**3GPP TSG-RAN4 Meeting #104-e *R4-220xxxx***

**Electronic meeting, 15 – 26 August, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.133** | **CR** | **-** | **rev** | **-** | **Current version:** | **15.18.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Big CR for 38.133 maintenance part1 (Rel-15) | | | | | | | | | |
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| ***Source to WG:*** | MCC, Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core, NR\_newRAT-Perf, TEI15 | | | | |  | ***Date:*** | | | 2022-8-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-15 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | **R4-2211541 Draft CR to FR2 NSA CSI-RS based L1-RSRP measurement**   1. Current setting of Dedicated CORESET Reference Channel will not be able to schedule 2 DCI for a slot. Which will be a conflict for CSI Request/DCI Trigger (for Aperiodic CSI) and PDSCH when they are transmitted in the same slot.  * Since Dedicated CORESET Reference Channel is updated, PDSCH Reference measurement channel and RMSI CORESET Reference Channel are also updated to unify/be consistent with other tests that uses the same Dedicated CORESET Reference Channel.  1. Typo in test configurations on A.5.6.3.3 and A.5.6.3.4.   **R4-2211888 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R15)**  In R4-2115240 RAN4 agreed:   * FR1/LTE+FR2 test has OTA testability problem if at least one of the following criteria is met:   + Tests where any requirement is tested for FR1/LTE,   + Tests where UE receives any DL message (e.g. RRC/DCI/MAC-CE configuration message/command etc) on FR1/LTE between the starting point and ending point of the test, and   + Tests where UE transmits any UL signal (e.g. measurement report, ACK/NACK, CSI etc) b on FR1/LTE between the starting point and ending point of the test.   In A.5.7.1.3 and A.7.7.1.3, UE has to receive RRC for measurement configuration and report measurement result via FR1 serving cell, which fulfills the above criteria. Therefore, UE shall be allowed to skip them.  Additional margins due to beamforming gain uncertainty has been agreed and considered in RAN4 RRM test cases. However, they are missing in A.5.7.1.3 and A.7.7.1.3.  **R4-2212253 [draft CR] R15 Maintenance for 38133 Core**  In the current version of 38.133, some symbols are defined under clause 3.2. The N\_TA\_offset is not correctly referred to, as currently 7.1.2.2 is a void section.  **R4-2212931 Correction to Rel-15 FR2 test cases\_r15**   1. Cell re-selection TCs    * Editorial changes.    * Effect of REFSENS should be considered in calculation of Es/Iot.    * Io given in Table A.7.1.1.2.2-3 is incorrect.    * SS-RSRP given in Table A.7.1.1.2.2-3 is incorrect. 2. TCI state switching TCs    * In TS38.214, the followings are defined for PDCCH. It can be observed that only CSI-RS resource can be indicated as source referenceSignal in a TCI state for PDCCH. Therefore, TCI.State.0 with SSB0 as referenceSignal and TCI.State.1 with SSB1 as referenceSignal cannot be configured for PDCCH.   TCI.State.2 and TCI.State.3 with CSI-RS as referenceSignal can be configured for PDCCH instead of TCI.State.0 and TCI.State.1.  CSI-RS in TCI.State.2 is QCL’d to SSB0, and CSI-RS in TCI.State.3 is QCL’d to SSB1   |  | | --- | | For the DM-RS of PDCCH, the UE shall expect that a *TCI-State* indicates one of the following quasi co-location type(s):  - 'typeA' with a CSI-RS resource in a *NZP-CSI-RS-ResourceSet* configured with higher layer parameter *trs-Info* and, when applicable, 'typeD' with the same CSI-RS resource, or  - 'typeA' with a CSI-RS resource in a *NZP-CSI-RS-ResourceSet* configured with higher layer parameter *trs-Info* and, when applicable, 'typeD' with a CSI-RS resource in an *NZP-CSI-RS-ResourceSet* configured with higher layer parameter *repetition*, or  - 'typeA' with a CSI-RS resource in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter trs-Info and without higher layer parameter *repetition* and,when applicable, 'typeD' with the same CSI-RS resource. |   **R4-2213935 CR on SCell activation maintenance in Rel-15**  Couple of changes:  1st change:  Interruption requirements do not considered SSB less SCell activation and due to that Interruption window for SSB less SCell activation is not clear.  When the SCell activation delay requirement contains both Tuncertainty\_MAC +TFineTiming, and TFirstSSB\_MAX it is not clear which interruption requirement condition UE has to follow.  2nd change:  TL1-RSRP, measure is L1-RSRP measurement delay and the current requirement contains reporting delay also  **R4-2214659 Correction on the FR2 inter-frequency relative RSRP accuracy**  Based on the WF approved in #103-e meeting (R4-2211210), two relaxation factors D and Ginter were captured in the UE requirements for FR2 relative SS-RSRP accuracy. This draft CR is to add some supplemental definitions in the spec based on the previously submitted CR R4-2203567 (postponed).  **R4-2214662 Draft CR to TS 38.133: Corrections to NR RRM test cases (Rel 15)**  Change 1: In CSI-RS.3.2 TDD for SCS=120kHz (Table A.3.14.2-3) Offset is currently set to 8 slot. When used along with TDD.3.1 Config, this causes the CSI RS resource to fall on a Flexible slot. In our understanding the CSI RS resource should fall on a DL slot. This would be the case if we change the slot Offset from 8 to 16.    Change 2:  For FR1 tests A.4.6.1.3 / A.4.6.1.4, the CSI-RS configuration for the PSCell is specified to use only resource #0: *CSI-RS .. resource #0,* probably because the cell case has only 1 SSB. The same clarification is missing in the FR2 analogue tests A.5.6.1.3 , A.5.6.1.4, A.7.6.1.3, A.7.6.1.4  **R4-2214673 Draft CR on scheduling restrictions for L3 measurements in FR1 (Rel-15)**   * In L3 measurements when SSB and PDCCH/PDSCH are with different SCS in FR1, SSB for measurement is prioritized over any PDCCH/PDSCH * In FR2 SSB for measurement is prioritized over PDCCH/PDSCH except in case of multiplexing pattern 2 or 3 and UE receives SI update through paging * In FR1 only multiplexing pattern 1 is used, but PDCCH/PDSCH carrying RMSI could overlap with SSB for measurements in case in FDD when deriveSSB\_IndexFromCell is not enabled.   + Exception to prioritize PDCCH/PDSCH carrying RMSI over SSB for measurement is missing in scheduling restrictions for FR1   **R4-2214692 draftCR for test configuration and requirement correction of CSI-RS based RLM OOS test in NR SA**  The test configuration and requirement of CSI-RS based RLM OOS test in NR SA is uncorrect.  For the test requirement, during the time duration T3, if the time is later than the time point C, the UE shall not transmit uplink signal in Cell1.  For the test configuration, in the test case of Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode, there is no Cell 2 in test configuration. Therefore, the Cell number in the correspoding figure should be revised.  **R4-2214703 Correction to NR SCell interruption requirements 38.133\_r15**   1. During last 2 RAN4 meeting, interruption length for SSB-less SCell and SCell without SMTC configuration were discussed. For a SCell which actually transmits SSB but has no SMTC configuration, it’s agreed that the SMTC duration for this SCell shall be assumed as [X] ms, where X is TBD.   During discussion we received comments that X may be less than 5ms. The main reason is that for a SCell transmitting SSB, its SSB time domain pattern can be explicitly obtained from ssb-PositionsInBurst. Then the length of assumed SMTC duration can be reduced.  We suggest x = number of consecutive subframes which contains all SSBs indicated by ssb-PositionsInBurst.  **R4-2214704 Correction to Rel-15 FR1 test cases\_r15**   1. Changes to TC 4.5.3.2 in agreed CR R4-2204844 are not implemented in 38.133. 2. In current version of 38.133, test configurations in most of FR1 CA test cases assume that NR SpCell and NR SCell use the same duplex mode/SCS/CBW. This means that most of CA test cases are not applicable to FDD+TDD CA BCs or 15kHz + 30kHz CA BCs. It is neccessary to extend CA TC to support the SpCC and SCC using different duplex+SCS combinations.   