**3GPP TSG- Meeting #99-e**

**Electronic Meeting, May 19 – 27, 2021**

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

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|  | | | | | | | | | | |
| ***Title:*** | Big CR 38.133: Introduction of Rel-16 MR-DC Direct SCell activation and SCell dormancy RRM performance requirements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Perf | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Test cases for Direct SCell activation and SCell dormancy are missing.  It has been agreed that introduction of test cases for Direct SCell activation and SCell dormancy to TS 38.133 shall be handled through a big CR.  This Big CR is based on the Draft Big CR R4-2105742 which was endorsed at RAN4#98-bis-e. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | RAN4#98e: Created big DraftCR by aggregation of the following endorsed DraftCRs.  Direct SCell activation:   * R4-2103557 (TC1): Updated clause (A.4.5.3.5) * R4-2103558 (TC2): Updated clause (A.5.5.3.7) * R4-2103559 (TC3): Updated clause (A.6.5.3.4) * R4-2103560 (TC4): Updated clause (A.7.5.3.4) * R4-2103561 (TC5): Updated clause (A.6.5.3.5) * R4-2103562 (TC6): Updated clause (A.7.5.3.5)   SCell dormancy:   * R4-2103564 (TC1): Updated clause (A.4.5.6.4.1) * R4-2103565 (TC2): Updated clause (A.4.5.6.4.2) * R4-2103566 (TC3): Updated clause (A.5.5.6.4.1) * R4-2103567 (TC4): Updated clause (A.5.5.6.4.2) * R4-2103568 (TC5): Updated clause (A.6.5.6.4.1) * R4-2103569 (TC6): Updated clause (A.6.5.6.4.2) * R4-2103570 (TC7): Updated clause (A.7.5.6.4.1) * R4-2103569 (TC8): Updated clause (A.7.5.6.4.2)   Corrected spelling (*clasue* to *clause*)  Removed highlighting  Corrected formatting of headings (H4,H5,H6)  Aligned text for headings pertaining to Direct SCell activation:  - A.4.5.3.5 Direct SCell activation at SCell addition of known SCell in FR1  - A.5.5.3.7 Direct SCell activation at SCell addition of known SCell in FR2  - A.6.5.3.4 Direct SCell activation at SCell addition of known SCell in FR1  - A.6.5.3.5 Direct SCell activation at handover with known SCell in FR1  - A.7.5.3.4 Direct SCell activation at SCell addition of known SCell in FR2  - A.7.5.3.5 Direct SCell activation at handover with known SCell in FR2  Aligned text for headings pertaining to SCell dormancy:  - A.4.5.6.4.1 E-UTRAN – NR FR1 PSCell SCell dormancy switch of single FR1 SCell outside active time  - A.4.5.6.4.2 E-UTRAN – NR FR1 PSCell SCell dormancy switch of two FR1 SCells inside active time  - A.5.5.6.4.1 E-UTRAN – NR FR2 PSCell SCell dormancy switch of single FR2 SCell inside active time  - A.5.5.6.4.2 E-UTRAN – NR FR1 PSCell SCell dormancy switch of two FR2 SCells outside active time  - A.6.5.6.4.1 NR FR1 PCell SCell dormancy switch of single FR1 SCell outside active time  - A.6.5.6.4.2 NR FR1 PCell SCell dormancy switch of two FR1 SCells inside active time  - A.7.5.6.4.1 NR FR2 PCell SCell dormancy switch of single FR2 SCell inside active time  - A.7.5.6.4.2 NR FR1 PCell SCell dormancy switch of two FR2 SCells outside active time  RAN4#98bis-e:  Updates due to change in baseline:  - A.3.14.1: CSI-RS configurations for FDD  - A.3.14.2: CSI-RS configurations for TDD  Updates due to endorsed draft CR R4-2106996:  - A.3.1.3.1: Updates to CORESET RMC for FDD  - A.3.1.3.2: Updates to CORESET RMC for TDD  - A.5.5.6.4.1: Corrections to Table A.5.5.6.4.1.1-3 (SCell dormancy TC3)  RAN4#99-e: Changes to test cases for SCell dormancy:   * TC1 (A.4.5.6.4.1): Split Dedicated CORESET parameters for Test 1 and Test 2, and specified the new CORESET RMC for Test 2. * TC2 (A.4.5.6.4.2): Split test case into Test 1 (triggering in first 3 OFDM symbols, and Test 2 (triggering outside first 3 OFDM symbols). Split Dedicated CORESET parameters for Test 1 and Test 2, and specified the new CORESET RMC for Test 2. * TC3 (A.5.5.6.4.1): <No update> * TC4 (A.5.5.6.4.2): Modified CORESET RMC to new CORESET RMC for configurations 7 – 12. Removed Note 1. * TC5 (A.6.5.6.4.1): Split test case into Test 1 (triggering in first 3 OFDM symbols, and Test 2 (triggering outside first 3 OFDM symbols). Split Dedicated CORESET parameters for Test 1 and Test 2, and specified the new CORESET RMC for Test 2. * TC6 (A.6.5.6.4.2): Split Dedicated CORESET parameters for Tests 1 and 2 and Tests 3 and 4 , and specified the new CORESET RMC for Tests 3 and 4. * TC7 (A.7.5.6.4.1): Split Dedicated CORESET parameters for Tests 1 and 2 and Tests 3 and 4 , and specified the new CORESET RMC for Tests 3 and 4. * TC8 (A.7.5.6.4.2): Split Dedicated CORESET parameters for Tests 1 and 2 and Tests 3 and 4 , and specified the new CORESET RMC for Tests 3 and 4. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Test cases for Direct SCell activation and SCell dormancy will be missing in the specification. Functionality will go untested and UE conformance to related RRM requirements cannot be guaranteed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | Modified clauses:  A.3.14.1, A.3.14.2, A.3.1.3.1, A.3.1.3.2  New clauses:  A.4.5.3.5, A.4.5.3.5.1, A.4.5.3.5.2,  A.4.5.6.4, A.4.5.6.4.1, A.4.5.6.4.1.1, A.4.5.6.4.1.2, A.4.5.6.4.2, A.4.5.6.4.2.1, A.4.5.6.4.2.2,  A.5.5.3.7, A.5.5.3.7.1, A.5.5.3.7.2,  A.5.5.6.4, A.5.5.6.4.1, A.5.5.6.4.1.1, A.5.5.6.4.1.2, A.5.5.6.4.2, A.5.5.6.4.2.1, A.5.5.6.4.2.2,  A.6.5.3.4, A.6.5.3.4.1, A.6.5.3.4.2, A.6.5.3.5, A.6.5.3.5.1, A.6.5.3.5.2, A.6.5.6.4, A.6.5.6.4.1, A.6.5.6.4.1.1, A.6.5.6.4.1.2, A.6.5.6.4.2, A.6.5.6.4.2.1, A.6.5.6.4.2.2,  A.7.5.3.4, A.7.5.3.4.1, A.7.5.3.4.2, A.7.5.3.5, A.7.5.3.5.1, A.7.5.3.5.2, A.7.5.6.4, A.7.5.6.4.1, A.7.5.6.4.1.1, A.7.5.6.4.1.2, A.7.5.6.4.2, A.7.5.6.4.2.1, A.7.5.6.4.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev.1: Revised to include corrections from endorsed Draft CR R4-2110975. | | | | | | | | |

Unchanged Sections Omitted

FIRST Modification

### A.3.1.3 CORESET for RMC scheduling

#### A.3.1.3.1 FDD

Table A.3.1.3.1-1: Control Channel RMC for FDD with SCS=15KHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | |
| Reference channel |  | CCR.1.1 FDD | CCR.1.2 FDD | CCR.1.3 FDD | CCR.1.4 FDD | CCR.1.5 FDD |  |  |
| Channel bandwidth | MHz | 10 | 10 | 10 | 10 | 10 |  |  |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 |  |  |
| Allocated resource blocks for CORESET Note 3 |  | 24 | 18 | 24 | 18 | 24 |  |  |
| Number of transmitter antennas |  | 1 | 1 | 1 | 1 | 1 |  |  |
| Duration of CORESET | symbols | 2 | 2 | 2 | 2 | 2 |  |  |
| monitoringSymbolsWithinSlot |  | 1100000  0000000 | 1100000  0000000 | 1100000  0000000 | 1100000  0000000 | 0011000  0000000 |  |  |
| REG bundle size |  | 6 | 6 | 6 | 6 | 6 |  |  |
| DMRS precoder granularity |  | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size |  |  |
| CCE to REG mapping |  | Interleaved | Interleaved | Interleaved | Interleaved | Interleaved |  |  |
| Interleave n\_shift |  | 0 | 0 | 0 | 0 | 0 |  |  |
| Interleave size |  | 2 | 2 | 2 | 2 | 2 |  |  |
| Beamforming Pre-Coder |  | N/A | N/A | N/A | N/A | N/A |  |  |
| Aggregation level | CCE | 4 | 2 | 8 | 4 | 4 |  |  |
| DCI formats |  | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 |  |  |
| Payload size (without CRC) | bits | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |  |  |
| Note 1: DCI format shall depend upon the test configuration.  Note 2: Payload size shall depend upon the test configuration  Note 3: Allocated in the resource blocks where the associated RMC is scheduled. | | | | | | | | |

#### A.3.1.3.2 TDD

Table A.3.1.3.2-1: Control Channel RMC for TDD with SCS=15KHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | |
| Reference channel |  | CCR.1.1 TDD | CCR.1.2 TDD | CCR.1.3 TDD | CCR.1.4 TDD | CCR.1.5 TDD |  |  |
| Channel bandwidth | MHz | 10 | 10 | 10 | 10 | 10 |  |  |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 | 15 |  |  |
| Allocated resource blocks for CORESET Note 3 |  | 24 | 18 | 24 | 18 | 18 |  |  |
| Number of transmitter antennas |  | 1 | 1 | 1 | 1 | 1 |  |  |
| Duration of CORESET | symbols | 2 | 2 | 2 | 2 | 2 |  |  |
| monitoringSymbolsWithinSlot |  | 1100000  0000000 | 1100000  0000000 | 1100000  0000000 | 1100000  0000000 | 0011000  0000000 |  |  |
| REG bundle size |  | 6 | 6 | 6 | 6 | 6 |  |  |
| DMRS precoder granularity |  | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size |  |  |
| CCE to REG mapping |  | Interleaved | Interleaved | Interleaved | Interleaved | Interleaved |  |  |
| Interleave n\_shift |  | 0 | 0 | 0 | 0 | 0 |  |  |
| Interleave size |  | 2 | 2 | 2 | 2 | 2 |  |  |
| Beamforming Pre-Coder |  | N/A | N/A | N/A | N/A | N/A |  |  |
| Aggregation level | CCE | 4 | 2 | 8 | 4 | 4 |  |  |
| DCI formats |  | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 |  |  |
| Payload size (without CRC) | bits | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |  |  |
| Note 1: DCI format shall depend upon the test configuration.  Note 2: Payload size shall depend upon the test configuration  Note 3: Allocated in the resource blocks where the associated RMC is scheduled. | | | | | | | | |

Table A.3.1.3.2-2: Control Channel RMC for TDD with SCS=30KHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | |
| Reference channel |  | CCR.2.1 TDD | CCR.2.2 TDD | CCR.2.3 TDD |  |  |  |  |
| Channel bandwidth | MHz | 40 | 40 | 40 |  |  |  |  |
| Subcarrier spacing | kHz | 30 | 30 | 30 |  |  |  |  |
| Allocated resource blocks for CORESET Note 3 |  | 24 | 24 | 24 |  |  |  |  |
| Number of transmitter antennas |  | 1 | 1 | 1 |  |  |  |  |
| Duration of CORESET | symbols | 2 | 2 | 2 |  |  |  |  |
| monitoringSymbolsWithinSlot |  | 1100000  0000000 | 1100000  0000000 | 0011000  0000000 |  |  |  |  |
| REG bundle size |  | 6 | 6 | 6 |  |  |  |  |
| DMRS precoder granularity |  | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size |  |  |  |  |
| CCE to REG mapping |  | Interleaved | Interleaved | Interleaved |  |  |  |  |
| Interleave n\_shift |  | 0 | 0 | 0 |  |  |  |  |
| Interleave size |  | 2 | 2 | 2 |  |  |  |  |
| Beamforming Pre-Coder |  | N/A | N/A | N/A |  |  |  |  |
| Aggregation level | CCE | 4 | 8 | 4 |  |  |  |  |
| DCI formats |  | Note 1 | Note 1 | Note 1 |  |  |  |  |
| Payload size (without CRC) | bits | Note 2 | Note 2 | Note 2 |  |  |  |  |
| Note 1: DCI format shall depend upon the test configuration.  Note 2: Payload size shall depend upon the test configuration.  Note 3: Allocated in the same resource blocks where the associated RMC is scheduled. | | | | | | | | |

Table A.3.1.3.2-3: Control Channel RMC for TDD with SCS=120KHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | |
| Reference channel |  | CCR.3.1 TDD | CCR.3.2 TDD | CCR.3.3 TDD | CCR.3.4 TDD | CCR.3.5 TDD | CCR.3.6 TDD | CCR.3.7 TDD |
| Channel bandwidth | MHz | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Subcarrier spacing | kHz | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| Allocated resource blocks for CORESET Note 3 |  | 24 | 24 | 24 | 24 | 24 | 24 | 48 |
| Number of transmitter antennas |  | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| monitoringSlotPeriodicityAndOffset |  | sl160  0 | sl160  0 | sl160  80 | sl160  0 | sl160  0 | sl160  80 | sl160  0 |
| monitoringSymbolsWithinSlot |  | 1100000  0000000 | 0011000  0000000 | 1100000  0000000 | 1100000  0000000 | 0011000  0000000 | 1100000  0000000 | 1100000  0000000 |
| Duration of CORESET | slot | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| REG bundle size |  | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| DMRS precoder granularity |  | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size |
| CCE to REG mapping |  | Interleaved | Interleaved | Interleaved | Interleaved | Interleaved | Interleaved | Interleaved |
| Interleave n\_shift |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Interleave size |  | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Beamforming Pre-Coder |  | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aggregation level | CCE | 4 | 4 | 4 | 8 | 8 | 8 | 4 |
| DCI formats |  | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 |
| Payload size (without CRC) | bits | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 | Note 2 |
| Note 1: DCI format shall depend upon the test configuration.  Note 2: Payload size shall depend upon the test configuration.  Note 3: Allocated in the same resource blocks where the associated PDSCH RMC is scheduled. | | | | | | | | |

End of FIRST Modification

Unchanged Sections Omitted

Second Modification

A.3.14 CSI-RS configurations

A.3.14.1 FDD

**Table A.3.14.1-1: CSI-RS Reference Measurement Channels for SCS=15kHz**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **CSI-RS.1.1 FDD** | **CSI-RS.1.2 FDD** | **CSI-RS.1.3 FDD** | **CSI-RS.1.4 FDD** | **CSI-RS.1.5 FDD** | **CSI-RS.1.6 FDD** |
| **Resource Type** | **periodic** | **periodic** | **aperiodic** | **aperiodic** | **aperiodic** | periodic |
| **Resource Set Config** |  |  |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on | off | n.a. |
| aperiodicTriggeringOffset | n.a. | n.a. | 6 | 4 | 4 | n.a. |
| trs-Info | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |  |  |
|  |  | 10 for resource #0 | 20 for resource #0 | 0 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |  |
|  |  |  |  | 2 for resource #2 |  |  |
|  |  |  |  | 3 for resource #3 |  |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 11 for resource #1 | 21 for resource #1 | 4 for resource #4 | 1 for resource #1 | 0 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |  |
|  |  |  |  | 6 for resource #6 |  |  |
|  |  |  |  | 7 for resource #7 |  |  |
| powerControlOffset | 0 | 0 | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 | 0 | 0 |
| Period (slots) | slot5 | slot10 | n.a. | n.a. | n.a. | slot40 |
| Offset | 1 | 1 | n.a. | n.a. | n.a. | 1 |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. | n.a. | TCI.State.0 |
|  |  | TCI.State.1 |  |  |  |  |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 | 000001 | 000001 |
| nrofPorts | 2 | 1 | 1 | 1 | 1 | 2 |
|  |  | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 | Specified in the test case for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |  |
|  |  |  |  | 2 for resource #2 |  |  |
|  |  |  |  | 3 for resource #3 |  |  |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 10 for resource #1 | 10 for resource #1 | 4 for resource #4 | n.a. | 5 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |  |
|  |  |  |  | 6 for resource #6 |  |  |
|  |  |  |  | 7 for resource #7 |  |  |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM | noCDM | FD-CDM2 |
| density | 1 | 3 | 3 | 3 | 3 | 1 |
| startingRB | 0 | 0 | 0 | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | | | | |

**Table A.3.14.1-1A: CSI-RS Reference Measurement Channels for SCS=15kHz**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CSI-RS.1.1A FDD** | **CSI-RS.1.2A FDD** | **CSI-RS.1.3A FDD** |
| **Resource Type** | **periodic** | **aperiodic** | **periodic** |
| **Resource Set Config** |  |  |  |
| nzp-CSI-ResourceSetId | 1 | 1 | 1 |
| repetition | off | off | off |
| aperiodicTriggeringOffset | n.a. | 6 | n.a. |
| trs-Info | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |
| nzp-CSI-RS-ResourceId | 12 for resource #0 | 22 for resource #0 | 14 for resource #0 |
|  |  |
|  |  |
|  |  |
| 13 for resource #1 | 23 for resource #1 | 15 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| powerControlOffset | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 |
| Period (slots) | slot20 | n.a. | slot10 |
| Offset | 1 | n.a. | 2 |
| qcl-InfoPeriodicCSI-RS | n.a. | n.a. | n.a. |
|  |  |  |
| frequencyDomainAllocation | 0001 | 0001 | 0001 |
| nrofPorts | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 6 for resource #0 | 7 for resource #0 | 6 for resource #0 |
|  |  |
|  |  |
|  |  |
| 10 for resource #1 | 11 for resource #1 | 10 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| cdm-Type | noCDM | noCDM | noCDM |
| density | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | |

A.3.14.2 TDD

**Table A.3.14.2-1: CSI-RS Reference Measurement Channels for SCS=15kHz**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **CSI-RS.1.1 TDD** | **CSI-RS.1.2 TDD** | **CSI-RS.1.3 TDD** | **CSI-RS.1.4 TDD** | **CSI-RS.1.5 TDD** |
| Resource Type | periodic | periodic | aperiodic | aperiodic | periodic |
| **Resource Set Config** |  |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on | n.a. |
| aperiodicTriggeringOffset | n.a. | n.a. | 4 | 4 | n.a. |
| trs-Info | n.a. | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |  |
|  |  | 10 for resource #0 | 20 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |
|  |  |  |  | 2 for resource #2 |  |
|  |  |  |  | 3 for resource #3 |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 11 for resource #1 | 21 for resource #1 | 4 for resource #4 | 0 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |
|  |  |  |  | 6 for resource #6 |  |
|  |  |  |  | 7 for resource #7 |  |
| powerControlOffset | 0 | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 | 0 |
| Period (slots) | slot5 | slot10 | n.a. | n.a. | slot40 |
| Offset | 1 | 1 | n.a. | n.a. | 1 |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. | TCI.State.0 |
|  |  | TCI.State.1 |  |  |  |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 | 000001 |
| nrofPorts | 2 | 1 | 1 | 1 | 2 |
|  |  | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |
|  |  |  |  | 2 for resource #2 |  |
|  |  |  |  | 3 for resource #3 |  |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 10 for resource #1 | 10 for resource #1 | 4 for resource #4 | 5 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |
|  |  |  |  | 6 for resource #6 |  |
|  |  |  |  | 7 for resource #7 |  |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM | FD-CDM2 |
| density | 1 | 3 | 3 | 3 | 1 |
| startingRB | 0 | 0 | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | | | |

**Table A.3.14.2-1A: CSI-RS Reference Measurement Channels for SCS=15kHz**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CSI-RS.1.1A TDD** | **CSI-RS.1.2A TDD** | **CSI-RS.1.3A TDD** |
| **Resource Type** | **periodic** | **aperiodic** | **periodic** |
| **Resource Set Config** |  |  |  |
| nzp-CSI-ResourceSetId | 1 | 1 | 1 |
| repetition | off | off | off |
| aperiodicTriggeringOffset | n.a. | 6 | n.a. |
| trs-Info | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |
| nzp-CSI-RS-ResourceId | 12 for resource #0 | 22 for resource #0 | 14 for resource #0 |
|  |  |
|  |  |
|  |  |
| 13 for resource #1 | 23 for resource #1 | 15 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| powerControlOffset | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 |
| Period (slots) | slot20 | n.a. | slot10 |
| Offset | 1 | n.a. | 2 |
| qcl-InfoPeriodicCSI-RS | n.a. | n.a. | n.a. |
|  |  |  |
| frequencyDomainAllocation | 0001 | 0001 | 0001 |
| nrofPorts | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 6 for resource #0 | 7 for resource #0 | 6 for resource #0 |
|  |  |
|  |  |
|  |  |
| 10 for resource #1 | 11 for resource #1 | 10 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| cdm-Type | noCDM | noCDM | noCDM |
| density | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | |

