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | | |
|  | |  | T1 | T2 | T3 | T1 | T2 | T3 |
| AoA setup | |  | Setup 3 defined in A.3.15 | | | | | |
|  | |  | AoA1 | | | AoA2 | | |
| Assumption for UE beams Note 5 | |  | Rough | | | Rough | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | | Not sent | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |  | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |  | | |
| ssb-Index 0 SNR | Config 1 | dB | 2Note 6 | -6Note 6 | -15 |  | | |
| ssb-Index 1 SNR | Config 1 |  | Not sent | | | 2Note 6 | -15 | -15 |
|  | Config 1 | dBm/ 15kHz | -92.1 | | | -92.1 | | |
| Time multiplexing of the downlink transmissions from each AoA | |  | Defined in Figure A.7.5.1.x .1-2 | | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | | | TDL-A 30ns 75Hz | | |
| Note 1: OCNG shall be used such a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR values are specified for testing a UE which supports 2RX on at least one band..  Note 5: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation.  Note 6: This value allows up to 1dB degradation from applied SNR to UE baseband | | | | | | | | |

Table A.7.5.1.x .1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

|  |  |
| --- | --- |
| Field | Test 1 |
| Value |
| gapOffset | 0 |

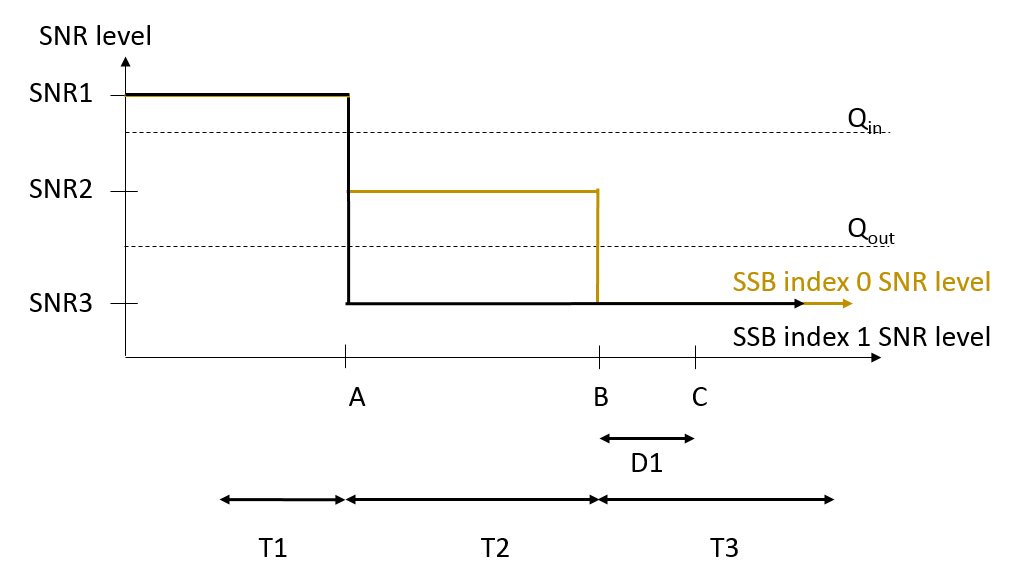


Figure A.7.5.1.x .1-1: SNR variation for out-of-sync testing



Figure A.7.5.1.x .1-2: Time multiplexed downlink transmissions

##### A.7.5.1.x.2 Test Requirements

The UE behavior in each test during time durations T1, T2 and T3 shall be as follows:

During the period from time point A to time point B the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

The UE shall stop transmitting uplink signal no later than time point C (D1 second after the start of the time duration T3).

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

# <End of Change 34>

# <Start of Change 35>

#### A.7.6.1.X SA event triggered reporting test without gap under non-DRX when CD-SSB is outside active BWP

##### A.7.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of an event when CD-SSB is outside active BWP. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.7.6.1.1.1-1.

The test environment is the same as in A.7.6.1.1 with following exceptions in Table A.7.6.1.1.1-3.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Intial BWP configuration |  | 1, 2 | DLBWP.0.1  ULBWP.0.1 | | - | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.5 | | - | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.5 | | - | |

##### A.7.6.1.X.2 Test Requirements

The test requirements are the same as in A.7.6.1.1.2.

# <End of Change 35>

<Start of Change 36>

#### A.7.6.1.X SA event triggered reporting test without gap under non-DRX with NCD-SSB

##### A.7.6.1.X.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements when NCD-SSB is configured in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.7.6.1.X.1-1.