Similar issue also exists in TC A.4.5.2.5/4.5.2.6 which involving LTE CA. It’s assumed that LTE PCell and LTE SCell use the same duplex mode in these 2 TCs. Then they are no longer applicable to some LTE FDD+TDD EN-DC BCs.  Instead of defining new test configurations to traverse all duplex+SCS combinations, we suggest allowing the SpCC and SCC to choose their own test configuration independently to minimize impact to RAN4/RAN5 specs. Take A.4.5.2.3 as an example. To test a FDD+TDD CA BC, test configuration 1 and 2 are chosen for Cell 2 and Cell 3 respectively. Then test parameters for Cell 2 and Cell 3 shall be independently chosen as follows:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Parameter** | | **Unit** | **Cell2** | **Cell3** | | Frequency Range | |  | FR1 | FR1 | | Duplex mode | Config 1,4 |  | FDD | FDD | | Config 2,3,5,6 | TDD | TDD | | TDD configuration | Config 1,4 |  | Not Applicable | Not Applicable | | Config 2,5 | TDDConf.1.1 | TDDConf.1.1 | | Config 3,6 | TDDConf.2.1 | TDDConf.2.1 |   **R4-2214731 CR on clarification of HO requirements**  T∆ definition is not consistent across all the HO scenarios.  For some scenarios it is mentioned as below:  T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.  For some other scenarios it is mentioned as below.  T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs.  It is important to have consistent definition for all the HO scenarios to avoid confusion. | | | | | | | | |
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| ***Summary of change:*** | | **R4-2211541 Draft CR to FR2 NSA CSI-RS based L1-RSRP measurement**   1. Change SR.3.1 TDD 🡪 SR.3.3 TDD, CR.3.1 TDD 🡪 CR.3.2 TDD, and CCR.3.1 TDD 🡪 CCR.3.7 TDD in Table A.5.6.3.3.2-1 and Table A.5.6.3.4.2-1 2. Changed “CSI-RS SCS” 🡪 “SSB SCS” in Table A.5.6.3.3.1-1 and Table A.5.6.3.4.1-1.   **R4-2211888 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R15)**  Update test applicability in A.3.13A to allow UE skip A.5.7.1.3 and A.7.7.1.3.  **R4-2212253 [draft CR] R15 Maintenance for 38133 Core**  Specify that N\_TA\_offset is specified in clause 7.1.2 instead of 7.1.2.2.  **R4-2212931 Correction to Rel-15 FR2 test cases\_r15**   1. Cell re-selection TCs    1. Editorial changes.    2. Es/Iot is changed to Es/Iot at BB to align with other FR2 TCs. Value of Es/Iot at BB is re-calculated.    3. Note 5 is added.    4. Io in Table A.7.1.1.2.2-3 is corrected.    5. SS-RSRP in Table A.7.1.1.2.2-3 is corrected. 2. TCI state switching TCs    1. replace TCI.State.0 with TCI.State.2    2. replace TCI.State.1 with TCI.State.3    3. update TRS configuration to align with TCI configuration.   **R4-2213935 CR on SCell activation maintenance in Rel-15**  1st change:  Interruption requirements are corrected to consider the SSB less SCell activation scenario.  When the SCell activation delay requirement contains both Tuncertainty\_MAC +TFineTiming, and TFirstSSB\_MAX,interruption requirement is clarified.  2nd change: adding TReport as 0 in TL1-RSRP, measure  **R4-2214659 Correction on the FR2 inter-frequency relative RSRP accuracy**   * For the FR2 SS-RSRP relative accuracy test requirement in Tables A.5.7.1.2.3-2 and A.7.7.1.2.3-2, Note 5 and 6 are reworded. * Specify parameter Ginter in new clause B.2.1.5.2 * Specify parameter D in new clause B.2.1.5.3   **R4-2214662 Draft CR to TS 38.133: Corrections to NR RRM test cases (Rel 15)**  Change 1: In CSI-RS.3.2 TDD for SCS=120kHz (Table A.3.14.2-3) Offset changed from 8 to 16.  Change 2: In TCs A.5.6.1.3 , A.5.6.1.4, A.7.6.1.3, A.7.6.1.4, for the CSI-RS parameters of PSCell clarification “resource #0” and comment “Resource #1 is not used” added (to CSI-RS.3.2 TDD).  **R4-2214673 Draft CR on scheduling restrictions for L3 measurements in FR1 (Rel-15)**  Added exception rule to scheduling restriction in FR1 for L3 measurement when UE receives system update through paging.  **R4-2214692 draftCR for test configuration and requirement correction of CSI-RS based RLM OOS test in NR SA**  Modify the Cell 2 to Cell 1 in Figure A.6.5.1.7.1-1  Delete the wording “During time durations T1, T2 and T3, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1” to align with other RLM OOS test requirements  **R4-2214703 Correction to NR SCell interruption requirements 38.133\_r15**  Interruption requirements for SCell addition/ activation are updated.  **R4-2214704 Correction to Rel-15 FR1 test cases\_r15**   1. Unimplemented changes in agreed CR R4-2204844 ar resubmitted. 2. Notes is added to test configuration tables of CA test cases to indicate that PCC/SCC can choose its test configuration independently.   **R4-2214731 CR on clarification of HO requirements**  T∆ definition is corrected so that consistent wording will be present across all the HO scenarios | | | | | | | | |
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| ***Consequences if not approved:*** | | **R4-2211541 Draft CR to FR2 NSA CSI-RS based L1-RSRP measurement**  A conformant UE may fail the test  **R4-2211888 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R15)**  UE would still need to pass A.5.7.1.3 and A.7.7.1.3, which cannot be correctly implemented.  **R4-2212253 [draft CR] R15 Maintenance for 38133 Core**  The definition of N\_TA\_offset remains not correctly referred to in clause 3.2.  **R4-2212931 Correction to Rel-15 FR2 test cases\_r15**  Conformant UE will fail the test.  **R4-2213935 CR on SCell activation maintenance in Rel-15**  SCell activation requirements are not clear in the current spec.  **R4-2214659 Correction on the FR2 inter-frequency relative RSRP accuracy**  UE requirements are incompletely specified, and a good UE may unfairly fail the test requirements.  **R4-2214662 Draft CR to TS 38.133: Corrections to NR RRM test cases (Rel 15)**  Specification will remain unclear regarding configuraiton of CSI-RS.  **R4-2214673 Draft CR on scheduling restrictions for L3 measurements in FR1 (Rel-15)**  UE behavior is not correctly defined.  **R4-2214692 draftCR for test configuration and requirement correction of CSI-RS based RLM OOS test in NR SA**  The test configuration and requirement of CSI-RS based RLM OOS test in NR SA will be uncorrect.  **R4-2214703 Correction to NR SCell interruption requirements 38.133\_r15**  Requirements are not clear.  **R4-2214704 Correction to Rel-15 FR1 test cases\_r15**  Conformant UE will fail the test.  **R4-2214731 CR on clarification of HO requirements**  T∆ definition is confusing for some of the HO scenarios | | | | | | | | |
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| ***Clauses affected:*** | | **R4-2211541 Draft CR to FR2 NSA CSI-RS based L1-RSRP measurement**  A.5.6.3.3, A.5.6.3.4  **Isolated impact analysis:**  No change to UE requirements, changes test parameters only.  **R4-2211888 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R15)**  A.3.13A  **R4-2212253 [draft CR] R15 Maintenance for 38133 Core**  3.2  **R4-2212931 Correction to Rel-15 FR2 test cases\_r15**  A.5.5.8, A.7.1.1, A.7.5.8  **R4-2213935 CR on SCell activation maintenance in Rel-15**  8.3.2  **R4-2214659 Correction on the FR2 inter-frequency relative RSRP accuracy**  A.5.7.1.2.3, A.7.7.1.2.3, B.2.1.5.2 (new), B.2.1.5.3 (new).  **R4-2214662 Draft CR to TS 38.133: Corrections to NR RRM test cases (Rel 15)**  A.3.14.2, A.5.6.1.3, A.5.6.1.4, A.7.6.1.3, A.7.6.1.4  **R4-2214673 Draft CR on scheduling restrictions for L3 measurements in FR1 (Rel-15)**  9.2.5.3.2  **R4-2214692 draftCR for test configuration and requirement correction of CSI-RS based RLM OOS test in NR SA**  A.6.5.1.5.2  A.6.5.1.7.1  A.6.5.1.7.2  A.7.5.1.5.2  A.7.5.1.7.2  **R4-2214703 Correction to NR SCell interruption requirements 38.133\_r15**  8.2.1.2.3, 8.2.1.2.4, 8.2.2.2.1, 8.2.2.2.2, 8.2.3.2.3, 8.2.3.2.4, 8.2.4.2.1, 8.2.4.2.2  **R4-2214704 Correction to Rel-15 FR1 test cases\_r15**  A.4.5.2.3, A.4.5.2.4, A.4.5.2.5, A.4.5.2.6, A.4.5.3.1, A.4.5.3.2, A.4.5.6.1.2, A.6.5.2.1, A.6.5.3.1, A.6.5.6.1.1  **R4-2214731 CR on clarification of HO requirements**  6.1.1.2, 6.1.1.3 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.533 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<<Start of change>>