**Table A.3.14.2-2: CSI-RS Reference Measurement Channels for SCS=30kHz**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **CSI-RS.2.1 TDD** | **CSI-RS.2.2 TDD** | **CSI-RS.2.3 TDD** | **CSI-RS.2.4 TDD** | **CSI-RS.2.5 TDD** | **CSI-RS.2.6 TDD** |
| **Resource Type** | **periodic** | **periodic** | **aperiodic** | **aperiodic** | **aperiodic** | periodic |
| **Resource Set Config** |  |  |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on | off | n.a. |
| aperiodicTriggeringOffset | n.a. | n.a. | 6 | 4 | 4 | n.a. |
| trs-Info | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |  |  |
|  |  | 10 for resource #0 | 20 for resource #0 | 0 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |  |
|  |  |  |  | 2 for resource #2 |  |  |
|  |  |  |  | 3 for resource #3 |  |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 11 for resource #1 | 21 for resource #1 | 4 for resource #4 | 1 for resource #1 | 0 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |  |
|  |  |  |  | 6 for resource #6 |  |  |
|  |  |  |  | 7 for resource #7 |  |  |
| powerControlOffset | 0 | 0 | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 | 0 | 0 |
| Period (slots) | slot10 | slot20 | n.a. | n.a. | n.a. | slot80 |
| Offset | 2 | 2 | n.a. | n.a. | n.a. | 2 |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. | n.a. | TCI.State.0 |
|  |  | TCI.State.1 |  |  |  |  |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 | 000001 | 000001 |
| nrofPorts | 2 | 1 | 1 | 1 | 1 | 2 |
|  |  | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 | Specified in the test case for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |  |
|  |  |  |  | 2 for resource #2 |  |  |
|  |  |  |  | 3 for resource #3 |  |  |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 10 for resource #1 | 10 for resource #1 | 4 for resource #4 | n.a. | 5 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |  |
|  |  |  |  | 6 for resource #6 |  |  |
|  |  |  |  | 7 for resource #7 |  |  |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM | noCDM | FD-CDM2 |
| density | 1 | 3 | 3 | 3 | 3 | 1 |
| startingRB | 0 | 0 | 0 | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | | | | |

**Table A.3.14.2-2A: CSI-RS Reference Measurement Channels for SCS=30kHz**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CSI-RS.2.1A TDD** | **CSI-RS.2.2A TDD** | **CSI-RS.2.3A TDD** |
| **Resource Type** | **periodic** | **aperiodic** | **periodic** |
| **Resource Set Config** |  |  |  |
| nzp-CSI-ResourceSetId | 1 | 1 | 1 |
| repetition | off | off | off |
| aperiodicTriggeringOffset | n.a. | 6 | n.a. |
| trs-Info | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |
| nzp-CSI-RS-ResourceId | 12 for resource #0 | 22 for resource #0 | 14 for resource #0 |
|  |  |
|  |  |
|  |  |
| 13 for resource #1 | 23 for resource #1 | 15 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| powerControlOffset | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 |
| Period (slots) | slot40 | n.a. | slot20 |
| Offset | 2 | n.a. | 4 |
| qcl-InfoPeriodicCSI-RS | n.a. | n.a. | n.a. |
|  |  |  |
| frequencyDomainAllocation | 0001 | 0001 | 0001 |
| nrofPorts | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 6 for resource #0 | 7 for resource #0 | 6 for resource #0 |
|  |  |
|  |  |
|  |  |
| 10 for resource #1 | 11 for resource #1 | 10 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| cdm-Type | noCDM | noCDM | noCDM |
| density | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | |

**Table A.3.14.2-3: CSI-RS Reference Measurement Channels for SCS=120kHz**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **CSI-RS.3.1 TDD** | **CSI-RS.3.2 TDD** | **CSI-RS.3.3 TDD** | **CSI-RS.3.4 TDD** | **CSI-RS.3.5 TDD** |
| Resource Type | periodic | periodic | aperiodic | aperiodic | periodic |
| **Resource Set Config** |  |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on | n.a. |
| aperiodicTriggeringOffset | n.a. | n.a. | 4 | 4 | n.a. |
| trs-Info | n.a. | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |  |
|  |  | 10 for resource #0 | 20 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |
|  |  |  |  | 2 for resource #2 |  |
|  |  |  |  | 3 for resource #3 |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 11 for resource #1 | 21 for resource #1 | 4 for resource #4 | 0 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |
|  |  |  |  | 6 for resource #6 |  |
|  |  |  |  | 7 for resource #7 |  |
| powerControlOffset | 0 | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 | 0 |
| Period (slots) | slot40 | slot80 | n.a. | n.a. | slot320 |
| Offset | 8 | 8 | n.a. | n.a. | 8 |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. | TCI.State.0 |
|  |  | TCI.State.1 |  |  |  |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 | 000001 |
| nrofPorts | 1 | 1 | 1 | 1 | 1 |
|  |  | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 |  |
|  |  |  |  | 1 for resource #1 |  |
|  |  |  |  | 2 for resource #2 |  |
|  |  |  |  | 3 for resource #3 |  |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 10 for resource #1 | 10 for resource #1 | 4 for resource #4 | 5 for resource #0 |
|  |  |  |  | 5 for resource #5 |  |
|  |  |  |  | 6 for resource #6 |  |
|  |  |  |  | 7 for resource #7 |  |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM | FD-CDM2 |
| density | 1 | 3 | 3 | 3 | 1 |
| startingRB | 0 | 0 | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | | | |

**Table A.3.14.2-3A: CSI-RS Reference Measurement Channels for SCS=120kHz**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **CSI-RS.3.1A TDD** | **CSI-RS.3.2A TDD** | **CSI-RS.3.3A TDD** |
| **Resource Type** | **periodic** | **aperiodic** | **periodic** |
| **Resource Set Config** |  |  |  |
| nzp-CSI-ResourceSetId | 1 | 1 | 1 |
| repetition | off | off | off |
| aperiodicTriggeringOffset | n.a. | 6 | n.a. |
| trs-Info | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |
| nzp-CSI-RS-ResourceId | 12 for resource #0 | 22 for resource #0 | 14 for resource #0 |
|  |  |
|  |  |
|  |  |
| 13 for resource #1 | 23 for resource #1 | 15 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| powerControlOffset | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 |
| Period (slots) | slot160 | n.a. | slot80 |
| Offset | 8 | n.a. | 16 |
| qcl-InfoPeriodicCSI-RS | n.a. | n.a. | n.a. |
|  |  |  |
| frequencyDomainAllocation | 0001 | 0001 | 0001 |
| nrofPorts | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 6 for resource #0 | 7 for resource #0 | 6 for resource #0 |
|  |  |
|  |  |
|  |  |
| 10 for resource #1 | 11 for resource #1 | 10 for resource #1 |
|  |  |  |
|  |  |  |
|  |  |  |
| cdm-Type | noCDM | noCDM | noCDM |
| density | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 |
| nrofRBs | 276 (Note 1) | 276 (Note 1) | 276 (Note 1) |
| Note 1: If the configured value of PRBs is larger than the width of the corresponding BWP relevant for the test case, the Test Equipment shall implement CSI-RS only in the width of that BWP. | | | |

End of SECOND Modification

Unchanged Sections Omitted

THIRD Modification

#### A.4.5.3.5 Direct SCell activation at SCell addition of known SCell in FR1

##### A.4.5.3.5.1 Test Purpose and Environment

The purpose of this test is to verify that the direct SCell activation time is within the requirements stated in clause 8.3.4, when the SCell in FR1 is known by the UE at the time of activation.

The supported test configurations are shown in table A.4.5.3.5.1-1 below. The test parameters are given in Tables A.4.5.3.5.1-2 and cell-specific parameters in A.4.5.3.5.1-3 below. The test consists of two successive time periods, with duration of T1 and T2, respectively. There are three carriers, E-UTRA has one cell, NR has two cells. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRA and Cell 2 (PSCell) on NR, but is not aware of Cell 3 (SCell) on NR. The UE is monitoring the PCell and PSCell. The UE shall be continuously scheduled in the PCell and PSCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the measurement on Cell 3 is configured. The UE now starts measuring the Cell 3. During T1, Cell 3 should be detected and measured by the UE such that it meets the condition for known cell defined in clause 8.3.4 for direct SCell activation. At the end of T1, the test equipment sends an RRC message for direct SCell activation of the Cell 3.

The point in time at which the RRC message for direct SCell actvation is received at the UE antenna connector, in a slot # denoted m, defines the start of time period T2. The UE shall be able to report valid CSI in PSCell for the activated SCell at latest in slot , as defined in clause 8.3.4. The UE shall start reporting CSI in PSCell in slot (m+k+TRRC\_process) and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PSCell interruption due to activation of SCell shall occur in the slot to slot , as defined in clause 8.3.4, where is the interruption length given in clause 8.2. Any E-UTRA PCell interruption due to activation of SCell shall occur in the subframe to subframe , where and are the index of the first and last subframe of E-UTRA PCell which overlaps with slot m, and is the interruption length given in TS 36.133 [14] clause 7.32.

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

The test equipment verifies the activation time by counting the slots from the time when the direct SCell activation command is sent until a CSI report with other than CQI index 0 is received.

Table A.4.5.3.5.1-1: known FR1 direct SCell activation supported test configurations

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

Table A.4.5.3.5.1-2: General test parameters for known FR1 direct SCell activation

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1,2,3 | One E-UTRAN radio channel (1) and two NR radio channel (2,3) are used for this test |
| Active PCell |  | Cell 1 | Primary cell on E-UTRAN RF channel number 1.  As specified in clause A.3.7.2.1 |
| Active PSCell |  | Cell 2 | Primary secondary cell on NR RF channel number 2. |
| SCell |  | Cell 3 | Secondary cell on NR RF channel number 3 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| CQI/PMI periodicity and offset configuration index |  | 0 | CQI reporting for SCell every four slots. |
| Cell-individual offset for cells on E-UTRA RF channel number | dB | 0 | Individual offset for cells on primary component carrier. |
| Cell-individual offset for cells on NR channel number | dB | 0 | Individual offset for cells on secondary component carrier. |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| Cell3 timing offset to cell2 | μs | 0 |  |
| Time alignment error between cell3 and cell2 | μs | ≤ Time alignment error as specified in TS 38.104 [13] clause 6.5.3.1. | The value of time alignment error depends upon the type of carrier aggregation. |
| T1 | s | 7 | During this time the Cell 3 shall be known. |
| T2 | s | 1 | During this time the UE shall activate the SCell. |
| THARQ | ms | k1NR slot length | k1 is a number of slots indicated by the PDSCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format or provided by *dl-DataToUL-ACK* if the PDSCH-to-HARQ feedback timing field is not present in the DCI format, the value is defined in 38.213 [3] |
| TCSI\_Reporting | ms | 2 | the delay uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2] |
| k | ms |  | As specified in clause 4.3 of TS 38.213 [3] |

Table A. 4.5.3.5.1-3: Cell specific test parameters for known FR1 direct SCell activation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 2 | | | Cell 3 | | |
|  | | |  | T1 | T2 | T3 | T1 | T2 | T3 |
| SSB ARFCN | | |  | freq1 | | | freq2 | | |
| Duplex mode | Config 1,4 | |  | FDD | | | | | |
|  | Config 2,3,5,6 | |  | TDD | | | | | |
| TDD configuration | Config 1,4 | |  | Not Applicable | | | | | |
|  | Config 2,5 | |  | TDDConf.1.1 | | | | | |
|  | Config 3,6 | |  | TDDConf.2.1 | | | | | |
| BWchannel | Config 1,4 | | MHz | 10: NRB,c = 52 | | | | | |
|  | Config 2,5 | |  | 10: NRB,c = 52 | | | | | |
|  | Config 3,6 | |  | 40: NRB,c = 106 | | | | | |
| 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.1.1 | | | | | |
| 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.1.1 | | | | | |
| DRx Cycle | | | ms | Not Applicable | | | | | |
| PDSCH Reference | Config 1,4 | |  | SR.1.1 FDD | | | SR.1.1 FDD | | |
| measurement channel | Config 2,5 | |  | SR.1.1 TDD | | | SR.1.1 TDD | | |
|  | Config 3,6 | |  | SR.2.1 TDD | | | SR.2.1 TDD | | |
| RMSI CORESET | Config 1,4 | |  | CR.1.1 FDD | | | CR.1.1 FDD | | |
| Reference Channel | Config 2,5 | |  | CR.1.1 TDD | | | CR.1.1 TDD | | |
|  | Config 3,6 | |  | CR.2.1 TDD | | | CR.2.1 TDD | | |
| RMC CORESET | Config 1,4 | |  | CCR.1.1 FDD | | | CCR.1.1 FDD | | |
| Reference Channel | Config 2,5 | |  | CCR.1.1 TDD | | | CCR.1.1 TDD | | |
|  | Config 3,6 | |  | CCR.2.1 TDD | | | CCR.2.1 TDD | | |
| TRS configuration | Config 1,4 | |  | TRS.1.1 FDD | | | TRS.1.1 FDD | | |
|  | Config 2,5 | |  | TRS.1.1 TDD | | | TRS.1.1 TDD | | |
|  | Config 3,6 | |  | TRS.1.2 TDD | | | TRS.1.2 TDD | | |
| OCNG Patterns | | |  | OP.1 | | | | | |
| SMTC configuration | | |  | SMTC.1 | | | | | |
| SSB configuration | Config 1,2,4,5 | |  | SSB.1 FR1 | | | | | |
|  | Config 3,6 | |  | SSB.2 FR1 | | | | | |
| PDSCH/PDCCH | Config 1,2,4,5 | | kHz | 15 kHz | | | | | |
| subcarrier spacing | Config 3,6 | |  | 30kHz | | | | | |
| EPRE ratio of PSS to SSS | | |  |  | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |  |  | | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | |  |  | | | | | |
| EPRE ratio of PDCCH DMRS to SSS | | |  |  | | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | | dB | 0 | | | | | |
| 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 | | | | | |
| Note2 | | Config 1,2,4,5 | dBm/SCS | -104 | | | | | |
|  | | Config 3,6 |  | -101 | | | | | |
|  | | | dB | 17 | | | | | |
|  | | | dB | 17 | | | | | |
| SS-RSRPNote3 | | Config 1,2,4,5 | dBm/SCS | -87 | | | | | |
|  | | Config 3,6 |  | -84 | | | | | |
| SCH\_RP Note 3 | | | dBm/15 kHz | -87 | | | | | |
| Propagation condition | | | - | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T2.] | | | | | | | | | |

##### A.4.5.3.5.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in the first available uplink resource after slot (m+k+TRRC\_process). UE is allowed to postpone CSI report to next available uplink resource if an available uplink resource is subject to interruption. Whether CSI report in slot (m+k+TRRC\_process) was interrupted is checked by monitoring ACK/NACK sent in PCell in slot (m+k+TRRC\_process).

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot . Ndirect = TRRC\_Process + T1 + Tactivation\_time + TCSI\_Reporting - 3ms, where TRRC\_Process = 16ms and other components are defined in clause 8.3.4.

During T2 interruption of PSCell during direct SCell activation shall not happen outside the slot to , and interruption of E-UTRA PCell during SCell activation shall not happen outside the subframe to subframe, as defined in clause 8.3.4.

The interruption of PSCell shall not be more than the values specified for EN-DC in Clause 8.2.1.2.8.

All of the above test requirements shall be fulfilled in order for the observed direct SCell activation delay to be counted as correct. The rate of correct observed direct SCell activation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot as defined in clause 8.3.4 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

End of THIRD Modification

Unchanged Sections Omitted

FOURTH Modification

#### A.4.5.6.4 SCell dormancy switch

##### A.4.5.6.4.1 E-UTRAN – NR FR1 PSCell SCell dormancy switch of single FR1 SCell outside active time

###### A.4.5.6.4.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL dormant BWP switch delay requirement defined in clause 8.6, and interruption requirements for NR victim cell defined in clause 8.2.1.2.15 and interruption requirement for E-UTRA victim cell defined in clause 7.32 of TS 36.133 [15]. Supported test configurations are shown in Table A.4.5.6.4.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), one NR PSCell (Cell 2) and one NR SCell (Cell 3) as given in Table A.4.5.6.4.1.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell and SCell are specified in Table A.4.5.6.4.1.1-3 below.

PDCCHs indicating new transmissions shall be sent continuously on PCell (Cell 1) and PSCell (Cell 2) to ensure that the UE will have ACK/NACK sending.

PDCCHs indicating new transmissions shall be sent continuously on SCell (Cell 3) to ensure that the UE would have ACK/NACK sending except for the time duration when the SCell is in dormancy during T2.

The UE is configured to monitor PDCCH for DCI format 2\_6 at *ps-Offset* before the start of *onDuration*. Two tests are specified, where a UE that only supports triggering within the first three OFDM symbols of a slot shall undergo Test1 only, and a UE that supports triggering also in remaining OFDM symbols of a slot shall undergo both Test1 and Test2. In the tested scenario, *ps-Offset* is selected to correspond to the dormancy switching time specified in clause 8.6.2A.

Before the test starts,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC), Cell 2 (PSCell) on radio channel 2 (PSCC) and Cell 3 (SCell) on radio channel 3 (SCC).

- UE is configured with 1 UE-specific downlink bandwidth parts the same as initial BWP for PSCell, BWP-1 in Cell 3 before starting the test.

- UE is configured with 2 different UE-specific downlink bandwidth parts for SCell, BWP-1 and BWP-2, in Cell 3 before starting the test. BWP-1 and BWP-2 always include bandwidth of the initial DL BWP and SSB. BWP-1 is configured in *OutsideActiveTimeConfig* as *firstOutsideActiveTimeBWP*. BWP-2 is configured as *dormantBWP*.

- UE is configured with RRM measurement on SCC.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in PSCell.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in SCell.

- UE is configured to monitor DCI format 2\_6, and to be active during onDuration even when no DCI format 2\_6 is detected (ps-WakeUp).

All cells have constant signal levels throughout the test.

The test consists of 3 successive time periods, with durations of T1, T2, and T3, respectively.

Time period T1 starts when a DCI format 2\_6 command for SCell switch from non-dormany to dormancy, sent from the test equipment to the UE, is received at the UE side at *ps-Offset* before *onDuration*. The UE shall switch its SCell bandwidth part from BWP-1 to BWP-2 into dormancy. During T1, test equipement verifies that:

The UE shall be able to receive CSI-RS on SCell BWP-2 at the beginning of the DL slot right after SCell’s DL slot (*i+TdormantBWPswitchDelay*) as defined in clause 8.6. TE shall observe the periodic reporting of CQI for SCell starting from slot (*i+TdormantBWPswitchDelay*).

PCell (Cell 1) interruption due to dormancy switch on SCell shall occur within the dormancy switch delay.

PSCell (Cell 2) interruption due to dormancy switch on SCell shall occur within the dormancy switch delay.

Time period T2 starts when T1 is completed. During T2, the test equipment continues to schedule the UE continuously in PCell and PSCell. The UE shall carry out CSI and RRM measurements on the dormant SCells. The UE shall report ACK/NACK in PCell and PSCell in response to scheduled PDSCH, with the maximum loss of transmitted ACK/NACKs fulfilling the requirement in clause 8.2.1.2.15. The test equipment verifies that the loss of ACK/NACKs is no larger than 1.5%.

Time period T3 starts when T2 is completed. During T3, the test equipment does not schedule the UE, by which the inactivity timer expires and the UE stops monitoring PDCCH except for signalling using DCI format 2\_6 at wake-up signalling occasions.

Time period T4 starts when the UE at *ps-Offset* before *onDuration* detects a DCI format 2\_6 carrying dormancy indication that indicates that SCell1 and SCell2 are to be switched from dormancy to non-dormancy. During T4, the test equipment schedules the UE with new data indication in PCell, PSCell and SCell during *onDuration.* The test equipment verifies that:

The UE shall be able to receive PDSCH at the beginning of the DL slot right after PSCell’s DL slot (*j+TdormantBWPswitchDelay*) as defined in clause 8.6 and starts to report valid ACK/NACK for the SCell at latest at the beginning of the DL slot right after slot (*j+TdormantBWPswitchDelay+k1*). The UE shall be continuously scheduled on SCell’s BWP-1 starting from the beginning of the DL slot right after slot (*j+TdormantBWPswitchDelay*).

PCell (Cell 1) interruption due to dormancy switch on SCell shall occur within the dormancy switch delay.

PSCell (Cell 2) interruption due to dormancy switch on SCell shall occur within the dormancy switch delay.