Table A.7.6.1.X.1-1: supported test configurations

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

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for the Cell 1 and Cell 2 are given in Table A.7.6.1.X.1-2, A.7.6.1.X.1-3 and A.7.6.1.X.1-4 below.

The CD-SSB is configured outside active DL BWP and NCD-SSB is configured fully within active DL BWP of FR1 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.

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.

Table A.7.6.1.X.1-2: General test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 without gap without DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Value | Comment |
| Active cell |  | 1, 2 | PCell (Cell 1) |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | One TDD carrier frequency is used for the NR cells. |
| SMTC configuration for CD-SSB |  | 1, 2 | SMTC.1 |  |
| SMTC configuration for NCD-SSB |  | 1, 2 | SMTC.10 |  |
| A3-Offset | dB | 1, 2 | -11 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX |  | 1, 2 | OFF |  |
| Time offset between Cell 1 and Cell 2 |  | 1, 2 | 3 μs | Synchronous cells |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

Table A.7.6.1.X.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 without gap without DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| TDD configuration |  | 1, 2 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 1, 2 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1 | 24 | | 24 | |
| 2 | 48 | | 48 | |
| Intial BWP configuration |  | 1, 2 | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.2 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.2 | |
| RLM-RS |  | 1, 2 | SSB | | SSB | |
| PDSCH RMC configuration |  | 1 | SR.3.2 TDD | | N/A | |
| 2 | SR.3.3 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | N/A | |
| 2 | CR.3.2 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | N/A | |
| 2 | CCR.3.7 TDD | | N/A | |
| PDSCH/PDCCH TCI states |  | 1, 2 | TCI.State.0 | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 120 | | 120 | |
| OCNG Patterns |  | 1, 2 | OP.5 | | N/A | |
| cellIndividualOffset | dB | 1~2 | N/A | | 16 | |
| CD-SSB |  | 1 | SSB.3 FR2 | | SSB.3 FR2 | |
|  | 2 | SSB.4 FR2 | | SSB.4 FR2 | |
| NCD-SSB |  | 1 | SSB.17 FR2 | | SSB.21 FR2 | |
|  | 2 | SSB.18 FR2 | | SSB.22 FR2 | |
| Propagation Condition |  | 1, 2 | AWGN | | AWGN | |
| Note 1: The starting PRB index of the CD-SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.  Note 2: The starting PRB index of the NCD-SSB can be the same as the starting PRB index for DL active BWP. | | | | | | |

Table A.7.6.1.X.1-4: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 without gap without DRX

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 1 | | Cell 2 | | |
|  |  |  | T1 | T2 | T1 | | T2 |
| AoA setup |  | 1, 2 | Setup 3 defined in A.3.15.3 | | | | |
|  |  |  | AoA1 | | AoA2 | | |
| Beam assumptionNote 4 |  | 1,2 | Rough | | Rough | | |
| Es | dBm/SCS | 1 | -89 | -89 | | -Infinity | -89 |
|  |  | 2 | -86 | -86 | | -Infinity | -86 |
| BB Note 5 | dB | 1, 2 | -0.12 | -0.12 | | -Infinity | -0.12 |
| SSB\_RP | dBm/SCS | 1 | -89 | -89 | -Infinity | | -89 |
|  |  | 2 | -86 | -86 | -Infinity | | -86 |
|  | dBm/95.04MHz | 1 | -64.41 | -64.41 | -Infinity | | -64.41 |
| 2 | -61.41 | -61.41 | -Infinity | | -61.41 |
| Time multiplexing of the downlink transmissions from each AoA | | 1, 2 | Defined in Figure A.7.6.1.X.1-1 | | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Void  Note 3: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | | |



Figure A.7.6.1.X.1-1: Time multiplexed downlink transmissions (Config 1 example)

##### A.7.6.1.X.2 Test Requirements

In the test, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- [6.4s] for a UE supporting power class 1,

- [3.84s] for a UE supporting power class 2, 3 and 4

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

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

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

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

<End of Change 36>

<Start of Change 37>

### A.7.6.3 L1-RSRP measurement for beam reporting

**--- Unchanged clauses omitted ---**

#### A.7.6.3.X CSI-RS based L1-RSRP measurement when DRX is not used and when CD-SSB is outside active BWP

##### A.7.6.3.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells in Table A.7.6.3.3.1-1.

The test is for UE supporting *rlm-BM-BFD-CSI-RS-OutsideActiveBWP-r18* and the UE is not required past legacy test in A.7.6.3.3.

The test environment is the same as in A.7.6.3.3 with following exceptions in Table A.7.6.3.3.2-1.