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

BWChannel Channel bandwidth, defined in TS 38.101-1, 38.101-2 and 38.101-3 subclause 3.2

Ês Received energy per RE (power normalized to the subcarrier spacing) during the useful part of the symbol, i.e. excluding the cyclic prefix, at the UE antenna connector or radiated interface boundary

FC *RF reference frequency* on the channel raster, given in table 5.4.2.2-1 in TS 38.101-1 and 38.101-2

FC,low The Fc of the lowest carrier, expressed in MHz

Io The total received power density, including signal and interference, as measured at the UE antenna connector or radiated interface boundary.

Ioc The power spectral density (integrated in a noise bandwidth equal to the chip rate and normalized to the chip rate) of a band limited noise source (simulating interference from cells, which are not defined in a test procedure) as measured at the UE antenna connector or radiated interface boundary.

Iot The received power spectral density of the total noise and interference for a certain RE (power integrated over the RE and normalized to the subcarrier spacing) as measured at the UE antenna connector or radiated interface boundary

 The power spectral density of a white noise source (average power per RE normalised to the subcarrier spacing), simulating interference from cells that are not defined in a test procedure, as measured at the UE antenna connector or radiated interface boundary

 Physical Resource Block number as defined in clause 3.2 in TS 38.211.

 Timing offset between uplink and downlink radio frames at the UE, as defined in clause 4.2 in TS 38.213.

 Fixed timing advance offset, as defined in clause 7.1.2 in TS 38.133.

 Configured UE transmitted power as defined in clause 6.2.4 in TS 38.101-1, 38-101-2 and 38.101-3.

PCMAX,c Configured UE transmitted power on a serving cell *c* as defined in clause 6.2.4 in TS 38.101-1, 38-101-2 and 38.101-3

S Cell Selection Criterion defined in TS 38.304, subclause 5.2.3.2 for NR

SSB\_RP Received (linear) average power of the resource elements that carry NR synchronisation burst, measured at the UE antenna connector or radiated interface boundary

Srxlev Cell selection RX level, defined in TS 38.304, subclause 5.2.3.2

Squal Cell selection quality, defined in TS 38.304, subclause 5.2.3.2

Sintrasearch Defined in TS 38.304 , subclause 5.2.4.7 for E-UTRAN amd 38.304 subclause 5.2.4.7 for NR

Snonintrasearch Defined in TS 38.304 , subclause 5.2.4.7

Tc Basic time unit, defined in clause 4.1 of TS 38.211 [6].

Treselection Defined in TS 25.304, subclause 5.2.6.1.5

TreselectionRAT Defined in TS 36.304 , subclause 5.2.4.7

TreselectionEUTRA Defined in TS 36.304 , subclause 5.2.4.7

TreselectionUTRA Defined in TS 36.304 , subclause 5.2.4.7

TreselectionGERANDefined in TS 36.304 , subclause 5.2.4.

Threshx, high Defined in TS 38.304 , subclause 5.2.4.7

Threshx, low  Defined in TS 38.304 , subclause 5.2.4.7

Threshserving, low Defined in TS 38.304 , subclause 5.2.4.7

Ts Reference time unit, defined in clause 4.1 of TS 38.211 [6].

TUE\_re-establish\_delay Time between the moments when any of the conditions requiring RRC re-establishment as defined in clause 5.3.7 in TS 38.331 [2] is detected by the UE and when the UE sends PRACH to the target PCell.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

6.1.1.2 NR FR1 - NR FR1 Handover

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers from NR FR1 cell to NR FR1 cell.

6.1.1.2.1 Handover delay

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover msec from the end of the last TTI containing the RRC command.

Where:

Dhandover equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.2.2.

6.1.1.2.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

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

Where:

Tsearch is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then Tsearch = 0 ms. If the target cell is an unknown intra-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = Trs ms. If the target cell is an unknown inter-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = 3\* Trs ms. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

Tprocessing is time for UE processing. Tprocessing can be up to 20ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2ms.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cellin the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the measObjectNRs having the same SSB frequency and subcarrier spacing configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms. If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*prior to the handover command, Trs follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 9.2.5 for intra-frequency handover and Clause 9.3.4 for inter-frequency handover.

6.1.1.3 NR FR2- NR FR1 Handover

The requirements in this clause are applicable to inter-frequency handovers from NR FR2 cell to NR FR1 cell.

6.1.1.3.1 Handover delay

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover ms from the end of the last TTI containing the RRC command.