Table A.4.5.6.4.1.1-1: DL BWP switch 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 30kHz 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 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: A UE which fulfils the requirements in test case A.4.5.6.X.1 can skip the test cases in A.4.5.6.X.1.  Note 3: NR configuration is the same for PSCell and SCells. | |

Table A.4.5.6.4.1.1-2: General test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | Comment |
| Test1 | Test2 |
| E-UTRA RF Channel Number |  | 1 | | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2, 3 | | Two NR radio channel is used for this test |
| Active PCell |  | Cell 1 | | PCell on RF channel number 1. |
| Active PSCell |  | Cell 2 | | PSCell on RF channel number 2. |
| Active SCell |  | Cell 3 | | SCell on RF channel number 3. |
| CP length |  | Normal | |  |
| CSI reporting periodicity, Non-dormant BWP | ms | 2 | | CSI reporting periodicity for periodic reporting of CQI for PCell and non-dormant SCells |
| CSI reporting periodicity, Dormant BWP | ms | 40 | | CSI reporting periodicity for periodic reporting of CQI for dormant SCells |
| ps-Offset |  | Depending on UE capability | | Monitoring of DCI 2\_6 ahead of start of drx-onDurationTimer. Value of ps-Offset shall correspond to SCell dormancy switching time for switching of two SCells, as specified in clause 8.6.2A. Actual value depends on reported UE capabilities. |
| ps-WakeUp |  | true | | Wake up for onDuration in case DCI format 2\_6 is not detected. |
| DRX |  | DRX.1 | |  |
| *'bwp-InactivityTimer* | ms | [200] | |  |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | | Individual offset for cells on PCC. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | | Individual offset for cells on PSCC. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | | Individual offset for cells on SCC. |
| Cell2 timing offset to cell1 | μs | 3 | | Synchronous EN-DC |
| Cell3 timing offset to cell2 | μs | 3 | | Synchronous cells |
| Number of CSI-RS ports |  | 4 | | The number of CSI-RS ports in a single resource without CRI report |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | 3 – 11 | Test1 is based on that triggering DCI is received within the first three OFDM symbols of a slot. Test2 is based on that the triggering DCI is received later than within the first three OFDM symbols of a slot. |
| T1 | s | [0.2] | |  |
| T2 | s | [10] | |  |
| T3 | s | [0.2] | |  |
| T4 | s | [0.2] | |  |

Table A.4.5.6.4.1.1-3: NR Cell specific test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | Cell 3 |
| Frequency Range | |  | FR1 | |
| Duplex mode | Config 1,4 |  | FDD | |
|  | Config 2,3,5,6 |  | TDD | |
| TDD configuration | Config 1,4 |  | Not Applicable | |
|  | Config 2,5 |  | TDDConf.1.1 | |
|  | Config 3,6 |  | TDDConf.1.2 | |
| BWchannel | Config 1,4 |  | 10 MHz: NRB,c = 52 | |
|  | Config 2,5 |  | 10 MHz: NRB,c = 52 | |
|  | Config 3,6 |  | 40 MHz: NRB,c = 106 | |
| Active BWP ID | |  | 1, 2 | 0 |
| Initial BWP | Config 1,4 |  | DLBWP.0.2 | DLBWP.0.2 |
| Configuration | Config 2,5 |  |  |  |
|  | Config 3,6 |  |  |  |
| Active BWP-0 | Config 1,4 |  | NA | DLBWP.0.2 |
| Configuration | Config 2,5 |  |  |  |
|  | Config 3,6 |  |  |  |
| Active BWP-1 | Config 1,4 |  | DLBWP.1.3 | NA |
| Configuration | Config 2,5 |  |  |  |
|  | Config 3,6 |  |  |  |
| Active BWP-2 | Config 1,4 |  | DLBWP.1.1 | NA |
| Configuration | Config 2,5 |  |  |  |
|  | Config 3,6 |  |  |  |
| PDSCH Reference | Config 1,4 |  | SR.1.1 FDD | |
| measurement channel | Config 2,5 |  | SR.1.1 TDD | |
|  | Config 3,6 |  | SR2.1 TDD | |
| RMSI CORESET | Config 1,4 |  | CR.1.1 FDD | |
| parameters | Config 2,5 |  | CR.1.1 TDD | |
|  | Config 3,6 |  | CR2.1 TDD | |
| Dedicated CORESET | Config 1,4 |  | CCR.1.1 FDD | |
| parameters, Test 1 | Config 2,5 |  | CCR.1.1 TDD | |
|  | Config 3,6 |  | CCR.2.1 TDD | |
| Dedicated CORESET | Config 1,4 |  | CCR.1.5 FDD | |
| parameters, Test 2 | Config 2,5 |  | CCR.1.5 TDD | |
|  | Config 3,6 |  | CCR.2.3 TDD | |
| OCNG Patterns | |  | OP.1 | |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 | |
|  | Config 3,6 |  | SSB.2 FR1 | |
| SMTC Configuration | |  | SMTC.1 | |
| TRS Configuration | Config 1,4 |  | TRS.1.1 FDD | |
|  | Config 2,5 |  | TRS.1.1 TDD | |
|  | Config 3,6 |  | TRS.1.2 TDD | |
| Antenna Configuration | |  | 1x2 | |
| Propagation Condition | |  | AWGN | |
| EPRE ratio of PSS to SSS | |  |  |  |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | 0 |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  |
| EPRE ratio of PDSCH to PDSCH | |  |  |  |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |  |  |  |
| NocNote 2 | | dBm/15 kHz | [-104] | [-104] |
| SS-RSRP Note 3 | | dBm/15 kHz | [-87] | [-87] |
| Ês/Iot | | dB | 17 | 17 |
| Ês/Noc | | dB | 17 | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | [-59] | [-59] |
|  | Config 3,6 | dBm/38.16MHz | [-61.9] | [-61.9] |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | | |

###### A.4.5.6.4.1.2 Test Requirements

During T1, any interruption on PCell and PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell. Starting from *onDuration* in time period T1, the UE shall transmit ACK/NACK in response to scheduling in PCell and PSCell. There shall be no loss of ACK/NACK.

During time period T2, the UE shall transmit ACK/NACKs in response to scheduling in PCell and the rate of missed ACK/NACKs shall be no more than 1.5%.

During T1, any interruption on PCell and PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell. Starting from *onDuration* in time period T4, the UE shall transmit ACK/NACK in response to scheduling in PCell, SCell1 and SCell2. There shall be no loss of ACK/NACK.

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

##### A.4.5.6.4.2 E-UTRAN – NR FR1 PSCell SCell dormancy switch of two FR1 SCells inside active time

###### A.4.5.6.4.2.1 Test Purpose and Environment

The purpose of this test is to verify the delay requirement of BWP switching from dormancy to non-dormancy and from non-dormancy to dormancy on SCell defined in clause 8.6.2, and interruption requirements for NR victim cell defined in clause 8.2.1.2.15 and interruption requirement for E-UTRA victim cell defined in clause 7.32.2.7 of TS 36.133 [15]. Supported test configurations are shown in Table A.4.5.6.4.2.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), one NR PSCell (Cell 2) and two NR SCells (Cell 3, and Cell 4) as given in Table A.4.5.6.4.2.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell and SCells are specified in Table A.4.5.6.4.2.1-3 below.

PDCCHs indicating new transmissions shall be sent continuously on PCell (Cell 1) and PSCell (Cell 2) to ensure that the UE will have ACK/NACK sending.

PDCCHs indicating new transmissions shall be sent continuously on SCell (Cell 3, and Cell 4) to ensure that the UE would have ACK/NACK sending except for the time duration when SCell (Cell2) performs the dormancy switching and stays in the dormant BWP.

Before the test starts,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC), Cell 2 (PSCell) on radio channel 2 (PSCC),, Cell 3 (SCell) on radio channel 3 (SCC) and Cell 4 (SCell) on radio channel 4 (SCC).

- UE is configured with 1 UE-specific downlink bandwidth parts the same as initial BWP for PSCell, BWP-0, in Cell 2 before starting the test. BWP-0 always include bandwidth of the initial DL BWP and SSB.

- UE is configured with 2 UE-specific downlink bandwidth parts for SCell, BWP-1 and BWP-2 in Cell 3 and Cell 4 before starting the test.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-0 in PSCell.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in all SCells.

- UE is indicated in *dormantBWP -Id* that the dormant BWPis BWP-2 in all SCells.

All cells have constant signal levels throughout the test.

The test consists of 3 successive time periods, with durations of T1, T2, and T3, respectively.

During T1,

Time period T1 starts when a DCI format 1\_1 command for enterning dormant BWP in SCell, sent from the test equipment to the UE, is received at the UE side in PCell’s slot # denoted *i*. Upon reception of the PDCCH indicating entering dormant BWP in PCell, UE shall switch the DL BWP-1 to DL BWP-2 in all SCells, i.e., switching from non-dormant BWP to dormant BWP.

The UE shall be able to receive PDSCH and report valid ACK/NACK on the PCell and PSCell all the time except interruption.

The starting time of PCell (Cell 1) interruption due to dormancy switching on SCells shall occur within the dormant BWP switch delay.

The starting time of PSCell (Cell 2) interruption due to dormancy switching on SCells shall occur within the dormant BWP switch delay.

During T2, the test equipment won’t transmit DCI format for PDSCH reception on all SCells.

The UE shall be able to receive PDSCH and report valid ACK/NACK on the PCell and PSCell all the time except interruption.

During T3,

Time period T3 starts when a DCI format 1\_1 command for leaving dormant BWP in SCells, sent from the test equipment to the UE, is received at the UE side in PSCell’s slot # denoted *j*. Upon reception of the PDCCH indicating leaving dormant BWP in PSCell, UE shall switch the DL BWP-2 to DL BWP-1 in SCells, i.e., switching from dormant BWP to non-dormant BWP.

The UE shall be able to receive PDSCH on all SCells no later than the first DL slot that occurs after the beginning of PSCell’s DL slot (*j+* TmutipledormantBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK on all SCells no later than the first UL slot that occurs after the beginning of slot (*j+N*) as defined in clause 10.3 in TS38.213.

The UE shall be able to receive PDSCH and report valid ACK/NACK on the PCell and PSCell all the time except interruption.

The starting time of PCell (Cell 1) interruption due to dormancy switching on SCells shall occur within the dormant BWP switch delay.

The starting time of PSCell (Cell 2) interruption due to dormancy switching on SCells shall occur within the dormant BWP switch delay.

The test equipment verifies that potential interruption to E-UTRA PCell and NR PSCell is carried out in the correct time span by monitoring ACK/NACK sent in PCell and PSCell during dormant BWP switch of SCells, respectively.

Table A.4.5.6.4.2.1-1: Dormant BWP switch 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 30kHz 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 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: A UE which fulfils the requirements in test case A.4.5.X.1.2 can skip the test cases in A.4.5.X.1.1.  Note 3: NR configuration is the same for PSCell and SCells. | |

Table A.4.5.6.4.2.1-2: General test parameters for Dormant BWP switch in synchronous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | Comment |
|  |  | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | 1 | | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2, 3, 4 | | Three NR radio channels are used for this test |
| Active PCell |  | Cell 1 | | PCell on RF channel number 1. |
| Active PSCell |  | Cell 2 | | PSCell on RF channel number 2. |
| Active SCell |  | Cell 3 | | SCell on RF channel number 3. |
| Active SCell |  | Cell 4 | | SCell on RF channel number 4. |
| CP length |  | Normal | |  |
| DRX |  | OFF | |  |
| *bwp-InactivityTimer* | ms | [200] | |  |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | | Individual offset for cells on PCC. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | | Individual offset for cells on PSCC. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | | Individual offset for cells on SCC. |
| Cell2 timing offset to cell1 | μs | 3 | | Synchronous EN-DC |
| Cell3 timing offset to cell2 | μs | 3 | | Synchronous cells |
| Cell4 timing offset to cell2 | μs | 3 | | Synchronous cells |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | 3 – 11 |  |
| T1 | s | [0.2] | |  |
| T2 | s | [0.2] | |  |
| T3 | s | [0.2] | |  |

Table A.4.5.6.4.2.1-3: NR Cell specific test parameters for Dormant BWP switch in synchronous EN-DC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | Cell 3 | Cell 4 |
| Frequency Range | |  | FR1 | | |
| Duplex mode | Config 1,4 |  | FDD | | |
|  | Config 2,3,5,6 |  | TDD | | |
| TDD configuration | Config 1,4 |  | Not Applicable | | |
|  | Config 2,5 |  | TDDConf.1.1 | | |
|  | Config 3,6 |  | TDDConf.1.2 | | |
| BWchannel | Config 1,4 |  | 10 MHz: NRB,c = 52 | | |
|  | Config 2,5 |  | 10 MHz: NRB,c = 52 | | |
|  | Config 3,6 |  | 40 MHz: NRB,c = 106 | | |
| Active BWP ID | |  | 0 | 1, 2 | |
| Initial BWP | Config 1,4 |  | DLBWP.0.2 | NA | |
| Configuration | Config 2,5 |  |  |  | |
|  | Config 3,6 |  |  |  | |
| Active BWP-0 | Config 1,4 |  | DLBWP.0.2 | NA | |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active BWP-1 | Config 1,4 |  | NA | DLBWP.1.1 | |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active BWP-2 | Config 1,4 |  | NA | DLBWP.1.3 | |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| PDSCH Reference | Config 1,4 |  | SR.1.1 FDD | | |
| measurement channel | Config 2,5 |  | SR.1.1 TDD | | |
|  | Config 3,6 |  | SR2.1 TDD | | |
| RMSI CORESET | Config 1,4 |  | CR.1.1 FDD | | |
| parameters | Config 2,5 |  | CR.1.1 TDD | | |
|  | Config 3,6 |  | CR2.1 TDD | | |
| Dedicated CORESET | Config 1,4 |  | CCR.1.1 FDD | | |
| parameters, Test 1 | Config 2,5 |  | CCR.1.1 TDD | | |
|  | Config 3,6 |  | CCR.2.1 TDD | | |
| Dedicated CORESET | Config 1,4 |  | CCR.1.5 FDD | | |
| parameters, Test 2 | Config 2,5 |  | CCR.1.5 TDD | | |
|  | Config 3,6 |  | CCR.2.3 TDD | | |
| OCNG Patterns | |  | OP.1 | | |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 | | |
|  | Config 3,6 |  | SSB.2 FR1 | | |
| SMTC Configuration | |  | SMTC.1 | | |
| TRS Configuration | Config 1,4 |  | TRS.1.1 FDD | | |
|  | Config 2,5 |  | TRS.1.1 TDD | | |
|  | Config 3,6 |  | TRS.1.2 TDD | | |
| Antenna Configuration | |  | 1x2 | | |
| Propagation Condition | |  | AWGN | | |
| EPRE ratio of PSS to SSS | |  |  | 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 | | dB | 0 |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |
| EPRE ratio of PDSCH to PDSCH | |  |  |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |  |  |
| NocNote 2 | | dBm/15 kHz | [-104] | [-104] | |
| SS-RSRP Note 3 | | dBm/15 kHz | [-87] | [-87] | |
| Ês/Iot | | dB | 17 | 17 | |
| Ês/Noc | | dB | 17 | 17 | |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | [-59] | [-59] | |
|  | Config 3,6 | dBm/38.16MHz | [-61.9] | [-61.9] | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | | | |

###### A.4.5.6.4.2.2 Test Requirements

During T1, the UE shall be able to to send the ACK/NACK for all SCells before UE PDCCH indicating entering dormant BWP is received in PSCell’s slot # denoted.

During T3, the UE shall start to send the ACK/NACK for all SCells from the first UL slot that occurs after the beginning of DL slot (*j+N*).

Where, *N* is the timing that UE provide HARQ-ACK information in response to a detection of a DCI format 1\_1 indicating SCell dormancy as specified in [3].

All of the above test requirements shall be fulfilled in order for the observed SCell dormant BWP switch delay to be counted as correct.

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

During T1, the start of the interruption of PCell during SCell active BWP switch shall not happen outside the BWP switch delay.

During T3, the start of the interruption of PCell during SCell active BWP switch shall not happen outside the BWP switch delay.

During T1, the start of the interruption of PSCell during SCell active BWP switch shall not happen outside the BWP switch delay.

During T3, the start of the interruption of PSCell during SCell active BWP switch shall not happen outside the BWP switch delay.

The interruption of PCell shall not be longer than the interruption duration specified for active BWP switch in clause 7.32.2.7 of TS 36.133 [15].

The interruption of PSCell shall not be longer than the interruption duration specified for dormant BWP switch in clause 8.6.

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK/NACK in the first DL slot that occurs after the beginning of DL slot (*i+ N*), (*j+ N*), then the UE shall use the next available uplink resource for reporting the corresponding ACK/NACK.

End of FOURTH Modification

Unchanged Sections Omitted

FIFth Modification

#### A.5.5.3.7 Direct SCell activation at SCell addition of known SCell in FR2

##### A.5.5.3.7.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in clause A.4.5.3.5 except the SCell is in FR2 intra-band.

The supported test configurations are shown in table A.5.5.3.7.1-1 below. The general and cell specific test parameters are the same except those described in the following clause. The listed parameter values in Tables A.5.5.3.7.1-2 and A.5.5.3.7.1-3 will replace the values of corresponding parameters in Tables A.4.5.3.5.1-2 and A.4.5.3.5.1-3. In this case, OTA related test parameters are shown in table A.5.5.3.7.1-4 below.

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell. Cell 1 operates in either FDD or TDD duplex mode according to test configuration. Cell 2 and Cell 3 operate in TDD duplex mode. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) and Cell 2 (PSCell) on radio channel 2 (PSCC), but is not aware of Cell 3 (SCell1) on radio channel 3 (SCC). The UE is only monitoring the PCC/PSCC. The UE shall be continuously scheduled in the PCell/PSCell throughout the whole test.

At the beginning of T1, the UE is configured to measure radio channel 3 and starts detecting the Cell 3 (SCell) on radio channel 3 (SCC). During T1 Cell 3 is detected and measured and measurement report is sent by the UE to the test equipment.

Time period T2 starts when test equipment sends the RRCConnectionReconfiguration message for the activation of the SCell within time period specified in clause 8.3.2 for known cell definition to ensure the configured SCell is known.The NR shall be use an *RRCConnectionReconfigurationComplete* message with parameter *sCellState* set to *activated*for the SCell (Cell 3), which causes the SCell to become configured and activated on radio channel 3 (SCC). The message is sent from the test equipment to the UE and is received in a subframe # denoted m at the UE antenna connector. The UE shall accomplish the activation of the SCell no later than subframe (m+ *Ndirect*).

Time period T3 starts at (m+ *Ndirect*), at which point UE shall be reporting a valid CQI for PCell/PSCell and SCell.

During T3, the UE shall be continuously scheduled in the SCell.

The test equipment verifies the activation time by counting the subframes from the time when the direct SCell activation is sent and until a CSI report with other than CQI index 0 is received.

The test equipment verifies the CSI report from the direct activated SCell after the activation procedure is completed contains CQI index other than 0.