The value of parameter “Dedicated BWP configuration” is DLBWP.1.2 and ULBWP.1.2.

Note: The starting PRB index of the SSB can be any possible PRB index of the RF channel BW occurring after the last PRB of the DL active BWP.

The test requirements are the same as in A.7.6.3.3.3.

<End of Change 37>

# <Start of Change 38>

#### A.7.6.3.X SSB based L1-RSRP measurement when DRX is not used when CD-SSB is outside active BWP

##### A.7.6.3.X.1 Test Purpose and Environment

The purpose of this test is to verify that the UE supporting *bwpOperationMeasWithoutInterrupt-r18* makes correct reporting of L1-RSRP measurement when CD-SSB is outside active BWP. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.7.6.3.1.1-1.

The test environment is the same as in A.7.6.3.1 with following exceptions in Table A.7.6.3.1.2-1.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.5  ULBWP.1.5 |

##### A.7.6.3.X.2 Test Requirements

The test requirements are the same as in A.7.6.3.1.3.

# <End of Change 38>

# <Start of Change 39>

#### A.7.6.3.x SSB based L1-RSRP measurement for UE supporting NCD-SSB based L1 measurement outside active BWP when DRX is not used

##### A.7.6.3.x.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.1, with the testing configurations for NR cells in Table A.7.6.3.x.1-1.

The AoA setup for this test is Setup 1 as defined in clause A.3.15

Table A.7.6.3.x.1-1: Applicable NR configurations for FR2 SSB based L1-RSRP test

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

##### A.7.6.3.x.2 Test parameters

There is one cells in the test, the FR2 PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.7.6.3.x.2-1 and Table A.7.6.3.x.2-2 below.

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

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

Table A.7.6.3.x.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~2 |  | freq1 |
| Duplex mode | 1~2 |  | TDD |
| TDD Configuration | 1~2 |  | TDDConf.3.1 |
| BWchannel | 1~2 | MHz | 100: NRB,c = 66 |
| Data RBs allocated | 1~2 |  | 66 |
| PDSCH Reference measurement channel | 1 |  | SR.3.2 TDD |
| 2 | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.3.1 TDD |
| 2 | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.3.1 TDD |
| 2 | CCR.3.7 TDD |
| CD-SSB configuration | 1 |  | SSB.1 FR2 |
|  | 2 | SSB.2 FR2 |
| NCD-SSB configuration | 1 |  | SSB.x FR2 |
| 2 | SSB.y FR2 |
| OCNG Patterns | 1~2 |  | OP.1 |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~2 |  | [DLBWP.1.1 RedCap]  [ULBWP.1.1 RedCap] |
| SMTC configuration for NCD-SSB | 1~2 |  | [SMTC.2 RedCap] |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 |
| DRX configuration | 1~2 |  | Off |
| reportConfigType | 1~2 |  | periodic |
| reportQuantity | 1~2 |  | ssb-Index-RSRP |
| Number of reported RS | 1~2 |  | 2 |
| L1-RSRP reporting period | 1~2 | slot | 320 |
| T1 | 1~2 | s | 5 |
| T2 | 1~2 | s | 2 |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |
| Propagation condition | 1~2 |  | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: NCD-SSB is configured within dedicated BWP. | | | |

Table A.7.6.3.x.2-2: SSB specific test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | | SSB#1 | |
|  |  |  | T1 | T2 | T1 | T2 |
| Angle of arrival configuration |  |  | Setup 1 according to A.3.15.1 | | | |
| Beam AssumptionNote 4 | 1-2 |  | Rough | | | |
| Note2 | 1~2 | dBm/15kHz | -105 | | | |
| Note2 | 1 | dBm/SSB SCS | -96 | | | |
|  | 2 |  | -93 | | | |
|  | 1~2 | dB | 0 | 0 | -Infinity | 9 |
| SSB\_RP Note3 | 1 | dBm/SSB SCS | -96 | -96 | -Infinity | -87 |
|  | 2 |  | -93 | -93 | -Infinity | -84 |
| Io Note3 | 1 | dBm/95.04MHz | -63.97 | -63.97 | -66.98 | -57.47 |
|  | 2 | -63.97 | -63.97 | -66.98 | -57.47 |
|  | 1~2 | dB | 0 | 0 | -Infinity | 9 |
| 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: SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | |

##### A.7.6.3.x.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots. No later than X ms plus 320 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0 and SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1, where X is

- [1680] for UE supporting power class 1

- [1200] for UE supporting power class 2,3 or 4.

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

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

# <End of Change 39>