Where:

Dhandover equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.3.2.

6.1.1.3.2 Interruption time

The interruption time is the time between the end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

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

Where:

Tsearch is the time required to search the target cell when the target cell is not already known when the handover command is received by the UE. If the target cell is known, then Tsearch = 0 ms. If the target cell is an unknown inter-frequency cell and the target cell Es/Iot ≥ -2 dB, then Tsearch = 3\* Trs ms. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

Tprocessing is time for UE processing. Tprocessing can be up to 40ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2ms.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms.

In the interruption requirement a cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown. Relevant cell identification requirements are described in Clause 9.2.5 for intra-frequency handover and Clause 9.3.4 for inter-frequency handover.

6.1.1.4 NR FR2- NR FR2 Handover

The requirements in this clause are applicable to both intra-frequency and inter-frequency handovers from NR FR2 cell to NR FR2 cell.

6.1.1.4.1 Handover delay

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover ms from the end of the last TTI containing the RRC command.

Where:

Dhandover equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.4.2.

6.1.1.4.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When intra-frequency or inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

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

Where:

Tsearch is the time required to search the target cell when the handover command is received by the UE. If the target cell is a known cell, then Tsearch = 0 ms. If the target cell is an unknown intra-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = 8\* Trs ms. If the target cell is an unknown inter-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = 8\*3\* Trs ms. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

Tprocessing is time for UE processing. Tprocessing can be up to 20ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2ms.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms. If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*prior to the handover command, Trs follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

In FR2, the target cell is known if it has been meeting the following conditions:

- During the last 5 seconds before the reception of the handover command:

- the UE has sent a valid measurement report for the target cell and

- One of the SSBs measured from the NR target cell being configured remains detectable according to the cell identification conditions specified in clause 9.3,

- One of the SSBs measured from the target cell also remains detectable during the handover delay according to the cell identification conditions specified in clause 9.3.

otherwise it is unknown.

6.1.1.5 NR FR1- NR FR2 Handover

The requirements in this clause are applicable to inter-frequency handovers from NR FR1 cell to NR FR2 cell.

6.1.1.5.1 Handover delay

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover ms from the end of the last TTI containing the RRC command.

Where:

Dhandover equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.5.2.

6.1.1.5.2 Interruption time

The interruption time is the time between end of the last TTI containing the RRC command on the old PDSCH and the time the UE starts transmission of the new PRACH, excluding the RRC procedure delay.

When inter-frequency handover is commanded, the interruption time shall be less than Tinterrupt

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

Where:

Tsearch is the time required to search the target cell when the handover command is received by the UE. If the target cell is a known cell, then Tsearch = 0 ms. . If the target cell is an unknown inter-frequency cell and the target cell Es/Iot≥-2 dB, then Tsearch = 8\*3\* Trs ms. Regardless of whether DRX is in use by the UE, Tsearch shall still be based on non-DRX target cell search times.

Tprocessing is time for UE processing. Tprocessing can be up 40ms.

Tmargin is time for SSB post-processing. Tmargin can be up to 2ms.

T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = Trs for both known and unknown target cell.

TIU is the interruption uncertainty in acquiring the first available PRACH occasion in the new cell. TIU can be up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in the table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the target NR cell if the UE has been provided with an SMTC configuration for the target cell in the handover command, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs=5ms assuming the SSB transmission periodicity is 5ms. There is no requirement if the SSB transmission periodicity is not 5ms.

In FR2, the target cell is known if it has been meeting the following conditions:

- During the last 5 seconds before the reception of the handover command:

- the UE has sent a valid measurement report for the target cell and

- One of the SSBs measured from the NR target cell being configured remains detectable according to the cell identification conditions specified in clause 9.3,

- One of the SSBs measured from the target cell also remains detectable during the handover delay according to the cell identification conditions specified in clause 9.3.

otherwise it is unknown.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 8.2.1.2.3 Interruptions at SCell addition/release

The requirements in this clause shall apply for the UE configured with PSCell.

When one E-UTRA SCell in MCG is added or released:

- the UE is allowed an interruption on any active serving cell in SCG:

- of up to X1 slot, if the active serving cell is not in the same band as the E-UTRA SCell being added or released, or

- of up to max{Y1 slot + TSMTC\_duration, 5ms} if the active serving cells are in the same band as the E-UTRA SCell being added or released, provided the cell specific reference signals from the active serving cells and the E-UTRA SCell being added or released are available in the same slot, where TSMTC\_duration is the longest SMTC duration among all above active serving cells in SCG;

Where X1 and Y1 are specified in Table 8.2.1.2.3-1.

When one SCell in SCG is added or released:

- the UE is allowed an interruption on any active serving cell in SCG:

- of up to X1 slot, if the active serving cell is not in the same band as any of the SCells being added or released, or

- of up to Y1 slot + TSMTC\_duration if the active serving cells are in the same band as any of the SCells being added or released, provided the cell specific reference signals from the active serving cells and the SCells being added or released are available in the same slot, where, TSMTC\_duration is

- the longest SMTC duration among all above active serving cells in SCG and the SCell being added when one SCell is added. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being added, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being added is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being added. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being added, TSMTC duration for the SCell being added is 0 ms;

- the longest SMTC duration among all above active serving cells in SCG when one SCell is released.

Where X1 and Y1 are specified in Table 8.2.1.2.3-2.

**Table 8.2.1.2.3-1: Interruption length X1 and Y1 at E-UTRA SCell addition/Release**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NR Slot length (ms) | Interruption length X1 (slots) | | Interruption length Y1 (slots) | |
| Sync | Async | Sync | Async |
| 0 | 1 | 1 | 2 | 1 | 2 |
| 1 | 0.5 | 2 | 3 | 2 | 3 |
| 2 | 0.25 | 5 | | 4 | 5 |
| 3 | 0.125 | 9 | | N/A | N/A |

Table 8.2.1.2.3-2: Interruption length X1 and Y1 at SCell addition/Release

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NR Slot length (ms) of victim cell | Interruption length X1 (slots) | | Interruption length Y1 (slots) |
| 0 | 1 | 1 | | 1 |
| 1 | 0.5 | 2 | | 2 |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 4 | 4 |
| Either aggressor cell or victim cell is on FR1 | 5 |
| 3 | 0.125 | Aggressor cell is on FR2 | 8 | 8 |
| Aggressor cell is on FR1 | 9 |

##### 8.2.1.2.4 Interruptions at SCell activation/deactivation

The requirements in this clause shall apply for the UE configured with PSCell and one SCell.

When one E-UTRA SCell in MCG is activated or deactivated:

- the UE is allowed an interruption on any active serving cell in SCG:

- of up to X2 slot, if the active serving cell is not in the same band as the E-UTRA SCell being activated or deactivated, or

- of up to max{Y2 slot + TSMTC\_duration, 5ms} if the active serving cells are in the same band as the E-UTRA SCell being activated or deactivated, provided the cell specific reference signals from the active serving cells and the E-UTRA SCell being activated or deactivated are available in the same slot, where TSMTC\_duration is the longest SMTC duration among all above active serving cells in SCG.

Where X2 and Y2 are specified in Table 8.2.1.2.4-1.