**Table A.5.5.3.7.1-1: Supported test configurations for FR2 SCell activation case with FR2 PSCell**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | FDD LTE PCell, Cell 2&3 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | TDD LTE PCell, Cell 2&3 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations | |

**Table A.5.5.3.7.1-2: General test parameters for FR2 SCell activation case with FR2 PSCell**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| RF Channel Number |  | 1, 2, 3 | Two radio channels are used for this test. One for E-UTRA cell and two for NR Cell |
| Active PCell |  | Cell1 | PCell on RF channel number 1. As specified in clause A.3.7.2.2 |
| Active PSCell |  | Cell2 | PSCell on RF channel number 2. |
| Deconfigured deactivated SCell |  | Cell3 | Deconfigured deactivated secondary cell on RF channel number 3 |
| DRX |  | OFF | Continuous monitoring of PCell/PSCell |
| PRACH configuration on cell2 |  | FR2 configuration 2 | Captured in A.3.8.3.2 |
| CQI/PMI periodicity and offset configuration index |  | TBD | CQI reporting for PCell/PSCell every uplink subframe |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | Individual offset for cells on carrier frequency of cell1. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | Individual offset for cells on carrier frequency of cell2. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | Individual offset for cells on carrier frequency of cell3. |
| T1 | s | 7 | During this time the PCell/PSCell shall be known and cell3 is detected, and UE shall report a valid CQI for PCell/PSCell. |
| T2 | s | *Ndirect* | During this time the UE shall be configured with directly activated SCell1. |
| T3 | s | 1 | During this time the UE shall report a valid CQI for PCell/PSCell and SCell. |

**Table A.5.5.3.7.1-3: Cell specific test parameters for FR2 SCell activation case with FR2 PSCell**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ParameterNote 5** | **Unit** | **Cell 2** | | | **Cell 3** | | |
|  |  | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| SSB ARFCN |  | freq1 | | | freq2 | | |
| Duplex mode |  | TDD | | | TDD | | |
| TDD configuration |  | TDDConf.3.1 | | | TDDConf.3.1 | | |
| BWchannel | MHz | 100: NRB,c = 66 | | | 100: NRB,c = 66 | | |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | | | SR.3.1 TDD | | |
| RMSI CORESET Reference Channel |  | CR.3.1 TDD | | | CR.3.1 TDD | | |
| RMC CORESET Reference Channel |  | CCR.3.1 TDD | | | CCR.3.1 TDD | | |
| DL initial BWP configuration |  | DLBWP.0.1 | | | | | |
| DL dedicated BWP configuration |  | DLBWP.1.1 | | | | | |
| UL initial BWP configuration |  | ULBWP.0.1 | | | | | |
| UL dedicated BWP configuration |  | ULBWP.1.1 | | | | | |
| OCNG Patterns |  | OP.1 | | | | | |
| SMTC configuration |  | SMTC.1 | | | | | |
| SSB configuration |  | SSB.1 FR2 | | | | | |
| TCI state |  | TCI.State.0 | | | | | |
| TRS configuration |  | TRS.2.1 TDD | | | | | |
| EPRE ratio of PSS to SSS | dB | 0 | | | | | |
| EPRE ratio of PBCH\_DMRS to SSS |  |  | | | | | |
| EPRE ratio of PBCH to PBCH\_DMRS |  |  | | | | | |
| EPRE ratio of PDCCH\_DMRS to SSS |  |  | | | | | |
| EPRE ratio of PDCCH to PDCCH\_DMRS |  |  | | | | | |
| EPRE ratio of PDSCH\_DMRS to SSS |  |  | | | | | |
| EPRE ratio of PDSCH to PDSCH\_DMRS |  |  | | | | | |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  | | | | | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  | | | | | |
| Propagation conditions |  | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: All parameters apply for configuration 1 and 2. | | | | | | | |

**Table A.5.5.3.7.1-4: OTA related test parameters for FR2 SCell activation case with FR2 PSCell**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ParameterNote 6** | **Unit** | **Cell 2** | | | **Cell 3** | | |
|  |  | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| Angle of arrival configuration |  | Setup 1 according to A.3.15.1 | | | | | |
| Assumption for UE beamsNote 7 |  | Rough | | | Rough | | |
| Note1 | dBm/15kHzNote4 | [-104.7] | | | [-104.7] | | |
| Note1 | dBm/SCSNote3 | [-95.7] | | | [-95.7] | | |
|  | dB | [7] | | | [7] | | |
| SS-RSRPNote2 | dBm/SCS Note4 | [-88.7] | | | [-88.7] | | |
|  | dB | [7] | | | [7] | | |
| IoNote2 | dBm/95.04 MHz Note4 | [-58.92] | | | [-58.92] | | |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone  Note 6: All parameters apply for configuration 1 and 2  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | | |

##### A.5.5.3.7.2 Test Requirements

The UE shall accomplish the activation of the SCell no later than subframe m+*Ndirect* as defined in clause 8.3.4.

Time period T3 starts at (m+ *Ndirect*), at which point UE shall be reporting a valid CQI for both PCell/PSCell and SCell.

During T3 the UE shall send CSI reports for SCell with non-zero CQI index and continue to send CSI reports for SCell 1 with non-zero CQI index until the end of T3. All of the above test requirements shall be fulfilled in order for the observed SCell1 direct activation delay to be counted as correct. The rate of correct observed SCell1 direct activation delay during repeated tests shall be at least 90%.

End of FIFth Modification

Unchanged Sections Omitted

SIXth Modification

#### A.5.5.6.4 SCell dormancy switch

##### A.5.5.6.4.1 E-UTRAN – NR FR2 PSCell SCell dormancy switch of single FR2 SCell inside active time

###### A.5.5.6.4.1.1 Test Purpose and Environment

The purpose of this test is to verify

1) the interruption due to RRM and CSI measurement during SCell dormancy on spCell is within the limits specified in clause 7.32.2.14.2 of 36.133 [15] for E-UTRA victim cell, and clause 8.2.1.2.15.2 and 8.2.1.2.15.3 for NR victim cell, and

2) the SCell dormancy switch delay is within the requirement defined in clause 8.6.2, and the SCell dormancy switch interruption is within the limits defined in clause 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell.

Supported test configurations are shown in Table A.5.5.6.4.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), one NR PSCell (Cell 2) and one NR SCell (Cell 3) as given in Table A.5.5.6.4.1.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell and SCell are specified in Table A.5.5.6.4.1.1-3 below.

The tests consist of three consecutive time periods T1, T2, and T3, respectively. All cells have constant signal levels throughout the test. The UE is continuously scheduled in PCell and PSCell throughout the test

Before the test starts,

UE is connected to Cell 1 (PCell), Cell 2 (PSCell) and Cell 3 (SCell).

UE is configured with a single UE-specific downlink bandwidth part, BWP-0, for Cell 2. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is configured with one non-dormant and one dormant UE-specific downlink bandwidth part, BWP-0 and BWP-1, respectively, for Cell 3. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPin Cell 3 is BWP-0.

UE is indicated that *firstOutsideActiveTimeBWP-Id* that the active DL BWP after when switching from dormant BWPin Cell 3 is BWP-0

T1 starts at the point in time at which the UE receives a DCI with dormancy indication on PDCCH in PSCell at the antenna connector, in a slot # denoted *m*, pertaining to dormancy indication for switching SCell from non-dormancy to dormancy. The UE shall complete switching of the SCells to dormancy by the end of slot *m* + ceil(TBWPswitchDelay/NR slot length) + 1 in Test1, and slot *m* + ceil(TBWPswitchDelay/NR slot length) + 2 in Test2, as specified in clause 8.6.2. Any PCell interruptions due to the switching between non-dormant and dormant BWPs shall fulfill requirements in clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell. Any PSCell interruptions due to the switching between non-dormant and dormant BWPs shall fulfill requirements in clause 8.2.1.2.15.1 for NR victim cell. The test equipment verifies that interruptions due to switching from non-dormancy to dormancy are within the requirements by analysing HARQ feedback transmitted in PCell for PCell and in PSCell for PSCell.

During T2, the UE is carrying out CSI and RRM measurements on dormant SCell. Any PCell interruptions due to CSI and RRM measurements shall fulfill requirements in clause 7.32.2.14.2 of 36.133 [15] for E-UTRA victim cell, and clause 8.2.1.2.15.2 and 8.2.1.2.15.3 for NR victim cell. The test equipment verifies that the interruptions are within the allowed percentages by counting ACK/NACKs in PCell and PSCell. At the end of T2, the test equipment transmits a DCI with dormancy indication on PDCCH in PCell carrying a dormany indication for switching SCell from dormancy to non-dormancy.

T3 starts at the point in time at which the UE receives a DCI with dormancy indication on PDCCH in PSCell at the antenna connector, in a slot # denoted *n*, pertaining to dormancy indication for switching SCell from dormancy to non-dormancy. The UE shall complete switching of the SCell to non-dormancy by the end of slot *n* + ceil(TBWPswitchDelay/NR slot length) + 1 in Test1, and slot *n* + ceil(TBWPswitchDelay/NR slot length) + 2 in Test2, as specified in clause 8.6.2. Any PCell interruptions due to the switching between non-dormant and dormant BWPs shall fulfill requirements in clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell. Any PSCell interruptions due to the switching between non-dormant and dormant BWPs shall fulfill requirements in clause 8.2.1.2.15.1 for NR victim cell. The test equipment verifies that interruptions due to switching from dormancy to non-dormancy are within the requirements by analysing HARQ feedback transmitted in PCell for PCell, and in PSCell for PSCell. PDCCHs indicating new transmissions shall be sent continuously on SCell from the slot right after *n* + ceil(TBWPswitchDelay/NR slot length) + 1 in Test1, and slot *n* + ceil(TBWPswitchDelay/NR slot length) + 2 in Test2. The test equipment verifies the SCell dormancy switch delay by counting the slots from slot n till an ACK/NACK for SCell is received.

There are two subtests in this test. In Subtest 1 the DCI format 1\_1 command for SCell dormancy switch is transmitted within the first 3 OFDM symbols in a slot, and in Subtest 2 the DCI format 1\_1 command for SCell dormancy switch is transmitted after the first 3 OFDM symbols in a slot. A UE that only supports triggering during within the first three OFDM symbols of a slot shall only undergo Test1, whereas a UE that supports triggering also in remaining OFDM symbols of a slot shall undergo Test1 and Test2*.*

Table A.5.5.6.4.1.1-1: Dormancy switch supported test configurations

|  |  |
| --- | --- |
| 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 |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: A UE which fulfils the requirements in test case A.5.5.6.1.2 can skip the test cases in A.5.5.6.1.1.  Note 3: NR configuration is the same for PSCell and SCells. | |

Table A.5.5.6.4.1.1-2: General test parameters for Dormancy switch in synchronous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | Comment |
| Subtest 1 | Subtest 2 |
| E-UTRA RF Channel Number |  | 1 | | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2, 3 | | Two NR radio channel is used for this test |
| Active PCell |  | Cell 1 | | PCell on RF channel number 1. |
| Active PSCell |  | Cell 2 | | PSCell on RF channel number 2. |
| Active SCell |  | Cell 3 | | SCell on RF channel number 3. |
| CP length |  | Normal | |  |
| DRX |  | OFF | |  |
| Measurement gap pattern Id |  | OFF | |  |
| *bwp-InactivityTimer* | ms | 500 | |  |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | | Individual offset for cells on PCC. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | | Individual offset for cells on PSCC. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | | Individual offset for cells on SCC. |
| Cell2 timing offset to cell1 | μs | 3 | | Synchronous EN-DC |
| Cell3 timing offset to cell2 | μs | 0 | | Synchronous cells |
| Triggering DCI format |  | DCI 1\_1 | | Triggering DCI format for triggering during active time |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | 3 – 11 | Test1 is based on that triggering DCI is received within the first three OFDM symbols of a slot. Test2 is based on that the triggering DCI is received later than within the first three OFDM symbols of a slot. |
| T1 | s | 0.2 | |  |
| T2 | s | 5 | |  |
| T3 | s | 0.2 | |  |

Table A.5.5.6.4.1.1-3: NR Cell specific test parameters for Dormancy switch in synchronous EN-DC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Subtest 1 | | Subtest 2 | |
| Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| Frequency Range |  | FR2 | | FR2 | |
| Duplex mode |  | TDD | | TDD | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel |  | 100 MHz: NRB,c = 66 | | 100 MHz: NRB,c = 66 | |
| Active BWP ID |  | 0 | 0 | 0 | 0 |
| Initial DL BWP Configuration |  | DLBWP.0.2 | DLBWP.0.2 | DLBWP.0.2 | DLBWP.0.2 |
| Active DL BWP-0 Configuration |  | DLBWP.1.1 | DLBWP.1.1 | DLBWP.1.1 | DLBWP.1.1 |
| Active DL BWP-1 Configuration |  | NA | DLBWP.1.2 | NA | DLBWP.1.2 |
| Initial UL BWP Configuration |  | ULBWP.0.2 | ULBWP.0.2 | ULBWP.0.2 | ULBWP.0.2 |
| Active UL BWP-0 Configuration |  | ULBWP.1.1 | ULBWP.1.1 | ULBWP.1.1 | ULBWP.1.1 |
| Active UL BWP-1 Configuration |  | NA | ULBWP.1.2 | NA | ULBWP.1.2 |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | | SR.3.1 TDD | |
| RMSI CORESET parameters |  | CR.3.1 TDD | | CR.3.1 TDD | |
| Dedicated CORESET parameters |  | CCR.3.1 TDD | | CCR.3.2 TDD | CCR.3.1 TDD |
| OCNG Patterns |  | OP.1 | | OP.1 | |
| SSB Configuration |  | SSB.1 FR2 | | SSB.1 FR2 | |
| SMTC Configuration |  | SMTC.1 | | SMTC.1 | |
| TCI State |  | TCI.State.0 | | TCI.State.0 | |
| TRS Configuration |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| CSI-RS for CSI reporting |  | CSI-RS.3.1 TDD | | CSI-RS.3.1 TDD | |
| CSI reporting periodicity | slots | 640 | | 640 | |
| SCell measurement cycle (measCycleSCell) | ms | 640 | | 640 | |
| Antenna Configuration |  | 1x2 | | 1x2 | |
| Propagation Condition |  | AWGN | | AWGN | |
| EPRE ratio of PSS to SSS | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3. | | | | | |

**Table A.5.5.6.4.1.1-4: OTA related test parameters for Dormancy switch in synchronous EN-DC**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | Cell 3 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15 | |
| NocNote 1 | dBm/15 kHz | -112 | -112 |
| SS-RSRP Note 2 | dBm/120 kHz Note3 | -85 | -85 |
| Ês/Iot | dB | 18 | 18 |
| IoNote2 | dBm/95.04 MHz Note4 | -56 | -56 |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone. | | | |

###### A.5.5.6.4.1.2 Test Requirements

During T1, any interruption on PCell and PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell.

During T2, interruptions on PCell and PSCell due to CSI and RRM measurements on dormant SCell shall be within the interruption rate requirements specified in 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell.

During T3, any interruption on PCell and PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell, and clause 7.32.2.14.1 of 36.133 [15] for E-UTRA victim cell. Monitoring of PDCCH for SCell in PSCell shall be resumed within the dormancy switching time specified in clause 8.6.2A.

For an event to be considered to be correct, all requirements above have to be fulfilled.

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

##### A.5.5.6.4.2 E-UTRAN – NR FR1 PSCell SCell dormancy switch of two FR2 SCells outside active time

###### A.5.5.6.4.2.1 Test Purpose and Environment

The purpose of this test is to verify the NR SCell dormant BWP switch delay requirement defined in clause 8.6.2A.1, interruption requirements due to the NR SCell dormant BWP switch defined in clause 8.2.1.2.15.1 for NR victim cells and in clause 7.32.2.14.1 of TS36.133 for E-UTRA victim cell, respectively, and interruption requirements due to CSI and RRM measurements on the NR dormant SCells defined in clauses 8.2.1.2.15.2 and 8.2.1.2.15.3 for NR victim cells and in clause 7.32.2.14.2 of TS36.133 for E-UTRA victim cell, respectively. Supported test configurations are shown in Table Table A.5.5.6.4.2.1-1.

The general test parameters are given in Table A.5.5.6.4.2.1-2, and NR cell specific test parameters are given in Table A.5.5.6.4.2.1-3 and Table A.5.5.6.4.2.1-4 below. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), one NR FR1 PSCell (Cell 2), and three NR FR2 SCells (Cell 3-5) as given in Table A.5.5.6.4.2.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell and SCell are specified in Table A.5.5.6.4.2.1-3 and Table A.5.5.6.4.2.1-4 below.

PDCCHs indicating new transmissions shall be sent continuously on PCell (Cell 1), PSCell (Cell 2), and SCell (Cell 5) to ensure that the UE will have ACK/NACK sending except the time before T1 and during T3. PDCCHs indicating new transmissions shall be sent continuously on SCells (Cell 3,4) to ensure that the UE would have ACK/NACK sending except for the time duration when BWP is switching on the cells and the time duration of when active BWP of the cell is dormant.

Before the test starts,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC), Cell 2 (PSCell) on radio channel 2 (PSCC), and Cell 3-5 (SCells) on radio channels 3-5 (SCCs), respectively.

- UE is configured with 2 different UE-specific downlink BWPs for Cell 3 and Cell 4, BWP-1 and BWP-2. BWP-1 and BWP-2 always include bandwidth of the initial DL BWP and SSB. Here, BWP-2 on Cell 3 and Cell 4 is configured as dormant BWP.

- UE is configured with 1 UE-specific downlink BWP the same as initial BWP for Cell 3 and Cell 4.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in Cell 3 and Cell 4.

- UE is configured with DRX.

- UE is configured to monitor PDCCH for DCI format 2\_6 from Cell 2 at *ps-Offset* before the start of *onDuration*. *ps-Offset* is selected to correspond to the dormancy switching time specified in clause 8.6.2A.

All cells have constant signal levels throughout the test.

The test consists of 3 successive time periods, with durations of T1, T2, T3, and T4, respectively.

During T1,

Time period T1 starts when a DCI format 2\_6 command for Cell 3 and Cell 4 DL BWP switch to BWP-2, sent from the test equipment to the UE, is received at the UE side in PSCell’s slot # denoted *i*. The UE shall switch its bandwidth part from BWP-1 to BWP-2.

The UE shall be able to receive PDSCH at the beginning of the DL slot right after PSCell’s DL slot (*i+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2. The UE shall be continuously scheduled on the cell starting from the beginning of the DL slot right after slot (*i+* TMultipleBWPswitchDelay+X).

The UE shall be able to receive PDSCH at the beginning of the DL slot right after SCell(Cell 5)’s DL slot (*i+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2. The UE shall be continuously scheduled on the cell starting from the beginning of the DL slot right after slot (*i+* TMultipleBWPswitchDelay+X).

PCell(Cell 1) interruption due to dormant BWP switch on PSCell shall occur within the dormant BWP switch delay.

SCell(Cell 5) interruption due to dormant BWP switch on SCell(Cell 5) shall occur within the dormant BWP switch delay.

During T2,

Time period T2 starts when dormant BWP switch latency requirement test is completed. The test equipement shall schedule PDSCH every slot.

The UE shall be able to report ACK/NACK corresponding to the scheduled PDSCH to PSCell except for the allowed times as defined in clauses 8.2.1.2.15.2 and 8.2.1.2.15.3.

The UE shall be able to report ACK/NACK corresponding to the scheduled PDSCH to PCell except for the allowed times as defined in clause 7.32.2.14.2 of TS36.133.

During T3,

Time period T3 starts when interruption due to SSB based RRM measurement and CSI measurement requirements test is completed. Test equipment shall not transmit PDCCH, hence, the UE doesn’t monitor PDCCH except DCI format 2\_6 based PDCCH.

During T4,

Time period T4 starts when a DCI format 2\_6 command for Cell 3 and Cell 4 DL BWP switch to BWP-1, sent from the test equipment to the UE, is received at the UE side in PSCell’s slot # denoted *j*. The UE shall switch its bandwidth part from BWP-2 to BWP-1.

The UE shall be able to receive PDSCH at the beginning of the DL slot right after PSCell’s DL slot (*j+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2. The UE shall be continuously scheduled on the cell starting from the beginning of the DL slot right after slot (*j+* TMultipleBWPswitchDelay+X).

The UE shall be able to receive PDSCH at the beginning of the DL slot right after all SCell’s (Cell 3,4,5) DL slot (*j+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2. The UE shall be continuously scheduled on the cells starting from the beginning of the DL slot right after slot (*j+* TMultipleBWPswitchDelay+X).

PCell(Cell 1) interruption due to dormant BWP switch on PSCell shall occur within the dormant BWP switch delay.

SCell(Cell 5) interruption due to dormant BWP switch on SCell(Cell 5) shall occur within the dormant BWP switch delay.

**Table A.5.5.6.4.2.1-1: Supported test configurations for EN-DC DCI 2\_6 based Domant BWP Switch on Multiple NR FR2 SCells**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Config** | **Cell 1** | **Cell 2** | **Cell 3, Cell 4, Cell 5** | **DCI 2\_6 of Cell 2** |
| 1 | LTE FDD | 15kHz SSB SCS, FDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 2 | LTE FDD | 15kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 3 | LTE FDD | 30kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 4 | LTE TDD | 15kHz SSB SCS, FDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 5 | LTE TDD | 15kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 6 | LTE TDD | 30kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | within 3 OFDM symbols |
| 7 | LTE FDD | 15kHz SSB SCS, FDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| 8 | LTE FDD | 15kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| 9 | LTE FDD | 30kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| 10 | LTE TDD | 15kHz SSB SCS, FDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| 11 | LTE TDD | 15kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| 12 | LTE TDD | 30kHz SSB SCS, TDD | 120kHz SSB SCS, TDD | after 3 OFDM symbols |
| Note 1: 10 MHz bandwidth for Cell 2 with 15kHz SSB SCS.  Note 2: 40 MHz bandwidth for Cell 2 with 30kHz SSB SCS.  Note 3: 100 MHz bandwidth for Cell 3,4,5.  Note 4: The UE is only required to be tested in one of the supported test configurations. | | | | |

**Table A.5.5.6.4.2.1-2: General test parameters for EN-DC DCI 2\_6 based Domant BWP Switch on Multiple NR FR2 SCells**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| E-UTRA RF Channel Number |  | 1 | One E-UTRAN carrier frequenciy is used. |
| NR RF Channel Number |  | 2,3,4,5 | Four NR radio channels are used for this test. RF channel number 2 is in FR 1 and RF channel numbers 3,4,5 are in a band where intra-band FR2 CA is allowed. |
| Active PCell |  | Cell 1 | Primary cell on NR RF channel number 1. |
| Active PSCell |  | Cell 2 | Primary SCG cell on NR RF channel number 2. |
| Configured activated SCell |  | Cell 3,4,5 | Configured activated secondary cell on NR RF channel numbers 3,4,5. |
| CP length |  | Normal |  |
| DRX |  | DRX.3 | As specified in clause A.3.3 |
| ps-Offset |  | Depending on UE capability | Monitoring of DCI 2\_6 ahead of start of drx-onDurationTimer. Value of ps-Offset shall correspond to SCell dormancy switching time for switching of two SCells, as specified in clause 8.6.2A. Actual value depends on reported UE capabilities. |
| ps-WakeUp |  | true | Wake up for onDuration in case DCI format 2\_6 is not detected. |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| Cell2 timing offset to cell1 | μs | 3 |  |
| Cell3,4,5 timing offset to cell1 | μs | 3 |  |
| Timing offset among cell3,4,5 | μs | 0 |  |
| T1 | s | [0.2] | During this time cell 3,4 switch to dormancy from non-dormancy. |
| T2 | s | [10] | During this time cell 3,4 are dormant. |
| T3 | S | [0.1] | During this time PDCCH is not transmitted from all cells. |
| T4 | s | [0.2] | During this time cell 3,4 switch to non-dormancy from dormancy. |

**Table A.5.5.6.4.2.1-3: Cell specific test parameters for EN-DC DCI 2\_6 based Domant BWP Switch on Multiple NR FR2 SCells**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 2** | **Cell 3,4** | **Cell 5** |
| Frequency range |  |  | FR1 | FR2 | FR2 |
| Duplex mode |  |  | FDD | TDD | TDD |
| TDD configuration | Config 1,4,7,10 |  | NA | TDDConf.3.1 | TDDConf.3.1 |
| Config 2,5, 8,11 |  | TDDConf.1.1 | TDDConf.3.1 | TDDConf.3.1 |
| Config 3,6,9,12 |  | TDDConf.2.1 | TDDConf.3.1 | TDDConf.3.1 |
| BWchannel | Config 1,2,4,5,7,8,10,11 | MHz | 10: NRB,c = 52 | 100: NRB,c = 66 | 100: NRB,c = 66 |
| Config 3,6,9,12 | MHz | 40: NRB,c = 106 | 100: NRB,c = 66 | 100: NRB,c = 66 |
| SSB Configuration | Config 1,2,4,5,7,8,10,11 |  | SSB.1 FR1 | SSB.1 FR2 | SSB.1 FR2 |
| Config 3,6,9,12 |  | SSB.2 FR1 | SSB.1 FR2 | SSB.1 FR2 |
| Downlink initial BWP Configuration |  |  | DLBWP.0.2 | DLBWP.0.2 | DLBWP.0.2 |
| Active (non-dormant) DL BWP-1 Configuration |  |  | NA | DLBWP.1.1 | NA |
| Active (dormant) DL BWP-2 Configuration |  |  | NA | DLBWP.1.1 | NS |
| Uplink initial BWP Configuration |  |  | ULBWP.0.2 | ULBWP.0.2 | ULBWP.0.2 |
| Active Uplink BWP-1 Configuration |  |  | NA | ULBWP.1.1 | NA |
| Active Uplink BWP-2 Configuration |  |  | NA | ULBWP.1.1 | NA |
| SMTC Configuration |  |  | SMTC.1 | SMTC.1 | SMTC.1 |
| TRS configuration | Config 1,4,7,10 |  | TRS.1.1 FDD | TRS.2.1 TDD | TRS.2.1 TDD |
| Config 2,5, 8,11 |  | TRS.1.1 TDD | TRS.2.1 TDD | TRS.2.1 TDD |
| Config 3,6,9,12 |  | TRS.1.2 TDD | TRS.2.1 TDD | TRS.2.1 TDD |
| TCI state |  |  | TCI.State.0 | TCI.State.0 | TCI.State.0 |
| PDSCH Reference measurement channel | Config 1,4,7,10 |  | SR.1.1 FDD | SR.3.1 TDD | SR.3.1 TDD |
| Config 2,5, 8,11 |  | SR.1.1 TDD | SR.3.1 TDD | SR.3.1 TDD |
| Config 3,6,9,12 |  | SR.2.1 TDD | SR.3.1 TDD | SR.3.1 TDD |
| RMSI CORESET Parameters | Config 1,4,7,10 |  | CR.1.1 FDD | CR.3.1 TDD | CR.3.1 TDD |
| Config 2,5, 8,11 |  | CR.1.1 TDD | CR.3.1 TDD | CR.3.1 TDD |
| Config 3,6,9,12 |  | CR.2.1 TDD | CR.3.1 TDD | CR.3.1 TDD |
| Dedicated CORESET Parameters for scheduling PDCCH | Config 1,4 |  | CCR.1.1 FDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 7,10 |  | CCR.1.5 FDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 2,5 |  | CCR.1.1 TDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 8,11 |  | CCR.1.5 TDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 3,6 |  | CCR.2.1 TDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 9,12 |  | CCR.2.3 TDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Dedicated CORESET Parameters for DCI 2\_6 | Config 1,4 |  | CCR.1.1 FDD | NA | NA |
| Config 7,10 |  | CCR.1.5 FDD | NA | NA |
| Config 2,5 |  | CCR.1.1 TDD | NA | NA |
| Config 8,11 |  | CCR.1.5 TDD | NA | NA |
| Config 3,6 |  | CCR.2.1 TDD | NA | NA |
| Config 9,12 |  | CCR.2.3 TDD | NA | NA |
| CSI-RS configuration |  |  | NA | CSI-RS.3.1 TDD | NA |
| OCNG Patterns |  |  | OP.1 | | |
| EPRE ratio of PSS to SSS |  | dB | 0 | 0 | 0 |
| EPRE ratio of PBCH\_DMRS to SSS |  |
| EPRE ratio of PBCH to PBCH\_DMRS |  |
| EPRE ratio of PDCCH\_DMRS to SSS |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS |  |
| EPRE ratio of PDSCH\_DMRS to SSS |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |
| Propagation conditions |  |  | N/A  Link only, see clause A.3.7A | 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.5.5.6.4.2.1-4: OTA related test parameters for EN-DC DCI 2\_6 based Domant BWP Switch on Multiple NR FR2 SCells**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ParameterNote 6** | **Unit** | **Cell 2** | **Cell 3,4** | **Cell 5** |
| Angle of arrival configuration |  | N/A  Link only, see clause A.3.7A | Setup 1 defined in clause A.3.15.1 | |
| Assumption for UE beams Note 7 |  | Fine | Fine |
| Note1 | dBm/15kHzNote4 | [-111.7112] | [-111.7112] |
| Note1 | dBm/SCSNote3 | [-102.7103] | [-102.7103] |
|  | dB | [7] | [7] |
| SS-RSRPNote2 | dBm/SCS Note4 | [-95.785] | [-95.785] |
|  | dB | [718] | [718] |
| IoNote2 | dBm/95.04 MHz Note4 | [-65.956] | [-65.956] |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone  Note 6: All parameters apply for configuration 1 and 2  Note 7: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation. | | | | |

###### A.5.5.6.4.2.2 Test Requirements

During T1, the UE shall start to send the ACK for PSCell in the DL slot right after PSCell’s DL slot (*i+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2.

During T2, the UE shall transmit at least [98.5]% of ACK/NACK on NR PCell.

During T4, the UE shall start to send the ACK for PSCell in the DL slot right after PSCell’s DL slot (*j+* TMultipleBWPswitchDelay+X) as defined in clause 8.6.2A.2.

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

During T1, the start of the interruption of PCell and SCell (Cell 5) during dormant BWP switch on SCells (Cell 3,4) shall not happen outside the dormant BWP switch delay.

During T1, the start of the interruption of PCell and SCells (Cell 3,4,5) during dormant BWP switch on SCells (Cell 3,4) shall not happen outside the dormant BWP switch delay.

End of SIXth Modification

Unchanged Sections Omitted

SEVENth Modification

#### A.6.5.3.4 Direct SCell activation at SCell addition of known SCell in FR1

##### A.6.5.3.4.1 Test Purpose and Environment

The purpose of this test is to verify fulfillment of direct SCell activation delay and interruption requirements at SCell addition as defined in clause 8.3.4 and 8.2.2, respectively. The supported test configurations are shown in Table A.6.5.3.4.1-1.

The test scenario comprises one PCell (Cell 1) and one SCell (Cell 2) as outlined in Table A.6.5.3.4.1-2. Cell-specific parameters are provided in Table A.6.5.3.4.1-3.

The test consists of two successive time periods with duration T1 and T2, respectively. There are two carriers, each with one cell. Cell 1 (PCell) is on RF channel 1 (PCC), and Cell 2 (SCell) is on RF channel 2 (SCC). Cell 1 and Cell 2 both operate according to one of the configurations in Table A.6.5.3.4.1-1.

Before the test starts the UE is connected to Cell 1 on RF channel 1. The UE is only monitoring RF channel 1 and is not aware of Cell 2 on RF channel 2.

The UE is continuously scheduled in PCell throughout the test.

At the beginning of T1 the UE is configured to measure RF channel 2 in measurement gaps. During T1, the UE detects and measures Cell 2 on RF channel 2, and sends a measurement report containing Cell 2 to the test equipment. After having received a measurement report containing Cell 2, the test equipment deconfigures the measurement gaps and thereafter sends a RRC connection reconfiguration message to the UE by which it configures the SCell (Cell 2) in activated state (*sCellState* is set to *activated*). The time between reception of the last measurement report carrying SCell and transmission of the RRC connection reconfiguration message directly activating SCell is kept short enough to allow the SCell to remain known to the UE.

Time period T2 starts when the UE receives the RRC connection reconfiguration message at the UE antenna connector. The corresponding slot at which the message is received at the UE antenna connector is denoted *n.* The UE shall complete activation of the SCell no later than in slot *n +* , as specified in clause 8.3.4. From slot *n+* and onwards the UE shall report valid CSI both for PCell and SCell.

The test equipment verifies the activation time by counting the slots between the RRC connection reconfiguration message is sent and until CSI report with non-zero CQI for both PCell and SCell is received.

The test equipment verifies that interruptions on other serving cells are within the requirements by counting ACK/NACKs transmitted in PCell.

**Table A.6.5.3.4.1-1: Supported test configurations**

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

|  |
| --- |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.6.5.3.4.1-2: General test parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1, 2 | Two NR radio channels are used for this test |
| Active PCell |  | Cell 1 | Primary cell on NR RF channel number 1. |
| Inter-frequency neighbor cell (SCell to-be) |  | Cell 2 | Inter-frequency neighbor cell on NR RF channel number 2 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| Measurement gap pattern |  | gp0 | Measurement gap is used during parts of time period T1 for detection of Cell 2. |
| CSI reporting periodicity | ms | 2 | CSI reporting periodicity for periodic reporting of CQI for PCell and, when added, SCell. |
| SCell measurement cycle (measCycleSCell) | ms | 160 | Measurement cycle for SCell does not come into effect in direct activation at SCell addition. |
| Timing offset between Cell 1 and Cell 2 | μs | ≤ MRTD | The value of maximum timing offset depends upon the carrier aggregation scenario. |
| T1 | s | 7 | During this time period the PCell shall be known and Cell 2 shall be detected as an inter-frequency neighbor cell. |
| T2 | s | 1 | During this time period Cell 2 shall be configured and directly activated as SCell. |

**Table A.6.5.3.4.1-3: NR Cell specific test parameters**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | Cell 2 | | |
| T1 | T2 | T1 | | T2 |
| Duplex mode | | Config 1 |  | FDD | | | | |
| Config 2,3 | TDD | | | | |
| TDD configuration | | Config 2 |  | TDDConf.1.1 | | | | |
| Config 3 | TDDConf.2.1 | | | | |
| BWchannel | | Config 1,2 | MHz | 10: NRB,c = 52 | | | | |
| Config 3 | 40: NRB,c = 106 | | | | |
| BWP configuration | | Initial DL |  | DLBWP.0.1 | | | --- | DLBWP.0.1 |
| Initial UL | ULBWP.0.1 | | | --- |
| Dedicated DL | DLBWP.1.1 | | | DLBWP.1.1 |
| Dedicated UL | ULBWP.1.1 | | | --- |
| TCI state | | |  | TCI.State.0 | | | --- | TCI.State.0 |
| CSI-RS configuration for CSI reporting | | Config 1 |  | CSI-RS.1.1 FDD | | | --- | CSI-RS.1.1 FDD |
| Config 2 | CSI-RS.1.1 TDD | | | CSI-RS.1.1 TDD |
| Config 3 | CSI-RS.2.1 TDD | | | CSI-RS.2.1 TDD |
| TRS Configuration | | Config 1 |  | TRS.1.1 FDD | | | --- | TRS.1.1 FDD |
| Config 2 | TRS.1.1 TDD | | | TRS.1.1 TDD |
| Config 3 | TRS.1.2 TDD | | | TRS.1.2 TDD |
| PDSCH Reference measurement channel | | Config 1 |  | SR.1.1 FDD | | | --- | SR.1.1 FDD |
| Config 2 | SR.1.1 TDD | | | SR.1.1 TDD |
| Config 3 | SR.2.1 TDD | | | SR.2.1 TDD |
| Dedicated CORESET parameters | | Config 1 |  | CCR.1.1 FDD | | | --- | CCR.1.1 FDD |
| Config 2 | CCR.1.1 TDD | | | CCR.1.1 TDD |
| Config 3 | CCR.2.1 TDD | | | CCR.2.1 TDD |
| RMSI CORESET parameters | | Config 1 |  | CR.1.1 FDD | | | --- | |
| Config 2 | CR.1.1 TDD | | |
| Config 3 | CR.2.1 TDD | | |
| OCNG Pattern | | |  | OP.1 | | | OP.1 | |
| SSB Configuration | | Config 1,2 |  | SSB.1 FR1 | | | SSB.1 FR1 | |
| Config 3 | SSB.2 FR1 | | | SSB.2 FR1 | |
| SMTC configuration | | |  | SMTC.1 | | | SMTC.1 | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS Note1 | | |
| EPRE ratio of OCNG to OCNG DMRS Note1 | | |
| *Noc* Note2 | Config 1,2 | | dBm/15kHz | -104 | | | -104 | |
| Config 3 | | -101 | | | -101 | |
| *Ês/Iot* | | | dB | 17 | | | 17 | |
| *Ês/Noc* | | | dB | 17 | | | 17 | |
| SS-RSRP Note3 | Config 1,2 | | dBm/SCS | -87 | | | -87 | |
| Config 3 | | -84 | | | -84 | |
| Io Note3 | Config 1,2 | | dBm/9.36 MHz | -59.0 | | | -59.0 | |
| Config 3 | | dBm/38.16 MHz | -52.9 | | | -52.9 | |
| Propagation condition | | |  | AWGN | | | AWGN | |
| Correlation Matrix and Antenna Configuration | | |  | 1x2 Low | | | 1x2 Low | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for *Noc* to be fulfilled.  Note 3: SS-RSRP, SCH\_RP, and Io levels have been derived from other parameters for information purpose. They are not settable parameters themselves. | | | | | | | | |

##### A.6.5.3.4.2 Test Requirements

The UE shall complete the direct activation of the SCell no later than at slot *n +* .

The UE shall report non-zero CQI for SCell from slot *n +*  and onwards throughout time period T2.

The interruption on PCell during direct activation of the SCell shall occur within the interruption window specified in clause 8.3.4 and shall not exceed the length specified in clause 8.2.2.2.11.

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

#### A.6.5.3.5 Direct SCell activation at handover with known SCell in FR1

##### A.6.5.3.5.1 Test Purpose and Environment

This test is to verify the requirement for the FDD-FDD and TDD-TDD intra frequency handover with direct SCell activation requirements specified in subclause 8.3.5.

Supported test configurations are shown in table A.6.5.3.5.1-1. Both handover with direct SCell activation requirements are tested by using the parameters in table A.6.5.3.5.1-2, and A.6.5.3.5.1-3.

The test scenario comprises of three NR FDD or NR TDD FR1 carriers and the 3 cells as given in tables A.6.5.3.5.1-1 and A.6.5.3.5.1-2. 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 is in connected mode with PCell and SCell1 (cell 2) is in activated state and UE is reporting CQI for both PCell and SCell1.

Time period T2 starts when UE receives a handover command to Cell 3 that also activates SCell1 (Cell2). This is done using an *RRCReconfiguration* message with parameter *sCellState* set to *activated* for the SCell1 (Cell 2). The message is sent from the test equipment to the UE and is received in a subframe # denoted n at the UE antenna connector. The UE shall accomplish the activation of the SCell no later than subframe (n +Ndirect).

Time period T3 starts at (n +Ndirect), at which point UE shall be reporting a valid CQI for both PCell and SCell1.

**Table A.6.5.3.5.1-1: Intra-frequency handover with direct SCell activation from FR1 to FR1 test configurations**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | PCell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  SCell: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | PCell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  SCell: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | PCell: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  SCell: 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.6.5.3.5.1-2: General test parameters Intra-frequency handover with direct SCell activation from FR1 to FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | PCell |  | Cell 1 |  |
| SCell |  | Cell 2 |  |
| Target cell |  | Cell 3 |  |
| Final condition | PCell |  | Cell 3 |  |
| SCell |  | Cell 2 |  |
| neighbour cell |  | Cell 1 |  |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| PRACH configuration index | |  | FR1 PRACH configuration 1 | As specified in table Table 6.3.3.2-3 in TS 38.211 [6] |
| Time offset between cells | |  | 3 μs | Synchronous cells |
|  | | s | [TBD] | UE is in connected mode with PCell and SCell1 (cell 2) is in activated state. UE receives a handover command |
| T2 | | s | [n +Ndirect] | UE shall accomplish the activation of the SCell |
| T3 | | s | [1] |  |
| THARQ | | slot | k | k is a number of slots indicated by the PDSCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format or provided by *dl-DataToUL-ACK* if the PDSCH-to-HARQ feedback timing field is not present in the DCI format, the value is defined in 38.213 [3] |
| TCSI\_Reporting | | ms | 2 | the delay uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2] |
| k | | ms |  | As specified in clause 4.3 of TS 38.213 [3] |

**Table A.6.5.3.5.1-3: Cell specific test parameters for NR FR1-FR1 Intra frequency handover with direct SCell activation test case**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 1** | | | **Cell 2** | | | **Cell 3** | | |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| NR RF Channel Number | |  | 1 | | | 2 | | | 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 measurement channel | Config 1 |  | SR.1.1 FDD | | | | | | | | |
| Config 2 | SR.1.1 TDD | | | | | | | | |
| Config 3 | SR2.1 TDD | | | | | | | | |
| CORESET Reference Channel | Config 1 |  | CR.1.1 FDD | | | | | | | | |
| Config 2 | CR.1.1 TDD | | | | | | | | |
| Config 3 | CR2.1 TDD | | | | | | | | |
| TRS configuration | Config 1 |  | TRS.1.1 FDD | | | | | | | | |
| Config 2 |  | TRS.1.1 TDD | | | | | | | | |
| Config 3 |  | TRS.1.2 TDD | | | | | | | | |
| OCNG Patterns | |  | OCNG pattern 1 | | | | | | | | |
| SMTC Configuration | |  | SMTC pattern 1 | | | | | | | | |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 | | | | | | | | |
| Config 3 | SSB.2 FR1 | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | Config 1,2 | kHz | 15 kHz | | | | | | | | |
| Config 3 | 30 kHz | | | | | | | | |
| PUCCH/PUSCH subcarrier spacing | Config 1,2 | kHz | 15 kHz | | | | | | | | |
| Config 3 | 30 kHz | | | | | | | | |
| PRACH configuration | |  | FR1 PRACH configuration 1 | | | | | | | | |
| BWP configuraiton | Initial DL BWP |  | DLBWP.0.1 | | | | | | | | |
| Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | | |
| Initial UL BWP |  | ULBWP.0.1 | | | | | | | | |
| Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | | | | | | |
| 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] | [8] | [8] | [8] | [8] | [8] | [8] | [8] | [8] |
|  | | dB | [8] | [8] | [8] | [8] | [8] | [8] | [8] | [8] | [8] |
| SSB\_RP | Config 1,2 | dBm/SCS | [-90] | [-90] | [-90] | [-90] | [-90] | [-90] | [-90] | [-90] | [-90] |
| Config 3 | dBm/SCS | [-87] | [-87] | [-87] | [-87] | [-87] | [-87] | [-87] | [-87] | [-87] |
| IoNote3 | Config 1,2 | dBm/  9.36MHz | [-61.41] | [-57.06] | [-57.06] | [-61.41] | [-57.06] | [-61.41] | [-57.06] | [-57.06] | [-61.41] |
| Config 3 | dBm/  38.16MHz | [-55.31] | [-50.96] | [-50.96] | [-55.31] | [-50.96] | [-55.31] | [-50.96] | [-50.96] | [-55.31] |
| Propagation condition | | - | AWGN | | | AWGN | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | | | | | |

##### A.6.5.3.5.2 Test Requirements

The UE shall be capable to transmit valid CSI report for the directly activated SCell1 no later than in subframe n+Ndirect.

The rate of correct observed SCell1 direct activation delay during repeated tests shall be at least 90%.