When one SCell in SCG is activated or deactivated:

- an interruption on any serving cell in SCG:

- of up to X2 slot, if the active serving cell is not in the same band as the SCell being activated or deactivated, or

- of up to Y2 slot + TSMTC\_duration if the active serving cells are in the same band as the SCell being activated or deactivated, provided the cell specific reference signals from the active serving cells and the SCell being activated or deactivated are available in the same slot, where, TSMTC\_duration is

- the longest SMTC duration among all above active serving cells in SCG and the SCell being activated when one SCell is activated. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being activated, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being activated is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being activated. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being activated, TSMTC duration for the SCell being activated is 0ms;

- the longest SMTC duration among all above active serving cells in SCG when one SCell is deactivated.

Where X2 and Y2 are specified in Table 8.2.1.2.4-2.

Table 8.2.1.2.4-1: Interruption length X2 and Y2 at E-UTRA SCell activation/deactivation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NR Slot length (ms) | Interruption length X2 (slots) | | Interruption length Y2 (slots) | |
| Sync | Async | Sync | Async |
| 0 | 1 | 1 | 2 | 1 | 2 |
| 1 | 0.5 | 1 | 2 | 1 | 2 |
| 2 | 0.25 | 3 | | 2 | 3 |
| 3 | 0.125 | 5 | | N/A | N/A |

Table 8.2.1.2.4-2: Interruption length X2 and Y2 at SCell activation/deactivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NR Slot length (ms) of victim cell | Interruption length X2 (slots) | | Interruption length Y2 (slots) |
| 0 | 1 | 1 | | 1 |
| 1 | 0.5 | 1 | | 1 |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 2 | 2 |
| Either aggressor cell or victim cell is on FR1 | 3 |
| 3 | 0.125 | Aggressor cell is on FR2 | 4 | 4 |
| Aggressor cell is on FR1 | 5 |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 8.2.2.2.1 Interruptions at SCell addition/release

When any number of SCells between one and 7 is added or released using the same *RRCConnectionReconfiguration* message as defined in TS 38.331 [2], the UE is allowed an interruption on any active serving cell during the RRC reconfiguration procedure as follows:

- an interruption on any active serving cell:

- of up to the duration shown in table 8.2.2.2.1-1, if the active serving cell is not in the same band as the SCell being added or released, or

- of up to the duration shown in table 8.2.2.2.1-2, if the active serving cells are in the same band as the SCell being added or released, provided the cell specific reference signals from the active serving cells and the SCell being added or released are available in the same slot.

Table 8.2.2.2.1-1: Interruption duration for SCell addition/release for inter-band CA

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length (slots)** | |
| 0 | 1 | 1 | |
| 1 | 0.5 | 2 | |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 4 |
| Either aggressor cell or victim cell is on FR1 | 5 |
| 3 | 0.125 | Aggressor cell is on FR2 | 8 |
| Aggressor cell is on FR1 | 9 |

**Table 8.2.2.2.1-2: Interruption duration for SCell addition/release for intra-band CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slot)** |
| 0 | 1 | 1 + TSMTC\_duration \* |
| 1 | 0.5 | 2 + TSMTC\_duration \* |
| 2 | 0.25 | 4 + TSMTC\_duration \* |
| 3 | 0.125 | 8 + TSMTC\_duration \* |
| NOTE 1: TSMTC\_duration measured in subframes is  - the longest SMTC duration among all above active serving cells and the SCell being added when one SCell is added. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being added, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being added is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being added. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being added, TSMTC duration for the SCell being added is 0ms;  - the longest SMTC duration among all active serving cells in the same band when one SCell is released.  NOTE 2: is as defined in TS 38.211 [6]. | | |

##### 8.2.2.2.2 Interruptions at SCell activation/deactivation

When an intra-band SCell is activated or deactivated as defined in TS 37.340 [17], the UE is allowed

- an interruption on any active serving cell:

- of up to the duration shown in table 8.2.2.2.2-1, if the active serving cell is not in the same band as the SCell being activated or deactivated, or

- of up to the duration shown in table 8.2.2.2.2-2, if the active serving cells are in the same band as the SCell being activated or deactivated provided the cell specific reference signals from the active serving cells and the SCell being activated or deactivated are available in the same slot.

Table 8.2.2.2.2-1: Interruption duration for SCell activation/deactivation for inter-band CA

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length (slots)** | |
| 0 | 1 |  | 1 |
| 1 | 0.5 |  | 1 |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 2 |
| Either aggressor cell or victim cell is on FR1 | 3 |
| 3 | 0.125 | Aggressor cell is on FR2 | 4 |
| Aggressor cell is on FR1 | 5 |

**Table 8.2.2.2.2-2: Interruption duration for SCell activation/deactivation for intra-band CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slots)** |
| 0 | 1 | 1 + TSMTC\_duration \* |
| 1 | 0.5 | 1 + TSMTC\_duration \* |
| 2 | 0.25 | 2 + TSMTC\_duration \* |
| 3 | 0.125 | 4 + TSMTC\_duration \* |
| NOTE 1: TSMTC\_duration measured in subframes is  - the longest SMTC duration among all above active serving cells and the SCell being activated when one SCell is activated. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being activated, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being activated is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being activated. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being activated, TSMTC duration for the SCell being activated is 0ms;  - the longest SMTC duration among all active servingNOTE 2: is as defined in TS 38.211 [6]. | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 8.2.3.2.3 Interruptions at PSCell/SCell addition/release

The requirements in this clause shall apply for the UE configured with E-UTRA PSCell.

When one E-UTRA PSCell/SCell in SCG is added or released:

- the UE is allowed an interruption on any active serving cell in MCG:

- of up to X1 slots, if the active serving cell is not in the same band as the E-UTRA PSCell/SCell being added or released, or

- of up to max{Y1 slots+ TSMTC\_duration, 5ms} if the active serving cells are in the same band as the E-UTRA PSCell/SCell being added or released, provided the cell specific reference signals from the active serving cells and the E-UTRA PSCell/SCell being added or released are available in the same slot, where TSMTC\_duration is the longest SMTC duration among all above activated serving cells in MCG;

Where X1 and Y1 are specified in Table 8.2.3.2.3-1.

When one SCell in MCG is added or released:

- the UE is allowed an interruption on any activated serving cell in MCG:

- of up to X1 slots, if the active serving cell is not in the same band as the SCell being added or released, or

- of up to Y1 slots + TSMTC\_duration if the active serving cells are in the same band as the SCell being added or released, provided the cell specific reference signals from the active serving cells and the SCell being added or released are available in the same slot, where, TSMTC\_duration is

- the longest SMTC duration among all above active serving cells in MCG and the SCell being added when one SCell is added. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being added, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being added is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being added. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being added, TSMTC duration for the SCell being added is 0ms;

- the longest SMTC duration among all above active serving cells in MCG when one SCell is released.

Where X1 and Y1 are specified in Table 8.2.3.2.3-2.

Table 8.2.3.2.3-1: Interruption length X1 and Y1 at E-UTRA PSCell/SCell addition/release

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NR Slot length (ms) | Interruption length X1 (slots) | | Interruption length Y1 (slots) | |
| Sync | Async | Sync | Async |
| 0 | 1 | 1 | 2 | 1 | 2 |
| 1 | 0.5 | 2 | 3 | 2 | 3 |
| 2 | 0.25 | 5 | | 4 | 5 |
| 3 | 0.125 | 9 | | N/A | N/A |

Table 8.2.3.2.3-2: Interruption length X1 and Y1 at SCell addition/Release

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NR Slot length (ms) of victim cell | Interruption length X1 (slots) | | Interruption length Y1 (slots) |
| 0 | 1 | 1 | | 1 |
| 1 | 0.5 | 2 | | 2 |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 4 | 4 |
| Either aggressor cell or victim cell is on FR1 | 5 |
| 3 | 0.125 | Aggressor cell is on FR2 | 8 | 8 |
| Aggressor cell is on FR1 | 9 |

##### 8.2.3.2.4 Interruptions at SCell activation/deactivation

The requirements in this clause shall apply for the UE configured with E-UTRA PSCell and one SCell.

When one E-UTRA SCell in SCG is activated or deactivated:

- the UE is allowed an interruption on any active serving cell in MCG:

- of up to X2 slots, if the active serving cell is not in the same band as the E-UTRA SCell being activated or deactivated, or

- of up to max{Y2 slots + TSMTC\_duration, 5ms} if the active serving cells are in the same band as the E-UTRA SCell being activated or deactivated, provided the cell specific reference signals from the active serving cells and the E-UTRA SCell being activated or deactivated are available in the same slot, where TSMTC\_duration is the longest SMTC duration among all above active serving cells in MCG.

Where X2 and Y2 are specified in Table 8.2.3.2.4-1.

When one SCell in MCG is activated or deactivated:

- the UE is allowed an interruption on any serving cell in MCG:

- of up to X2 slots, if the active serving cell is not in the same band as the SCell being activated or deactivated, or

- of up to Y2 slots + TSMTC\_duration if the active serving cells are in the same band as the SCell being activated or deactivated, provided the cell specific reference signals from the active serving cells and the SCell being activated or deactivated are available in the same slot, where, TSMTC\_duration is

- the longest SMTC duration among all above active serving cells in MCG and the SCell being activated when one SCell is activated, If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being activated, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being activated is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being activated. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being activated, TSMTC duration for the SCell being activated is 0ms;

- the longest SMTC duration among all above active serving cells in MCG when one SCell is deactivated.

Where X2 and Y2 are specified in Table 8.2.3.2.4-2.

Table 8.2.3.2.4-1: Interruption length X2 and Y2 at E-UTRA SCell activation/deactivation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | NR Slot length (ms) | Interruption length X2 (slots) | | Interruption length Y2 (slots) | |
| Sync | Async | Sync | Async |
| 0 | 1 | 1 | 2 | 1 | 2 |
| 1 | 0.5 | 1 | 2 | 1 | 2 |
| 2 | 0.25 | 3 | | 2 | 3 |
| 3 | 0.125 | 5 | | N/A | N/A |

Table 8.2.3.2.4-2: Interruption length X2 and Y2 at SCell activation/deactivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NR Slot length (ms) of victim cell | Interruption length X2 (slots) | | Interruption length Y2 (slots) |
| 0 | 1 | 1 | | 1 |
| 1 | 0.5 | 1 | | 1 |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 2 | 2 |
| Either aggressor cell or victim cell is on FR1 | 3 |
| 3 | 0.125 | Aggressor cell is on FR2 | 4 | 4 |
| Aggressor cell is on FR1 | 5 |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 8.2.4.2.1 Interruptions at PSCell/SCell addition/release

When PSCell or one or more SCells is added or released using the same *RRCConnectionReconfiguration* message as defined in TS 38.331 [2], the UE is allowed an interruption on any activated serving cell during the RRC reconfiguration procedure as follows:

- an interruption on any active serving cell:

- of up to the duration shown in table 8.2.4.2.1-1, if the active serving cell is not in the same band as the SCell being added or released, or

- of up to the duration shown in table 8.2.4.2.1-2, if the active serving cells are in the same band as the SCell being added or released, provided the cell specific reference signals from the active serving cells and the SCell being added or released are available in the same slot.

Table 8.2.4.2.1-1: Interruption duration for PSCell/SCell addition/release for inter-band DC/CA

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NR Slot length (ms) of victim cell** | **Interruption length (slots)** | |
| 0 | 1 | 1 | |
| 1 | 0.5 | 2 | |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 4 |
| Either aggressor cell or victim cell is on FR1 | 5 |
| 3 | 0.125 | Aggressor cell is on FR2 | 8 |
| Aggressor cell is on FR1 | 9 |

**Table 8.2.4.2.1-2: Interruption duration for SCell addition/release for intra-band DC/CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slots)** |
| 0 | 1 | 1 + TSMTC\_duration \* |
| 1 | 0.5 | 2 + TSMTC\_duration \* |
| 2 | 0.25 | 4 + TSMTC\_duration \* |
| 3 | 0.125 | 8 + TSMTC\_duration \* |
| NOTE 1: TSMTC\_duration measured in subframes is  - the longest SMTC duration among all above activeserving cells and the SCell being added when one SCell is added. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being added, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being added is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being added. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being added, TSMTC duration for the SCell being added is 0ms;  - the longest SMTC duration among all active serving cells in the same band when one SCell is released.  NOTE 2: is as defined in TS 38.211 [6]. | | |

##### 8.2.4.2.2 Interruptions at SCell activation/deactivation

When a SCell is activated or deactivated as defined in TS 37.340 [17], the UE is allowed

- an interruption on any active serving cell:

- of up to the duration shown in table 8.2.4.2.2-1, if the active serving cell is not in the same band as the SCell being activated or deactivated, or

- of up to the duration shown in table 8.2.4.2.2-2, if the active serving cells are in the same band as the SCell being activated or deactivated provided the cell specific reference signals from the active serving cells and the SCell being activated or deactivated are available in the same slot.

Table 8.2.4.2.2-1: Interruption duration for SCell activation/deactivation for inter-band DC/CA

|  |  |  |  |
| --- | --- | --- | --- |
|  | NR Slot length (ms) of victim cell | Interruption length (slots) | |
| 0 | 1 | 1 | |
| 1 | 0.5 | 1 | |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | 2 |
| Either aggressor cell or victim cell is on FR1 | 3 |
| 3 | 0.125 | Aggressor cell is on FR2 | 4 |
| Aggressor cell is on FR1 | 5 |

**Table 8.2.4.2.2-2: Interruption duration for SCell activation/deactivation for intra-band DC/CA**

|  |  |  |
| --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length (slots)** |
| 0 | 1 | 1 + TSMTC\_duration \* |
| 1 | 0.5 | 1 + TSMTC\_duration \* |
| 2 | 0.25 | 2 + TSMTC\_duration \* |
| 3 | 0.125 | 4 + TSMTC\_duration \* |
| NOTE 1: TSMTC\_duration measured in subframes is  - the longest SMTC duration among all above active serving cells and the SCell being activated when one SCell is activated. If SSB configuration (*absoluteFrequencySSB*) but no SMTC configuration is provided for the SCell being activated, the SSB transmission periodicity is assumed to be 5ms and TSMTC duration for the SCell being activated is x ms, where x = the number of consecutive subframes containing all SSBs in one SSB burst transmitted by the SCell being activated. If no SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration is provided for the SCell being activated, TSMTC duration for the SCell being activated is 0ms;  - the longest SMTC duration among all active serving cells in the same band when one SCell is deactivated.  NOTE 2: is as defined in TS 38.211 [6]. | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

8.3.2 SCell Activation Delay Requirement for Deactivated SCell

The requirements in this clause shall apply for the UE configured with one downlink SCell in EN-DC, or in standalone NR carrier aggregation or in NE-DC or in NR-DC and when one SCell is being activated.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in slot *n*, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated no later than in slot , where:

THARQ (in ms) is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3]

Tactivation\_time is the SCell activation delay in millisecond.