NOTE: The SCell activation delay, Ndirect, can be expressed as: Ndirect = TRRC\_process + Tinterrupt + T2 + T3 + Tactivation\_time + TCSI\_Reporting - 3ms, where:

TRRC\_Process: RRC procedure delay defined in clause 12 of TS 38.331 [2],

Tinterrupt: Interruption time during handover as specified in clause 6.1.1,

T2: Delay from slot until UE has obtained a valid TA command for the target PCell,

T3: Delay for applying the received TA for uplink transmission in the target PCell, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213,

Tactivation\_timeand TCSI\_Reportingare specified in clause 8.3.2, where the following definitions of *TFirstSSB* and *TFirstSSB\_MAX* as defined in section 8.3.5 shall apply:

- TFirstSSB: the time to the end of the first complete SSB burst indicated by the SMTC after slot n + (𝑇𝑅𝑅𝐶\_𝑃𝑟𝑜𝑐𝑒𝑠𝑠+𝑇𝑖𝑛𝑡𝑒𝑟𝑟𝑢𝑝𝑡+𝑇2+𝑇3)/(*N*𝑅 𝑠𝑙𝑜𝑡 𝑙𝑒𝑛𝑔𝑡ℎ)

- TFirstSSB\_MAX: the time to the end of the first complete SSB burst indicated by the SMTC after slot n + (𝑇𝑅𝑅𝐶𝑃𝑟𝑜𝑐𝑒𝑠𝑠+𝑇𝑖𝑛𝑡𝑒𝑟𝑟𝑢𝑝𝑡+𝑇2+𝑇3)/(*N*𝑅 𝑠𝑙𝑜𝑡 𝑙𝑒𝑛𝑔𝑡ℎ)

This gives a total of Ndirect = 10 + 52 *+* TIU + T2 + T3+ Tactivation\_time + TCSI\_Reporting - 3 ms = 62 + 10 + 13 + 6 + 20 + 2 - 3 = 94 ms for test configurations 1 and 2.

This gives a total of Ndirect = 10 + 52 *+* TIU + T2 + T3+ Tactivation\_time + TCSI\_Reporting - 3 ms = 62 + 10 + 13 + 6 + 20 + 2 - 3 = 94 ms for test configuration 3.

During T3 the UE shall send valid CSI reports for PCell and SCell1 with non-zero CQI index and continue to send CSI reports for PCell and SCell1 (Cell 2) with non-zero CQI index until the end of T3.

All of the above test requirements shall be fulfilled in order for the observed SCell1 direct activation delay to be counted as correct.

End of SEVENth Modification

Unchanged Sections Omitted

EIGHth Modification

#### A.6.5.6.4 SCell dormancy switch

##### A.6.5.6.4.1 NR FR1 PCell SCell dormancy switch of single FR1 SCell outside active time

###### A.6.5.6.4.1.1 Test Purpose and Environment

The purpose of this test is to verify the SCell dormancy switch delay requirements defined in clause 8.6 when the UE is triggered to switch between dormancy to non-dormancy and non-dormancy to dormancy outside the DRX active time. Further the test purpose is to verify the interruption rate on other serving cells when the UE performing CSI and RRM measurements on dormant SCell(s) as defined in clause 8.2.2.2.12 and also to verify the interruption requirement on other active serving cell defined in clause 8.2.2.2.5.

In the test scenario UE is connected to one PCell (Cell 1) in FR1 and one SCell in FR1. In the test the SCell is switched from non-dormancy to dormancy, and vice versa, at a point in time before start of *onDuration*. The UE is configured to monitor PDCCH for DCI format 2\_6 at *ps-Offset* before the start of *onDuration*. Two tests are specified, where a UE that only supports triggering within the first three OFDM symbols of a slot shall undergo Test1 only, and a UE that supports triggering also in remaining OFDM symbols of a slot shall undergo both Test1 and Test2. In the tested scenario, *ps-Offset* is selected to correspond to the dormancy switching time specified in clause 8.6.

The supported test configurations are shown in Table A.6.5.6.4.1.1-1. The general test configuration is given in Table A.6.5.6.4.1.1-2. NR Cell-specific parameters are specified in Table A.6.5.6.4.1.1-3.

Before the test starts,

- UE is connected to Cell 1 (PCell) on radio channel 1 (PCC), and Cell 2 (SCell) on radio channel 2 (SCC).

- UE is configured with 1 UE-specific downlink bandwidth parts the same as initial BWP for PCell, BWP-0 in Cell 1 before starting the test.

- UE is configured with 2 different UE-specific downlink bandwidth parts for SCell, BWP-1 and BWP-2, in Cell 2 before starting the test. BWP-1 and BWP-2 always include bandwidth of the initial DL BWP and SSB.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-0 in PCell.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in SCell.

- UE is indicated in *dormantBWP -Id* that the active DL BWPis BWP-2 in the SCell.

- UE is configured with DRX.

- UE is configured to monitor DCI format 2\_6, and to be active during *onDuration* even when no DCI format 2\_6 is detected (*ps-WakeUp*).

All cells have constant signal levels throughout the test.

The test consists of 4 successive time periods, with durations of T1, T2, T3 and T4, respectively.

During T1,

Time period T1 starts when a DCI format 2\_6 command intended for dormant BWP switch in a SCell from non-dormancy to dormancy, sent from the test equipment to the UE, is received at the UE side in PCell’s slot # denoted *i* (at *ps-Offset* before *onDuration*). Upon reception of the PDCCH indicating entering dormant BWP in PCell (i.e. through cross-carrier scheduling), UE shall switch the DL BWP-1 to DL BWP-2 in SCell, i.e., switching from non-dormant BWP to dormant BWP and the UE shall complete the switching before the start of *onDuration*.

The UE shall be able to receive PDCCH on PCell no later than the first DL slot that occurs after the beginning of PCell’s DL slot (*i+* TdormantBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK on the PCell no later than the first UL slot that occurs after the beginning of slot (*i+N*) as defined in clause 10.3 in TS38.213. The UE shall be continuously scheduled on PCell’s BWP-0 no later than the first DL slot that occurs after the beginning of slot (*i+* TdormantBWPswitchDelay).

The starting time of PCell (Cell 1) interruption due to dormancy switching on SCell shall occur within the dormant BWP switch delay, i.e. before start of *onDuration*.

The UE shall not transmit signals on SCell after the beginning of PCell’s DL slot (*i+* TdormantBWPswitchDelay) as defined in clause 8.6. The UE shall not be scheduled on SCells BWP-1 no later than the first DL slot that occurs after the beginning of slot (*i+* TdormantBWPswitchDelay).

Time period T2 starts when T1 is completed. During T2, the test equipment continues to schedule the UE continuously in PCell. The UE shall carry out CSI and RRM measurements on the dormant SCells. The UE shall report ACK/NACK in PCell in response to scheduled PDSCH, with the maximum loss of transmitted ACK/NACKs fulfilling the requirement in clause 8.2.2.2.12. The test equipment verifies that the loss of ACK/NACKs is no larger than 1.5%.

Time period T3 starts when T2 is completed. During T3, the test equipment does not schedule the UE, by which the inactivity timer expires and the UE stops monitoring PDCCH except for signalling using DCI format 2\_6 at wake-up signalling occasions.

During T4,

Time period T4 starts when a DCI format 2\_6 command for leaving dormant BWP in SCell, sent from the test equipment to the UE, is received at the UE side in PCell’s slot # denoted *j* (at *ps-Offset* before *onDuration*)*.* Upon reception of the PDCCH indicating leaving dormant BWP in PCell (i.e. through cross-carrier scheduling), UE shall switch the DL BWP-2 to DL BWP-1 in SCell, i.e., switching from dormant BWP to non-dormant BWP.

The UE shall be able to receive PDSCH on PCell and SCell no later than the first DL slot that occurs after the beginning of PCell’s DL slot (*j+* TdormantBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK on the PCell (for both PCell and SCell) no later than the first UL slot that occurs after the beginning of slot (*j+N*) as defined in clause 10.3 in TS 38.213. The UE shall be continuously scheduled on PCell’s BWP-0 no later than the first DL slot that occurs after the beginning of slot (*j+* TdormantBWPswitchDelay).

The starting time of PCell (Cell 1) interruption due to dormancy switching on SCell shall occur within the dormant BWP switch delay.

The UE shall be ready to transmit signals on SCell no later than the first DL slot that occurs after the beginning of PCell’s DL slot (*j+* TdormantBWPswitchDelay) as defined in clause 8.6. The UE shall be ready to continuously scheduled on SCell’s BWP-1 no later than the first DL slot that occurs after the beginning of slot (*j+* TdormantBWPswitchDelay).

The test equipment verifies the DL dormant BWP switch time in SCell by counting the slots from the time when the dormant BWP switch command is received till an ACK/NACK on PCell is received.

The test equipment verifies that potential interruption to PCell is carried out in the correct time span by monitoring ACK/NACK sent in PCell during dormant BWP switch of SCell (i.e. before start of *onDuration*), respectively.

**Table A.6.5.6.4.1.1-1: SCell dormancy switch supported test configurations**

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

**Table A.6.5.6.4.1.1-2: General test parameters for SCell dormancy switch in SA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | **Comment** |
|  |  | **Test 1** | **Test 2** |  |
| NR RF Channel Number |  | 1, 2 | | Two NR radio channels are used for this test |
| Active PCell |  | Cell 1 | | PCell on RF channel number 1. |
| Active SCell |  | Cell 2 | | SCell on RF channel number 2. |
| CP length |  | Normal | |  |
| DRX |  | ON | | For both PCell and SCell |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | | Individual offset for cells on PCC. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | | Individual offset for cells on SCC. |
| Cell2 timing offset to cell1 | μs | 3 | | Time alignment error as specified in TS 38.104 [13] clause 6.5.3.1. |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | 3 – 11 |  |
| T1 | s | 0.2 | |  |
| T2 | s | 0.2 | |  |

**Table A.6.5.6.4.1.1-3: NR Cell specific test parameters for SCell dormancy switch in SA**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | **Cell2** |
| Frequency Range | | |  | FR1 | FR1 |
| Duplex mode | | Config 1 |  | FDD | FDD |
| Config 2,5 | TDD | TDD |
| Config 3 | TDD | FDD |
| Config 4 | FDD | TDD |
| TDD configuration | | Config 1 |  | Not Applicable | Not Applicable |
| Config 2 | TDDConf.1.1 | TDDConf.1.1 |
| Config 3 | TDDConf.1.1 | Not Applicable |
| Config 4 | Not Applicable | TDDConf.1.1 |
| Config 5 | TDDConf.2.1 | TDDConf.2.1 |
| BWchannel | | Config 1,2,3,4 |  | 10 MHz: NRB,c = 52 | 10 MHz: NRB,c = 52 |
| Config 5 | 40 MHz: NRB,c = 106 | 40 MHz: NRB,c = 106 |
| Active BWP ID | | |  | 0 | 1 |
| Initial DL BWP Configuration | | |  | DLBWP.0.2Note4 | |
| Initial UL BWP Configuration | | |  | ULBWP.0.2Note4 | |
| Active DL BWP-0 Configuration | | |  | DLBWP.0.2Note4 | N.A. |
| Active DL BWP-1 Configuration | | |  | N.A. | DLBWP.1.1Note4 |
| Active DL BWP-2 Configuration | | |  | N.A. | DLBWP.1.3Note4 |
| Active UL BWP-0 Configuration | | |  | ULBWP.0.2Note4 | N.A. |
| Active UL BWP-1 Configuration | | |  | N.A. | ULBWP.1.1Note4 |
| Active UL BWP-2 Configuration | | |  | N.A. | ULBWP.1.3Note4 |
| PDSCH Reference measurement channel | | Config 1 |  | SR.1.1 FDD | SR.1.1 FDD |
| Config 2 | SR.1.1 TDD | SR.1.1 TDD |
| Config 3 | SR.1.1 TDD | SR.1.1 FDD |
| Config 4 | SR.1.1 FDD | SR.1.1 TDD |
| Config 5 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET parameters | | Config 1 |  | CR.1.1 FDD | CR.1.1 FDD |
| Config 2 | CR.1.1 TDD | CR.1.1 TDD |
| Config 3 | CR.1.1 TDD | CR.1.1 FDD |
| Config 4 | CR.1.1 FDD | CR.1.1 TDD |
| Config 5 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET parameters, Test 1 | | Config 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
| Config 2 | CCR.1.1 TDD | CCR.1.1 TDD |
| Config 3 | CCR.1.1 TDD | CCR.1.1 FDD |
| Config 4 | CCR.1.1 FDD | CCR.1.1 TDD |
| Config 5 | CCR.2.1 TDD | CCR.2.1 TDD |
| Dedicated CORESET parameters, Test 2 | | Config 1 |  | CCR.1.5 FDD | CCR.1.1 FDD |
| Config 2 | CCR.1.5 TDD | CCR.1.1 TDD |
| Config 3 | CCR.1.5 TDD | CCR.1.1 FDD |
| Config 4 | CCR.1.5 FDD | CCR.1.1 TDD |
| Config 5 | CCR.2.3 TDD | CCR.2.1 TDD |
| OCNG Patterns | | |  | OP.1 | |
| SSB Configuration | | Config 1,2,3,4 |  | SSB.1 FR1 | |
| Config 5 | SSB.2 FR1 | |
| SMTC Configuration | | |  | SMTC.1 | |
| Correlation Matrix and Antenna Configuration | | |  | 1x2 Low | |
| 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) | | |
| NocNote 2 | Config 1,2,3,4 | | dBm/SCS | -104 | -104 |
| Config 5 | | -101 | -101 |
| NocNote 2 | | | dBm/15KHz | -104 | -104 |
| SS-RSRP Note 3 | Config 1,2,3,4 | | dBm/SCS | -87 | -87 |
| Config 5 | | -84 | -84 |
| Ês/Iot | | | dB | 17 | 17 |
| Ês/Noc | | | dB | 17 | 17 |
| IoNote3 | | Config 1,2,3,4 | dBm/  9.36MHz | -58.96 | -58.96 |
| Config 5 | dBm/  38.16MHz | -52.86 | -52.86 |
| 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 Noc to be fulfilled.  Note 3 SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | | | |

###### A.6.5.6.4.1.2 Test Requirements

During T1, the UE shall start to send the ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot (*i+N*) (i.e. from the start of *onDuration*).

During time period T2, the UE shall transmit ACK/NACKs in response to scheduling in PCell and the rate of missed ACK/NACKs shall be no more than 1.5%.

During T4, the UE shall start to send the ACK/NACK for PCell and SCell from the first UL slot that occurs after the beginning of DL slot (*j+N*) (i.e. from the start of *onDuration*).

Where, *N* is the timing that UE provide HARQ-ACK information in response to a detection of a DCI format 2\_6 indicating SCell dormancy as specified in [3].

All of the above test requirements shall be fulfilled in order for the observed SCell dormant BWP switch delay to be counted as correct.

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

During T1 and T4, the start time of PCell interruption during SCell dormant BWP switch shall not happen outside the dormant BWP switch delay.

The interruption of PCell shall not be longer than the interruption duration specified for dormant BWP switch in clause 8.6.

NOTE: During T1, T4 if there are no uplink resources for reporting the ACK/NACK in the first DL slot that occurs after the beginning of DL slot (*i+ N*), (*j+ N*), then the UE shall use the next available uplink resource for reporting the corresponding ACK/NACK.

##### A.6.5.6.4.2 NR FR1 PCell SCell dormancy switch of two FR1 SCells inside active time

###### A.6.5.6.4.2.1 Test Purpose and Environment

The purpose of this test is to verify fulfillment of SCell dormancy switching delay requirements in clause 8.6.2A, requirements on interruptions due to SCell dormancy switching in clause 8.2.2.2.12.1, and requirements on interruptions due to CSI and RRM measurements on dormant SCells in clauses 8.2.2.2.12.2 and 8.2.2.2.12.3, respectively. In the tested scenario, the UE is connected to PCell and two SCells in FR1, and the SCells are switched from non-dormancy to dormancy, and back, during active time. Depending on UE capability on whether DCI for dormancy switching can be received also later than within the initial three OFDM symbols of a slot, the UE may have to undergo one or two sets of tests. A UE that only supports triggering during within the first three OFDM symbols of a slot shall only undergo Test1 and Test2, whereas a UE that supports triggering also in remaining OFDM symbols of a slot shall undergo Test1 through Test4.

The supported test configurations are provided in Table A.6.5.6.4.2.1-1 below. General test parameters are provided in Table A.6.5.6.4.2.1-2, and cell-specific parameters are provided in Table A.6.5.6.4.2.1-3 below.

The tests consist of three consecutive time periods T1, T2, and T3, respectively.

Three carriers are used in the test, each within FR1 and each with one cell. Cell 1 (PCell) is on RF channel 1 (PCC), Cell 2 (SCell1) is on RF channel 2 (SCC1), and Cell 3 (SCell2) is on RF channel 3 (SCC2). All three cells have constant signal levels throughout the test. The UE is continuously scheduled in PCell throughout the test.

Before the test starts,

UE is connected to Cell 1 (PCell), Cell 2 (SCell1) and Cell 3 (SCell2).

UE is configured with a single UE-specific downlink bandwidth part, BWP-0, for Cell 1. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is configured with one non-dormant and one dormant UE-specific downlink bandwidth part, BWP-0 and BWP-1, respectively, for Cell 2 and Cell 3. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWP in Cell 1 is BWP-0.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPin Cell 2 is BWP-0.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPin Cell 3 is BWP-0.

UE is continuously scheduled in PCell, SCell1 and SCell2.

T1 starts at the point in time at which the UE receives a DCI with dormancy indication on PDCCH in PCell at the antenna connector, in a slot # denoted *m*, pertaining to dormancy indication for switching SCell1 and SCell2 from non-dormancy to dormancy. The UE shall complete switching of the SCells to dormancy by the end of slot *m* + ceil(TMultipleBWPswitchDelay/NR slot length) + 1 in Test1 and Test2, and slot *m* + ceil(TMultipleBWPswitchDelay/NR slot length) + 2 in Test3 and Test4, as specified in clause 8.6.2A. Any PCell interruptions due to the switching between non-dormant and dormant BWPs shall fulfill requirements in clause 8.2.2.2.12.1. The test equipment verifies that interruptions due to switching from non-dormancy to dormancy are within the requirements by analysing HARQ feedback transmitted in PCell for PCell.

During T2, the UE is carrying out CSI and RRM measurements on dormant SCell1 and SCell2. Any PCell interruptions due to CSI and RRM measurements shall fulfill requirements in clauses 8.2.2.2.12.2 and 8.2.2.2.12.3, respectively. The test equipment verifies that the interruptions are within the allowed percentages by counting ACK/NACKs in PCell. At the end of T2, the test equipment transmits a DCI with dormancy indication on PDCCH in PCell carrying a dormany indication for switching SCell1 and SCell2 from dormancy to non-dormancy.

T3 starts at the point in time at which the UE receives a DCI with dormancy indication on PDCCH in PCell at the antenna connector, in a slot # denoted *n*, pertaining to dormancy indication for switching SCell1 and SCell2 from dormancy to non-dormancy. The UE shall complete switching of the SCells to non-dormancy by the end of slot *n* + ceil(TMultipleBWPswitchDelay/NR slot length) + 1 in Test1 and Test2, and slot *n* + ceil(TMultipleBWPswitchDelay/NR slot length) + 2 in Test3 and test4, as specified in clause 8.6.2A. Any PCell interruptions due to the switching between dormant and non-dormant BWPs shall fulfill requirements in clause 8.2.2.2.12.1. The test equipment verifies that interruptions due to switching from dormancy to non-dormancy are within the requirements by analysing HARQ feedback transmitted in PCell for PCell. The test equipment verifies the switching delay by analysing HARQ feedback transmitted in PCell for SCells.