If the SCell is known and belongs to FR1, Tactivation\_time is:

- TFirstSSB+ 5ms, if the measurement period of the SCell being activated is equal to or smaller than 2400ms.

- TFirstSSB\_MAX + Trs + 5ms, if the measurement period of the SCell being activated is larger than 2400ms.

If the SCell being activated belongs to FR1 and if there is at least one active serving cell contiguous to the SCell on that FR1 band, if the UE is not provided with SSB configuration (*absoluteFrequencySSB*) nor SMTC configuration for the target SCell, Tactivation\_time is 3 ms for UE supporting *scellWithoutSSB*, provided

- The RTD between the target SCell and the contiguous active serving cell is within within ±260ns, and

- The difference of the reception power with the contiguous active serving cell is <= 6dB, and

- The RS(s) of SCell being activated is (are) QCL-TypeA with TRS(s) of the SCell being activated, and the TRS(s) of the SCell being activated is (are) further QCL-TypeC with SSB(s) of any active serving cell that is contiguous to the SCell being activated on that FR1 band.

If the SCell is unknown and belongs to FR1, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, then Tactivation\_time is:

- TFirstSSB\_MAX + TSMTC\_MAX + 2\*Trs + 5ms

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, then Tactivation\_time is TFirstSSB+ 5ms provided:

- The UE is provided with SMTC for the target SCell, and

- The SSBs in the serving cell(s) and the SSBs in the SCell fulfil the condition defined in clause 3.6.3.

- The parameter *ssb-PositionsInBurst* is same for the serving cell(s) and the SCell.

- SSB is in the same half-frame on the SCell and the contiguous FR2 active serving cell

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, if the UE supporting *scellWithoutSSB* is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms, provided

- the RS (s) of SCell being activated is (are) QCL-TypeD with RS (s) of one active serving cell on that FR2 band.

If the SCell being activated belongs to FR2 and if there is no active serving cell on that FR2 band provided that PCell or PSCell is FR1:

If the target SCell is known to UE and semi-persistent CSI-RS is used for CSI reporting, then Tactivation\_time is:

- 3ms + max(Tuncertainty\_MAC + TFineTiming + 2ms, Tuncertainty\_SP), where Tuncertainty\_MAC=0 and Tuncertainty\_SP=0 if UE receives the SCell activation command, semi-persistent CSI-RS activation command and TCI state activation command at the same time.

If the target SCell is known to UE and periodic CSI-RS is used for CSI reporting, then Tactivation\_time is:

- max(Tuncertainty\_MAC + 5ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay-THARQ), where Tuncertainty\_MAC=0 if UE receives the SCell activation command and TCI state activation commands at the same time.

If the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, then Tactivation\_time is:

- 6ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2ms, Tuncertainty\_SP).

If the target SCell is unknown to UE and periodic CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, then Tactivation\_time is:

- 3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)}.

where,

TSMTC\_MAX:

- In FR1, in case of intra-band SCell activation, TSMTC\_MAX is the longer SMTC periodicity between active serving cells and SCell being activated provided the cell specific reference signals from the active serving cells and the SCells being activated or released are available in the same slot; in case of inter-band SCell activation, TSMTC\_MAX is the SMTC periodicity of SCell being activated.

- In FR2, TSMTC\_MAX is the longer SMTC periodicity between active serving cells and SCell being activated provided that in Rel-15 only support FR2 intra-band CA.

- TSMTC\_MAX is bounded to a minimum value of 10ms.

Trs is the SMTC periodicity of the SCell being activated if the UE has been provided with an SMTC configuration for the SCell in SCell addition message, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the measObjectNRs having the same SSB frequency and subcarrier spacing configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement which involves Trs is applied with Trs = 5ms assuming the SSB transmission periodicity is 5ms. There are no requirements if the SSB transmission periodicity is not 5ms.

TFirstSSB: is the time to the end of the first complete SSB burst indicated by the SMTC, or within 5ms if SMTC is not configured, after slot n + .

TFirstSSB\_MAX: Is the time to the end of the first complete SSB burst indicated by the SMTC, or within 5ms if SMTC is not configured, after slot n + , further fulfilling:

- In FR1, in case of intra-band SCell activation, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot; in case of inter-band SCell activation, the first occasion when the SCell being activated is transmitting SSB burst.

- In FR2, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot.

TFineTiming is the time period between UE finish processing the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and the timing of first complete available SSB corresponding to the TCI state.

TL1-RSRP, measure is L1-RSRP measurement delay TL1-RSRP\_Measurement\_Period\_SSB msor TL1-RSRP\_Measurement\_Period\_CSI-RS based on applicability as defined in clause 9.5 assuming M=1 and TReport=0.

TL1-RSRP, report is delay of acquiring CSI reporting resources.

Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable) relative to

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

Tuncertainty\_SP is the time period between reception of the activation command for semi-persistent CSI-RS resource set for CQI reporting relative to

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

Tuncertainty\_RRC is the time period between reception of the RRC configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) relative to

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

TRRC\_delay is the RRC procedure delay as specified in TS 38.331 [2].

Longer delays for RRM measurement requirements, and in case of FR2 also SSB based RLM/BFD/CBD/L1-RSRP measurement requirements, can be expected during the cell detection time for unknown SCell activation.

When *absoluteFrequencySSB* is not configured in *DownlinkConfigCommon* for target SCell but SMTC for target SCell is configured, no requirement would be applied.

TCSI\_reporting is the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2].

SCell in FR1 is known if it has been meeting the following conditions:

- During the period equal to max(5\*measCycleSCell,  5\*DRX cycles) for FR1 before the reception of the SCell activation command:

- the UE has sent a valid measurement report for the SCell being activated and

- the SSB measured remains detectable according to the cell identification conditions specified in clause 9.2 and 9.3.

- the SSB measured during the period equal to max(5\*measCycleSCell, 5\*DRX cycles) also remains detectable during the SCell activation delay according to the cell identification conditions specified in clause 9.2 and 9.3.

Otherwise SCell in FR1 is unknown.

The requirements for FR1 unknown SCell activation specified in this clause apply when one of the following conditions is met

- ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or

- ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation.

For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:

- During the period equal to 4s for UE supporting power class1 and 3s for UE supporting power class 2/3/4 before UE receives the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable):

- the UE has sent a valid L3-RSRP measurement report with SSB index

- SCell activation command is received after L3-RSRP reporting and no later than the time when UE receives MAC-CE command for TCI activation

- During the period from L3-RSRP reporting to the valid CQI reporting, the reported SSBs with indexes remain detectable according to the cell identification conditions specified in clauses 9.2 and 9.3, and the TCI state is selected based on one of the latest reported SSB indexes.