**Table A.6.5.6.4.2.1-1: Supported test configurations**

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

|  |
| --- |
| Note: The UE is only required to be tested in one of the supported test configurations |

**Table A.6.5.6.4.2.1-2: General test parameters**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | **Comment** |
| **Test1** | **Test2** | **Test3** | **Test4** |
| NR RF Channel Number |  | 1, 2, 3 | | | | Three NR radio channels are used for this test |
| Active PCell |  | Cell 1 | | | | Primary cell on NR RF channel number 1 in FR1 |
| SCell1 |  | Cell 2 | | | | SCell1 on NR RF channel number 2 in FR1 |
| SCell2 |  | Cell 3 | | | | SCell2 on NR RF channel number 3 in FR1 |
| CP length |  | Normal | | | |  |
| DRX |  | OFF | | | | Continuous monitoring of primary cell |
| CSI reporting periodicity, Non-dormant BWP | ms | 2 | | | | CSI reporting periodicity for periodic reporting of CQI for PCell and non-dormant SCells |
| CSI reporting periodicity, Dormant BWP | ms | 40 | | | | CSI reporting periodicity for periodic reporting of CQI for dormant SCells |
| Timing offset between Cell 1 and Cell 2 | ns | 0 | | | |  |
| Timing offset between Cell 1 and Cell 3 | ns | 0 | | | |  |
| Triggering DCI format |  | 1\_1 | 0\_1 | 1\_1 | 0\_1 | Triggering DCI format for triggering during active time |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | | 3 – 11 | | Test1 and Test3 are based on that triggering DCI is received within the first three OFDM symbols of a slot.Test2 and Test4 are based on that the triggering DCI is received later than within the first three OFDM symbols of a slot. |
| T1 | s | 0.2 | | | |  |
| T2 | s | 5 | | | |  |
| T3 | s | 0.2 | | | |  |

**Table A.6.5.6.4.2.1-3: NR Cell specific test parameters**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | **Cell 2** | **Cell 3** |
| Frequency range | | |  | FR1 | | |
| NR RF channel | | |  | 1 | 2 | 3 |
| Duplex mode | | Config 1 |  | FDD | | |
| Config 2,3 | TDD | | |
| TDD configuration | | Config 2 |  | TDDConf.1.1 | | |
| Config 3 | TDDConf.2.1 | | |
| BWchannel | | Config 1,2 | MHz | 10: NRB,c = 52 | | |
| Config 3 | 40: NRB,c = 106 | | |
| Downlink initial BWP configuration | | |  | DLBWP.0.1 | DLBWP.0.1 | DLBWP.0.1 |
| Uplink initial BWP configuration | | |  | ULBWP.0.1 | --- | --- |
| Downlink active non-dormant BWP-0 configuration | | |  | DLBWP.1.1 | DLBWP.1.1 | DLBWP.1.1 |
| Downlink active dormant BWP-1 configuration | | |  | --- | DLBWP.1.1 | DLBWP.1.1 |
| Uplink active BWP-0 configuration | | |  | ULBWP.1.1 | --- | --- |
| TCI state | | |  | TCI.State.0 | TCI.State.0 | TCI.State.0 |
| CSI-RS configuration for CSI reporting, Non-dormant BWP | | Config 1 |  | CSI-RS.1.1 FDD | CSI-RS.1.1 FDD | CSI-RS.1.1 FDD |
| Config 2 | CSI-RS.1.1 TDD | CSI-RS.1.1 TDD | CSI-RS.1.1 TDD |
| Config 3 | CSI-RS.2.1 TDD | CSI-RS.2.1 TDD | CSI-RS.2.1 TDD |
| CSI-RS configuration for CSI reporting, Dormant BWP | | Config 1 |  | --- | CSI-RS.1.6 FDD | CSI-RS.1.6 FDD |
| Config 2 |  | CSI-RS.1.5 TDD | CSI-RS.1.5 TDD |
| Config 3 |  | CSI-RS.2.6 TDD | CSI-RS.2.6 TDD |
| TRS Configuration | | Config 1 |  | TRS.1.1 FDD | TRS.1.1 FDD | TRS.1.1 FDD |
| Config 2 | TRS.1.1 TDD | TRS.1.1 TDD | TRS.1.1 TDD |
| Config 3 | TRS.1.2 TDD | TRS.1.2 TDD | TRS.1.2 TDD |
| PDSCH Reference measurement channel | | Config 1 |  | SR.1.1 FDD | SR.1.1 FDD | SR.1.1 FDD |
| Config 2 | SR.1.1 TDD | SR.1.1 TDD | SR.1.1 TDD |
| Config 3 | SR.2.1 TDD | SR.2.1 TDD | SR.2.1 TDD |
| Dedicated CORESET parameters, Test 1,2 | | Config 1 |  | CCR.1.1 FDD | CCR.1.1 FDD | CCR.1.1 FDD |
| Config 2 | CCR.1.1 TDD | CCR.1.1 TDD | CCR.1.1 TDD |
| Config 3 | CCR.2.1 TDD | CCR.2.1 TDD | CCR.2.1 TDD |
| Dedicated CORESET parameters, Test 3,4 | | Config 1 |  | CCR.1.5 FDD | CCR.1.1 FDD | CCR.1.1 FDD |
| Config 2 | CCR.1.5 TDD | CCR.1.1 TDD | CCR.1.1 TDD |
| Config 3 | CCR.2.3 TDD | CCR.2.1 TDD | CCR.2.1 TDD |
| RMSI CORESET parameters | | Config 1 |  | CR.1.1 FDD | --- | --- |
| Config 2 | CR.1.1 TDD |
| Config 3 | CR.2.1 TDD |
| OCNG Pattern | | |  | OP.1 | OP.1 | OP.1 |
| SSB Configuration | | Config 1,2 |  | SSB.1 FR1 | SSB.1 FR1 | SSB.1 FR1 |
| Config 3 | SSB.2 FR1 | SSB.2 FR1 | SSB.2 FR1 |
| SMTC configuration | | |  | SMTC.1 | SMTC.1 | SMTC.1 |
| EPRE ratio of PSS to SSS | | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS Note1 | | |
| EPRE ratio of OCNG to OCNG DMRS Note1 | | |
| *Noc* Note2 | Config 1,2 | | dBm/15kHz | -104 | -104 | -104 |
| Config 3 | | -101 | -101 | -101 |
| *Ês/Iot* | | | dB | 17 | 17 | 17 |
| *Ês/Noc* | | | dB | 17 | 17 | 17 |
| SS-RSRP Note3 | Config 1,2 | | dBm/SCS | -87 | -87 | -87 |
| Config 3 | | -84 | -84 | -84 |
| Io Note3 | Config 1,2 | | dBm/9.36 MHz | -59.0 | -59.0 | -59.0 |
| Config 3 | | dBm/38.16 MHz | -52.9 | -52.9 | -52.9 |
| Propagation condition | | |  | AWGN | AWGN | AWGN |
| Correlation Matrix and Antenna Configuration | | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| Note 1: OCNG shall be used such that the cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for *Noc* to be fulfilled.  Note 3: SS-RSRP, SCH\_RP, and Io levels have been derived from other parameters for information purpose. They are not settable parameters themselves. | | | | | | |

###### A.6.5.6.4.2.2 Test Requirements

During T1, any interruption on PCell due to dormancy switching of SCells shall be within the requirement specified in clause 8.2.2.2.12.1.

During T2, interruptions on PCell due to CSI and RRM measurements on dormant SCells shall be within the interruption rate requirements specified in clauses 8.2.2.2.12.2 and 8.2.2.2.12.3, respectively.

During T3, any interruption on PCell due to dormancy switching of SCells shall be within the requirement specified in clause 8.2.2.2.12.1. Monitoring of PDCCH for SCell in SCell shall be resumed within the dormancy switching time specified in clause 8.6.2A.

For an event to be considered to be correct, all requirements above have to be fulfilled.

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

End of EIGHth Modification

Unchanged Sections Omitted

NINth Modification

#### A.7.5.3.4 Direct SCell activation at SCell addition of known SCell in FR2

##### A.7.5.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the delay and interruption for direct SCell activation delay at SCell addition are within the requirements stated in clause 8.3.4.

The supported test configurations are shown in Table A.7.5.3.4.1-1 below. The general test parameters are given in Table A.7.5.3.4.1-2 and cell-specific test parameters in Table A.7.5.3.4.1-3. OTA related test parameters are shown in Table A.7.5.3.4.1-4.

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two FR2 carriers and two NR cells. Before the test starts the UE is connected to Cell 1 (PCell) on carrier #1, but is not aware of Cell 2 on NR carrier #2. Cell 1 and Cell 2 have constant signal levels throughout the test. The UE is monitoring the PCell. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the Cell 2 is monitored by the UE. During T1, Cell 2 should be detected and measured by the UE such that it meets the condition for known cell defined in clause 8.3.4 for direct SCell activation.

Time period T2 starts when the *RRCReconfiguration* message for the configuration and activation of Cell 2 (the SCell), which is sent from the test equipment, is received at the UE antenna connector in a slot # denoted m. The test equipment shall set the parameter *sCellState* to *activated* for the SCell, which causes Cell 2 to become configured and activated.

Time period T3 starts at (m + Ndirect), at which point UE shall be reporting a valid CQI for both PCell and SCell.

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell during the activation of SCell. The test equipment verifies the activation time by counting the slots from the time when the SCell activation message is sent until a CQI report with other than CQI index 0 is received.

Table A.7.5.3.4.1-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | NR 120 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 | |

Table A.7.5.3.4.1-2: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1,2 | Two NR radio channels (1,2) in FR2 are used for this test |
| Active PCell |  | Cell 1 | Primary cell on NR RF channel number 1. |
| Configured and activated SCell |  | Cell 2 | Configured and activated SCell on NR RF channel number 2. |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| T1 | s | 7 | During this time the measurement for Cell 2 is configured, and Cell 2 is detected. |
| T2 | s | Ndirect | During this time the UE shall configure and activate Cell 2 as SCell. |
| T3 | ms | 100 | During this time the UE shall report valid CQI for both PCell and SCell. |
| THARQ | ms | k1NR slot length | k1 is a number of slots indicated by the PDSCH-to-HARQ\_feedback timing indicator field in a corresponding DCI format or provided by *dl-DataToUL-ACK* if the PDSCH-to-HARQ feedback timing field is not present in the DCI format, the value is defined in 38.213 [3] |
| k | slot |  | As specified in clause 4.3 of TS 38.213 [3] |

Table A.7.5.3.4.1-3: Cell specific test parameters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| SSB ARFCN | |  | freq1 | | | freq2 | | |
| Duplex mode | Config 1 |  | TDD | | | | | |
| TDD configuration | Config 1 |  | TDDConf.3.1 | | | | | |
| BWchannel | Config 1 | MHz | 100: NRB,c = 66 | | | | | |
| DL initial BWP configuration | Config 1 |  | DLBWP.0.1 | | | | | |
| DL dedicated BWP configuration | Config 1 |  | DLBWP.1.1 | | | | | |
| UL initial BWP configuration | Config 1 |  | ULBWP.0.1 | | | | | |
| UL dedicated BWP configuration | Config 1 |  | ULBWP.1.1 | | | | | |
| Timing offset to Cell 1 | | ms | Not Applicable | | | 0 | | |
| PDSCH Reference measurement channel | Config 1 |  | SR.3.1 TDD | | | SR.3.1 TDD | | |
| RMSI CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | | | CR.3.1 TDD | | |
| RMC CORESET Reference Channel | Config 1 |  | CCR.3.1 TDD | | | CCR.3.1 TDD | | |
| TRS configuration | Config 1 |  | TRS.2.1 TDD | | | TRS.2.1 TDD | | |
| CSI-RS configuration | Config 1 |  | CSI-RS.3.1 TDD | | | CSI-RS.3.1 TDD | | |
| CSI reporting periodicity | Config 1 | ms | 5 | | | 5 | | |
| OCNG Patterns | |  | OP.1 | | | | | |
| SMTC configuration | |  | SMTC.1 | | | | | |
| SSB configuration | Config 1 |  | SSB.1 FR2 | | | SSB.1 FR2 | | |
| 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) | |
| Propagation condition | | - | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | | | | | | |

Table A.7.5.3.4.1-4: OTA related test parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ParameterNote 6 | Unit | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| Angle of arrival configuration |  | Setup 1 according to A.3.15.1 | | | | | |
| Assumption for UE beamsNote 7 |  | Rough | | | Rough | | |
| Note1 | dBm/15kHzNote4 | -112 | | | -112 | | |
| Note1 | dBm/SCSNote3 | -102.97 | | | -102.97 | | |
|  | dB | 14 | | | 14 | | |
| SS-RSRPNote2 | dBm/SCS Note4 | -88.97 | | | -88.97 | | |
|  | dB | 14 | | | 14 | | |
| IoNote2 | dBm/95.04 MHz Note4 | -59.81 | | | -59.81 | | |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone  Note 6: All parameters apply for configuration 1 and 2  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | | | |

##### A.7.5.3.4.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in the first available uplink resource after slot (m+k). UE is allowed to postpone CSI report to next available UL resource if an available uplink resource is subject to interruption. Whether CSI report in a slot was interrupted is checked by monitoring ACK/NACK sent in PCell in the slot.

During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index in the configured slots for CSI reporting no later than slot , where

Ndirect = TRRC\_Process + T1 + Tactivation\_time + TCSI\_Reporting - 3ms,

- TRRC\_Process = 16ms, which is the RRC procedure delay defined for SCell addition in clause 12 of TS 38.331 [2],

- T1 is the delay from slot m + TRRC\_Process until the transmission of *RRCReconfigurationComplete* message,

- Tactivation\_time = TFirstSSB+ 5ms = 25ms,

- TCSI\_Reporting = 10ms

This gives a total of Ndirect = 16 + T1 + 25 + 10 - 3 = (48 + T1) ms, and NR slot length is 0.125ms.

During T3 the UE shall send CSI reports for SCell with non-zero CQI index and continue to send CSI reports for SCell with non-zero CQI index until the end of T3.

During T2 interruption of PSCell during SCell activation shall not happen outside the window from slot *m*+1 to slot *m+*1+ as defined in clause 8.3.4, where TX =20ms.

The interruption of PCell due to activation of SCell shall not be more than the values specified for NR SA in clause 8.2.2.2.11.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot as defined in clause 8.3.4 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

#### A.7.5.3.5 Direct SCell activation at handover with known SCell in FR2

##### A.7.5.3.5.1 Test Purpose and Environment

This test is to verify the requirements specified in sub clause 8.3.5 for the FR2 handover with direct SCell activation.

The test scenario comprises of three FR2 cells, one source PCell (Cell 1), one target PCell (Cell 2) and one SCell (Cell 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 is in connected mode with PCell (Cell 1). Both Cell 2 and Cell 3 are known to UE and UE is reporting CQI for all Cell 1.

Time period T2 starts when UE receives a handover command that initiate handover of UE to Cell2 and also activates Cell 3. This is done using an *RRCConnectionReconfiguration* message with parameter *sCellState* set to *activated* for the Cell 3. The message is sent from the test equipment to the UE and is received in a slot number n at the UE antenna connector. The UE shall accomplish the handover, addition and activation of the SCell no later than slot (n +).

Time period T3 starts at (n +), at which point UE shall be reporting a valid CSI for both Cell 2 and Cell 3 as given in tables A.7.5.3.5.1-1 and A.7.5.3.5.1-2.

**Table A.7.5.3.5.1-1: Supported test configurations for FR2 handover with direct SCell activation case**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | SCell: NR 120 kHz SSB SCS, 100MHz bandwidth, TDD duplex mode  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.7.5.3.5.1-2: General test parameters for FR2 handover with direct SCell activation case**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| RF Channel Number | |  | 1, 2, 3 | Three NR radio channels are used for this test, Cell 1, Cell2 and Cell 3 use RF channel 1, 2 and 3 respectively. |
| A4-Offset | | dBm | -120 |  |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| Initial conditions | Source cell |  | Cell 1 | Source Cell |
| Target cell |  | Cell 2 | Neighbour cell |
| SCell |  | Cell 3 | SCell is not added and activated |
| Final condition | Source cell |  | Cell 2 | Cell 2 is Source cell after handover |
| Neighbour cell |  | Cell 1 | Neighbour cell |
| SCell |  | Cell 3 | SCell is added and activated |

**Table A.7.5.3.5.1-3: Cell specific test parameters for FR2 SCell activation case**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ParameterNote 5** | **Unit** | **T1** | | | **T2** | | | **T3** | | |
| **Cell 1** | **Cell 2** | **Cell 3** | **Cell 1** | **Cell 2** | **Cell 3** | **Cell 1** | **Cell 2** | **Cell 3** |
| SSB ARFCN |  | freq1 | freq2 | freq 3 | freq1 | freq2 | freq 3 | freq1 | freq2 | freq3 |
| Duplex mode |  | TDD | | | TDD | | | TDD | | |
| TDD configuration |  | TDDConf.3.1 | | | TDDConf.3.1 | | | TDDConf.3.1 | | |
| Downlink initial BWP Configuration |  | DLBWP.0.1 | | | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Downlink dedicated BWP Configuration |  | DLBWP.1.1 | | | DLBWP.1.1 | | | DLBWP.1.1 | | |
| Uplink initial BWP configuration |  | ULBWP.0.1 | | | ULBWP.0.1 | | | ULBWP.0.1 | | |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | | | ULBWP.1.1 | | | ULBWP.1.1 | | |
| TRS configuration |  | TRS.2.1 TDD | | | TRS.2.1 TDD | | | TRS.2.1 TDD | | |
| TCI state |  | TCI.State.0 | | | TCI.State.0 | | | TCI.State.0 | | |
| BWchannel | MHz | 100: NRB,c = 66 | | | 100: NRB,c = 66 | | | 100: NRB,c = 66 | | |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | | - | SR.3.1 TDD | | - | SR.3.1 TDD | |  |
| RMSI CORESET Parameters |  | CR.3.1 TDD | | - | CR.3.1 TDD | | - | CR.3.1 TDD | |  |
| Dedicated CORESET Parameters |  | CCR.3.1 TDD | | - | CCR.3.1 TDD | | - | CCR.3.1 TDD | |  |
| OCNG Patterns |  | OP.1 | | | | | | | | |
| SSB Configuration |  | SSB.1 FR2 | | | | | | | | |
| SMTC Configuration |  | SMTC.1 | | | | | | | | |
| PRACH configuration |  | FR2 PRACH configuration 1 | | | | | | | | |
| EPRE ratio of PSS to SSS | dB | 0 | | | | | | | | |
| EPRE ratio of PBCH\_DMRS to SSS |
| EPRE ratio of PBCH to PBCH\_DMRS |
| EPRE ratio of PDCCH\_DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH\_DMRS |
| EPRE ratio of PDSCH\_DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH\_DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Propagation conditions |  | AWGN | | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: All parameters apply for configuration 1 and 2 | | | | | | | | | | |

**Table A.7.5.3.5.1-4: OTA related test parameters for FR2 SCell activation case**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ParameterNote 6** | | **Unit** | **Cell 1** | | | **Cell 2** | | | **Cell 3** | | |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| Angle of arrival configuration | |  | Setup 1 according to table A.3.15.1 | | | Setup 1 according to table A.3.15.1 | | | Setup 1 according to table A.3.15.1 | | |
| Assumption for UE beams Note 7 | |  | Rough | | | Rough | | | Rough | | |
| Note1 | | dBm/15kHzNote4 | -112 | | | -112 | | | -112 | | |
| Note1 | | dBm/SCSNote3 | -102.97 | | | -102.97 | | | -102.97 | | |
|  | | dB | 14 | | | 14 | | | 14 | | |
| SS-RSRPNote2 | | dBm/SCS Note4 | -88.97 | | | -88.97 | | | -88.97 | | |
|  | | dB | 14 | | | 14 | | | 14 | | |
| IoNote2 | | dBm/95.04 MHz Note4 | -88.80 | | | -88.80 | | | -88.80 | | |
|  | Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone  Note 6: All parameters apply for configuration 1 and 2  Note 7: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation. | | | | | | | | | | |

##### A.7.5.3.5.2 Test Requirements

The UE shall be capable to transmit valid CSI report for PCell (Cell 2) and to the directly activated SCell1 no later than in slot n+ *Ndirect*.

The SCell activation delay, Ndirect, can be expressed as: Ndirect = TRRC\_process + Tinterrupt + T2 + T3 + Tactivation\_time + TCSI\_Reporting - 3ms; Where:

TRRC\_Process: RRC procedure delay defined in clause 12 of TS 38.331 and it is equal to 16ms,

Tinterrupt: Interruption time during handover as specified in clause 6.1.1. The value to be verified in the test is 52 ms (Tinterrupt = 0 ms for Tsearch + 10ms for TIU + 20 ms for Tprocessing + 20ms for T∆ + 2 ms for Tmargin ms) by assuming known SCell and SMTC.1 configuration.

T2: Delay from slot until UE has obtained a valid TA command for the target PCell,

T3: Delay for applying the received TA for uplink transmission in the target PCell, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213,

Tactivation\_timeand TCSI\_Reportingare specified in clause 8.3.2, where the following definitions of *TFirstSSB* and *TFirstSSB\_MAX* as defined in section 8.3.5 shall apply:

During time period T2 of the test, the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot , Tactivation\_time = TSMTC\_SCell + 5ms, as defined in clause 8.3.

During time period T3 of the test, the UE shall stop sending CSI reports for SCell at latest in a slot , as defined in clause 8.3.

During time period T2 of the test, interruption of PCell / PSCell during SCell activation shall not happen outside the slot to , as defined in clause 8.3.

During time period T3 of the test, the starting point of interruption of PCell during SCell deactivation shall not happen outside the slot to , as defined in clause 8.3.

The interruption on any activated serving cell shall not be more than the values specified for SA in clause 8.2.2.2.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay and SCell deactivation delay during repeated tests shall be at least 90%.

NOTE: During time period T2 of the test, if there are no uplink resources for reporting the valid CSI in a slot as defined in clause 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

End of NINth Modification

Unchanged Sections Omitted

TEnth Modification

#### A.7.5.6.4 SCell dormancy switch

##### A.7.5.6.4.1 NR FR2 PCell SCell dormancy switch of single FR2 SCell inside active time

###### A.7.5.6.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the Dormant SCell BWP switch delay requirements are within the requirements stated in section 8.6 for UE configured with a single downlink SCell, when the dormancy indication is received in any of the first 3 OFDM symbols or is received after the first 3 OFDM symbols.

The Supported test configurations are given in Table A.7.5.6.4.1.1-1. The test parameters are given in Tables A.7.5.6.4.1.1-2 and cell-specific parameters in A.7.5.6.4.1.1-3 below. In the measurement control information, a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A6 is used The test consists of four successive time periods, with duration of T1, T2, T3 and T4, respectively. There are two carriers both in FR2, with one cell on the PCC and 2 cells on SCC. Cell 1, Cell 2 and Cell 3 operate in either FDD or TDD duplex mode according to test configuration. All cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on radio channel 1 (PCC) with configured and activated SCell (SCell1) on radio channel 2 (SCC1). The UE is not aware of Cell 3 on radio channel 2 (SCC1). The UE is reporting CSI and shall not report CQI index 0 (out-of-range) in the available uplink resources to report CQI for the SCell. The UE shall be continuously scheduled in the PCell throughout the whole test.

The UE receives a DCI-based BWP switch command by which the SCell1 (Cell 2) is requested to switch the active BWP to the dormant BWP.

The point in time at which the DCI message is received at the UE antenna connector, in a subframe # denoted n, defines the start of time period T1. The UE shall accomplish the BWP switch to the dormant BWP latest in subframe (n + TBWPswitchDelay + X). The UE shall continue to shall report valid CQI if the UE has available uplink resources to report CQI for the dormant SCell. The UE shall continue to shall report L1-RSRP if the UE has available uplink resources to report L1-RSRP for the Dormant SCell. Any PCell interruption due to BWP switch on the SCell shall occur in the subframes n to (n+ TBWPswitchDelay + X).

Time T2 start at T1 + (TBWPswitchDelay + X). During T2 the UE shall continue to measure and report CQI and L1-RSRP in the available uplink resources to report CQI and L1-RSRP for the SCell.

Time T3 starts at T2 + 500ms. During T3 the UE shall continue to measure and report CQI and L1-RSRP in the available uplink resources to report CQI and L1-RSRP for the SCell.

Starting at T4 = T3 + 500ms, Cell 3 becomes detectable. During T3 the UE shall continue to measure and report CQI and L1-RSRP in the available uplink resources to report CQI and L1-RSRP for the SCell. The UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T4. The UE is not required to read the neighbour cell SSB index in this test.

At time T5 starting at T4 + 1500ms a a DCI-based BWP switch command by which the SCell1 (Cell 2) is requested to switch the active BWP to the non-dormant BWP.

The point in time at which the DCI message is received at the UE antenna connector, in a subframe # denoted n, defines the start of time period T6. The UE shall accomplish the BWP switch to the non-dormant BWP latest in subframe (n + TBWPswitchDelay + X). The UE shall continue to shall report valid CQI if the UE has available uplink resources to report CQI for the non-dormant SCell. The UE shall continue to shall report L1-RSRP if the UE has available uplink resources to report L1-RSRP for the non-dormant SCell. Any PCell interruption due to BWP switch on the SCell shall occur in the subframes n to (n+ TBWPswitchDelay + X).

During T2, T3 and T4 the total rate of ACK/NACK feedback loss on any non-dormant serving cell resulting from CQI measurements and RRM measurements, clause 8.2.2.2.12.3, on dormant SCells, shall not exceed [0.5]%.

During T2, T3 and T4 the total rate of ACK/NACK feedback loss on any non-dormant serving cell resulting from L1-RSRP measurements and RRM measurements, clause 8.2.2.2.12.x, on dormant SCells, shall not exceed [0.5]%.

During T2, T3 and T4 the total rate of ACK/NACK feedback loss on any non-dormant serving cell resulting from RRM measurements and RRM measurements, clause 8.2.2.2.12.3, on dormant SCells, shall not exceed [0.5]%

During T1, T2, T3, T4, T5 and T6, the UE shall be continuously scheduled in the SCell1.

**Table A.7.5.6.4.1.1-1:** **Supported test configurations**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

**Table A.7.5.6.4.1.1-2: General test parameters for dormancy SCell in NR SA with PCell and SCell in FR2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Value** | | | | **Comment** |
| **Test 1** | **Test 2** | **Test 3** | **Test 4** |
| PCell |  | 1 | Cell 1 | | | |  |
| SCell |  | 1 | Cell 2 | | | |  |
| Neighbour cell |  | 1 | Cell 3 | | | | Cell to be identified. |
| RF Channel Number |  | 1 | 1 | | | | cell 1 |
| RF Channel Number |  | 1 | 2 | | | | Cell 2 and Cell 3 |
| Measurement gap type |  | 1 |  | | | | No measurement gaps configured |
| SSB configuration |  | 1 | SSB.1 FR2 | | | | for all cells |
| SMTC configuration |  | 1 | SMTC.1 | | | | all cells |
| CSI-RS parameters |  | 1 | CSI-RS.3.2 FDD | | | |  |
| CSI reporting periodicity, Non-dormant BWP | ms |  | 2 | | | |  |
| CSI reporting periodicity, Dormant BWP | ms |  | 40 | | | |  |
| Timing offset between the cells | ms |  | 0 | | | |  |
| Triggering DCI format |  |  | 1\_1 | 0\_1 | 1\_1 | 0\_1 | Triggering DCI format |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  |  | 0 – 2 | | 3 – 11 | | Test1 and Test3 are based on that triggering DCI is received within the first three OFDM symbols of a slot. Test2 and Test4 are based on that the triggering DCI is received after the first three OFDM symbols of a slot |
| A3-Offset | dB | 1 | -4.5 | | | |  |
| CP length |  | 1 | Normal | | | |  |
| Hysteresis | dB | 1 | 0 | | | |  |
| Time To Trigger | s | 1 | 0 | | | |  |
| Filter coefficient |  | 1 | 0 | | | | L3 filtering is not used |
| DRX | ms | 1 |  | | | | OFF |
| T1 | s | 1 | [5] | | | |  |
| T2 | s | 1 | [5] | | | |  |

**Table A.7.5.6.4.1.1-3: NR Cell specific test parameters for dormancy SCell in NR SA with PCell and SCell in FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1, Cell 2** | | **Cell 3** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1 | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | | SR.3.1 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | CR.3.1 TDD | |
| Dedicated CORESET RMC configuration, Test 1,2 |  | 1 | CCR.3.1 TDD | | CCR.3.1 TDD | |
| Dedicated CORESET RMC configuration, Test 3,4 |  |  | CCR.3.2 TDD | | CCR.3.1 TDD | |
| OCNG Patterns |  | 1 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.2.1 TDD | | N/A | |
| Downlink initial BWP configuration |  | 1 | DLBWP.0.1 | | N/A | |
| Uplink initial BWP configuration |  | 1 | ULBWP.0.1 | N/A | N/A | |
| Downlink active non-dormant BWP configuration |  | 1 | N/A | DLBWP.1.2 | N/A | |
| Downlink active dormant BWP configuration |  | 1 | DLBWP.1.2 | | N/A | |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | N/A | N/A | |
| RLM-RS |  | 1 | CSI-RS | | N/A | |
| 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 SSSNote 4 |  |
| EPRE ratio of OCNG to OCNG DMRSNote 4 |  |
| Note 2 | dBm/SCS | 1 | [-98] | | | |
| Note 2 | dBm/15 kHz | 1 | [-98] | | | |
|  | dB | 1 | [4] | [-1.46] | [-Infinity] | [-1.46] |
|  | dB | 1 | [4] | [4] | [-Infinity] | [4] |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | [-94] | [-94] | [-Infinity] | [-94] |
| Io | dBm/9.36 MHz | 1 | [-64.60] | [-62.25] | [--64.60] | [-62.25] |
| Propagation Condition |  | 1 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: OCNG shall be used such that the cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols | | | | | | |

###### A.7.5.6.4.1.2 Test Requirements

During T1 the UE shall switch to the dormant BWP.

During T2, T3, T4 and T5 the UE shall not send ACK/NACK for the PDSCH data scheduled on the SCell.

During T2, T3, T4 and T5 the UE shall continue to send CSI reports for SCell1 with non-zero CQI index.

During T2, T3, T4 and T5 the UE shall continue to send L1-RSRP reports for SCell.

During T4 the UE shall send one Event A6 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T4.

During T2, T3, T4 and T5, the missing ACK/NACK sent in PCell shall be less than [0.5 + x + x]% of the total number of the expected ACK/NACK.

During T6, the UE shall send ACK/NACK for the PDSCH data scheduled after subframe (n+ TBWPswitchDelay + X) for the SCell1.

All of the above test requirements shall be fulfilled in order for the observed SCell1 BWP switch delays, Pcell interruption rate, correct CSI and L1-RSRP reporting and event triggeres reporting. The rate of correct observed SCell1 hibernation delay, activation delay and SCell1 deactivation delay during repeated tests shall be at least 90%.

##### A.7.5.6.4.2 NR FR1 PCell SCell dormancy switch of two FR2 SCells outside active time

###### A.7.5.6.4.2.1 Test Purpose and Environment

The purpose of this test is to verify fulfillment of SCell dormancy switching delay requirements in clause 8.6.2A when the UE is triggered to switch between non-dormancy and dormancy outside DRX active time. In the tested scenario, the UE is connected to PCell in FR1and two SCells in FR2, and the SCells are switched from non-dormancy to dormancy, and vice versa, at a point in time before start of *onDuration*. The UE is configured to monitor PDCCH for DCI format 2\_6 at *ps-Offset* before the start of *onDuration*. Two tests are specified, where a UE that only supports triggering within the first three OFDM symbols of a slot shall undergo Test1 only, and a UE that supports triggering also in remaining OFDM symbols of a slot shall undergo both Test1 and Test2. In the tested scenario, *ps-Offset* is selected to correspond to the dormancy switching time specified in clause 8.6.2A.

The supported test configurations are provided in Table A.7.5.6.4.2.1-1 below. General test parameters are provided in Table A.7.5.6.4.2.1-2, and cell-specific parameters are provided in Table A.7.5.6.4.2.1-3 below. OTA-related test parameters are provided in Table A.7.5.6.4.2.1-4.

The tests consist of four consecutive time periods, T1, T2, T3 and T4, respectively.

Three carriers are used in the test. Cell 1 (PCell) is on RF channel 1 (PCC) in FR1, and Cell 2 (SCell1) and Cell 3 (SCell2) are on RF channels 2 (SCC1) and 3 (SCC2) in FR2, respectively. All three cells have constant signal levels throughout the test.

Before the test starts,

UE is connected to Cell 1 (PCell), Cell 2 (SCell1) and Cell 3 (SCell2).

UE is configured with a single UE-specific downlink bandwidth part, BWP-0, for Cell 1. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is configured with one non-dormant and one dormant UE-specific downlink bandwidth part, BWP-0 and BWP-1, respectively, for Cell 2 and Cell 3. BWP-0 includes the bandwidth of the initial DL BWP and SSB.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWP in Cell 1 is BWP-0.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPin Cell 2 is BWP-0.

UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPin Cell 3 is BWP-0.

UE is configured with DRX.

UE is configured to monitor DCI format 2\_6, and to be active during *onDuration* even when no DCI format 2\_6 is detected (*ps-WakeUp*).

Time period T1 starts when the UE at *ps-Offset* before *onDuration* detects a DCI format 2\_6 carrying dormancy indication that indicates that SCell1 and SCell2 are to be switched from non-dormancy to dormancy. The UE shall switch active bandwidth parts for SCell1 and SCell2, respectively, from non-dormant BWP-0 to dormant BWP-1. The UE shall complete the switching before the start of *onDuration*. The test equipment schedules the UE continuously with new data indications in PCell starting from beginning of *onDuration*. The test equipment verifies that the UE is transmitting HARQ feedback for PCell from the beginning of *onDuration* and thus verifies that the UE has completed interruptions due to dormancy switching before the start of *onDuration.*

Time period T2 starts when T1 is completed. The test equipment continues to schedule the UE continuously in PCell. The UE shall carry out CSI and RRM measurements on the dormant SCells. The UE shall report ACK/NACK in PCell in response to scheduled PDSCH, with the maximum loss of transmitted ACK/NACKs fulfilling the requirement in clause 8.2.2.2.12. The test equipment verifies that the loss of ACK/NACKs is no larger than 1.5%.

Time period T3 starts when T2 is completed. During T3, the test equipment does not schedule the UE, by which the inactivity timer expires and the UE stops monitoring PDCCH except for signalling using DCI format 2\_6 at wake-up signalling occasions.

Time period T4 starts when the UE at *ps-Offset* before *onDuration* detects a DCI format 2\_6 carrying dormancy indication that indicates that SCell1 and SCell2 are to be switched from dormancy to non-dormancy. The UE shall switch active bandwidth parts for SCell1 and SCell2, respectively, from dormant BWP-1 to non-dormant BWP-0. The UE shall complete the switching before the start of *onDuration*. The test equipment schedules the UE with new data indication in PCell, SCell1 and SCell2 during *onDuration*. The UE shall receive in PCell, SCell1 and SCell2 and send HARQ feedback for PCell, SCell1 and SCell2 via PCell. The test equipment verifies that the UE is transmitting HARQ feedback for PCell, SCell1 and SCell2 from the beginning of *onDuration*, and thus verifies that the UE has completed interruptions due to dormancy switching before the start of *onDuration*.

**Table A.7.5.6.4.2.1-1: Supported test configurations**

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | PCell: 15kHz SSB SCS, 10MHz bandwidth, FDD duplex mode  SCells: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | PCell: 15kHz SSB SCS, 10MHz bandwidth, TDD duplex mode  SCells: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 3 | PCell: 30kHz SSB SCS, 40MHz bandwidth, TDD duplex mode  SCells: NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to undergo test for one of the supported test configurations. | |

**Table A.7.5.6.4.2.1-2: General test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | **Comment** |
| **Test1** | **Test2** |
| NR RF Channel Number |  | 1, 2, 3 | | Three NR radio channels are used for this test |
| Active PCell |  | Cell 1 | | PCell on RF channel number 1 in FR1 |
| Active SCell1 |  | Cell 2 | | SCell1 on RF channel number 2 in FR2 |
| Active SCell2 |  | Cell 3 | | SCell2 on RF channel number 3 in FR2 |
| CSI reporting periodicity, Non-dormant BWP | ms | 2 | | CSI reporting periodicity for periodic reporting of CQI for PCell and non-dormant SCells |
| CSI reporting periodicity, Dormant BWP | ms | 40 | | CSI reporting periodicity for periodic reporting of CQI for dormant SCells |
| CP length |  | Normal | |  |
| DRX |  | DRX.8 | | For both PCell and SCells. See clause A.3.3.8. |
| ps-Offset |  | Depending on UE capability | | Monitoring of DCI 2\_6 ahead of start of drx-onDurationTimer. Value of ps-Offset shall correspond to SCell dormancy switching time for switching of two SCells, as specified in clause 8.6.2A. Actual value depends on reported UE capabilities. |
| ps-WakeUp |  | true | | Wake up for onDuration in case DCI format 2\_6 is not detected. |
| Cell 2 timing offset to Cell 1 | µs | <24 | | Timing offset shall be less than MRTD for FR1-FR2 CA, and leave margin for timing difference between Cell2 and Cell3. |
| Cell 3 timing offset to Cell 2 | ns | <260 | | Timing offset shall be less than MRTD for FR2 intra-band non-contiguous CA. |
| OFDM symbol range in slot for transmission of DCI with dormancy indication |  | 0 – 2 | 3 – 11 | Test1 is based on that triggering DCI is received within the first three OFDM symbols of a slot.Test2 is based on that the triggering DCI is received later than within the first three OFDM symbols of a slot. |
| T1 | s | [0.2] | | During this time the SCells are switched from non-dormancy to dormancy. |
| T2 | s | [10] | | During this time the SCells are dormant. |
| T3 | s | [0.2] | | During this time the UE is not scheduled in PCell. |
| T4 | s | [0.2] | | During this time the SCells are switched from dormancy to non-dormancy. |

**Table A.7.5.6.4.2.1-3: Cell specific test parameters**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 1** | **Cell2** | **Cell 3** |
| Frequency Range | |  | FR1 | FR2 | FR2 |
| NR RF channel | |  | 1 | 2 | 3 |
| Duplex mode | Config 1 |  | FDD | TDD | TDD |
| Config 2,3 |  | TDD |
| TDD configuration | Config 1 |  | --- | TDDConf.3.1 | TDDConf.3.1 |
| Config 2 |  | TDDConf.1.1 |
| Config 3 |  | TDDConf.2.1 |
| BWchannel | Config 1,2 | MHz | 10: NRB,c = 52 | 100: NRB,c = 66 | 100: NRB,c = 66 |
| Config 3 | 40: NRB,c = 106 |
| Downlink initial BWP Configuration | |  | DLBWP.0.2 | DLBWP.0.2 | DLBWP.0.2 |
| Uplink initial BWP Configuration | |  | ULBWP.0.2 | --- | --- |
| Downlink active non-dormant BWP-0 Configuration | |  | DLBWP.1.1 | DLBWP.1.1 | DLBWP.1.1 |
| Downlink active dormant BWP-1 Configuration | |  | --- | DLBWP.1.1 | DLBWP.1.1 |
| Uplink active BWP-0 Configuration | |  | ULBWP.0.2 | --- | --- |
| PDSCH Reference measurement channel | Config 1 |  | SR.1.1 FDD | SR.3.1 TDD | SR.3.1 TDD |
| Config 2 |  | SR.1.1 TDD |
| Config 3 |  | SR.2.1 TDD |
| CSI-RS configuration for CSI reporting, Non-dormant BWP | Config 1 |  | CSI-RS.1.1 FDD | CSI-RS.3.1 TDD | CSI-RS.3.1 TDD |
| Config 2 |  | CSI-RS.1.1 TDD |
| Config 3 |  | CSI-RS.2.1 TDD |
| CSI-RS configuration for CSI reporting, Dormant BWP | |  | --- | CSI-RS.3.5 TDD | CSI-RS.3.5 TDD |
| TRS configuration | Config 1 |  | TRS.1.1 FDD | TRS.2.1 TDD | TRS.2.1 TDD |
| Config 2 |  | TRS.1.1 TDD |
| Config 3 |  | TRS.1.2 TDD |
| TCI state | |  | TCI.State.0 | TCI.State.0 | TCI.State.0 |
| RMSI CORESET parameters | Config 1 |  | CR.1.1 FDD | --- | --- |
| Config 2 |  | CR.1.1 TDD |
| Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET parameters, Test 1,2 | Config 1 |  | CCR.1.1 FDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 2 |  | CCR.1.1 TDD |
| Config 3 |  | CCR.2.1 TDD |
| Dedicated CORESET parameters, Test 3,4 | Config 1 |  | CCR.1.5 FDD | CCR.3.1 TDD | CCR.3.1 TDD |
| Config 2 |  | CCR.1.5 TDD |
| Config 3 |  | CCR.2.3 TDD |
| OCNG Patterns | |  | OP.1 | OP.1 | OP.1 |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 | SSB.1 FR2 | SSB.1 FR2 |
|  | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | |  | SMTC.1 | SMTC.1 | SMTC.1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | | |
| EPRE ratio of PSS to SSS | | dB | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSSNote1 | |
| EPRE ratio of OCNG to OCNG DMRSNote1 | |
| Propagation Condition | |  | N/A  Link only, see clause A.3.7A | AWGN | AWGN |
| Note 1: OCNG shall be used such that the cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | | | |

**Table A.7.5.6.4.2.1: OTA related test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | **Cell 2** | **Cell 3** |
| Angle of arrival configuration |  | N/A  Link only, see clause A.3.7A | Setup 1 defined in clause A.3.15.1 | |
| Assumtion for UE beams Note6 |  | Fine | Fine |
| *Noc* Note1 | dBm/15kHz | -112 | -112 |
| *Noc* Note1 | dBm/SCS | -103 | -103 |
| SS-RSRPNote2 | dBm/SCS Note3 | -85 | -85 |
| *Ês/Iot* | dB | 18 | 18 |
| IoNote4 | dBm/95.04 MHz Note4 | -56 | -56 |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation. | | | | |

###### A.7.5.6.4.2.2 Test Requirements

Starting from *onDuration* in time period T1, the UE shall transmit ACK/NACK in response to scheduling in PCell. There shall be no loss of ACK/NACK.

During time period T2, the UE shall transmit ACK/NACKs in response to scheduling in PCell and the rate of missed ACK/NACKs shall be no more than 1.5%.

Starting from *onDuration* in time period T4, the UE shall transmit ACK/NACK in response to scheduling in PCell, SCell1 and SCell2. There shall be no loss of ACK/NACK.

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

END of TEnth Modification

Unchanged Sections Omitted