Otherwise, the first SCell in FR2 band is unknown. The requirement for unknown SCell applies provided that the activation commands for PDCCH TCI, PDSCH TCI (when applicable), semi-persistent CSI-RS for CQI reporting (when applicable), and configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) are based on the latest valid L1-RSRP reporting.

If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*prior to the activation command, TSMTC\_Scell follows *smtc1* or *smtc2* according to the physical cell ID of the target cell being activated. TSMTC\_MAX follows *smtc1* or *smtc2* according to the physical cell IDs of the target cells being activated and the active serving cells.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in TS 38.331 [2] for a SCell at the first opportunities for the corresponding actions once the SCell is activated.

The starting point of an interruption window on spCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+, where NR slot length is with respect to the numerology used in the SCell being activated, and TX is:

- 0, if Tactivation\_time is 3ms

- TFirstSSB, for any scenario where Tactivation\_time includes TFirstSSB;

- TFirstSSB\_MAX, for any scenario where Tactivation\_time includes TFirstSSB\_MAX;

- Tuncertainty\_MAC +TFineTiming, for any scenario where Tactivation\_time includes only TFineTiming- and no TFirstSSB\_MAX.

The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

The requirements in this clause and requriements on interruption due to SCell activation in clause 8.2 apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell.

Starting from the slot specified in clause 4.3 of TS 38.213 [3] (timing for secondary Cell activation/deactivation) and until the UE has completed the SCell activation, the UE shall report out of range if the UE has available uplink resources to report CQI for the SCell.

Starting from the slot specified in clause 4.3 of TS 38.213 [3] (timing for secondary Cell activation/deactivation) and until the UE has completed the SCell activation, the UE shall report out of range if the UE has available uplink resources to report CQI for the SCell.

Starting from the slot specified in clause 4.3 of TS 38.213 [3] (timing for secondary Cell activation/deactivation) and until the UE has completed a first L1-RSRP measurement, the UE shall report lowest valid L1 SS-RSRP range if the UE has available uplink resources to report L1-RSRP for the SCell.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 9.2.5.3.2 Scheduling availability of UE performing measurements with a different subcarrier spacing than PDSCH/PDCCH on FR1

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

- If *deriveSSB\_IndexFromCell* is enabled the UE is not expected to transmit PUCCH/PUSCH/SRS or receive PDCCH/PDSCH/TRS/CSI-RS for CQI on SSB symbols to be measured, and on 1 data symbol before each consecutive SSB symbols to be measured and 1 data symbol after each consecutive SSB symbols to be measured within SMTC window duration. If the high layer signalling of *smtc2*is configured in TS 38.331 [2], the SMTC periodicityfollows *smtc2*; Otherwise the SMTC periodicity follows *smtc1.*

- If *deriveSSB\_IndexFromCell* is not enabled the UE is not expected to transmit PUCCH/PUSCH/SRS or receive PDCCH/PDSCH/TRS/CSI-RS for CQI on all symbols within SMTC window duration. If the high layer signalling of *smtc2*is configured in TS 38.331 [2], the SMTC periodicityfollows *smtc2*; Otherwise the SMTC periodicity follows *smtc1.*

If the following conditions are met:

- The UE has been notified about system information update through paging,

- The gap between the UE’s reception of PDCCH that UE monitors in the Type 2-PDCCH CSS set that notifies system information update, and the PDCCH that UE monitors in the Type0-PDCCH CSS set, is greater than 2 slots

The UE is expected to receive the PDCCH that the UE monitors in the Type0-PDCCH CSS set, and/or the corresponding PDSCH, on SSB symbols to be measured.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

## A.3.13A Test Cases involving E-UTRA/FR1 and FR2 carriers

### A.3.13A.1 Introduction

The following applies to UE compliant to this version of the specification when undergoing tests with a mix of E-UTRA/NR FR1 and NR FR2 carriers in clauses A.5, A.7 and A.8.

### A.3.13A.2 Principle of Testing in EN-DC

For test cases in clause A.5 listed in Table A.3.13A.2-1, the following applies:

- UE does not have to pass the test case

Table A.3.13A.2-1: Test cases UE does not have to pass in current version of specification (EN-DC)

|  |  |
| --- | --- |
| **Clause** | **Test case slogan** |
| A.5.5.3.2 | SCell Activation and deactivation of known SCell in FR1 for 160ms SCell measurement cycle |
| A.5.5.3.5 | SCell Activation and deactivation of SCell in FR2 |
| A.5.7.1.3 | EN-DC inter-frequency measurement accuracy with FR1 serving cell and FR2 target cell |

### A.3.13A.3 Principle of Testing in SA

For test cases in clause A.7 listed in Table A.3.13A.3-1, the following applies:

- UE does not have to pass the test case

Table A.3.13A.3-1: Test cases UE does not have to pass in current version of specification (SA)

|  |  |
| --- | --- |
| **Clause** | **Test case slogan** |
| A.7.5.3.2 | SCell Activation and deactivation for FR1+FR2 inter-band with target SCell in FR2 |
| A.7.5.6.1.2 | NR FR1- NR FR2 DL active BWP switch of PCell with non-DRX in SA |
| A.7.6.2.5 | SA event triggered reporting tests for FR2 without SSB time index detection when DRX is not used (PCell in FR1) |
| A.7.6.2.6 | SA event triggered reporting tests for FR2 without SSB time index detection when DRX is used (PCell in FR1) |
| A.7.6.2.7 | SA event triggered reporting tests for FR2 with SSB time index detection when DRX is not used (PCell in FR1) |
| A.7.6.2.8 | SA event triggered reporting tests for FR2 with SSB time index detection when DRX is used (PCell in FR1) |
| A.7.7.1.3 | SA inter-frequency measurement accuracy with FR1 serving cell and FR2 target cell |

### A.3.13A.4 Principle of Testing in E-UTRA

For test cases in clause A.8 listed in Table A.3.13A.4-1, the following applies:

- UE does not have to pass the test case.

Table A.3.13A.4-1: Test cases UE does not have to pass in current version of specification (E-UTRA)

|  |  |
| --- | --- |
| **Clause** | **Test case slogan** |
| A.8.4.2.5 | NR Inter-RAT event triggered reporting tests for FR2 without SSB time index detection when DRX is not used |
| A.8.4.2.6 | NR Inter-RAT event triggered reporting tests for FR2 without SSB time index detection when DRX is used |
| A.8.4.2.7 | NR Inter-RAT event triggered reporting tests for FR2 with SSB time index detection when DRX is not used |
| A.8.4.2.8 | NR Inter-RAT event triggered reporting tests for FR2 with SSB time index detection when DRX is used |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### 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 |
| Resource Type | periodic | periodic | aperiodic | aperiodic |
| Resource Set Config |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on |
| aperiodicTriggeringOffset | n.a. | n.a. | 4 | 4 |
| trs-Info | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 1 for resource #1 | 1 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| powerControlOffset | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 |
| Period (slots) | slot5 | slot10 | n.a. | n.a. |
| Offset | 1 | 1 | n.a. | n.a. |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. |
| TCI.State.1 |  |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 |
| nrofPorts | 2 | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 4 for resource #0 | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 10 for resource #1 | 10 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM |
| density | 1 | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 | 0 |
| nrofRBs | 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.3.14.2-2: 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 |
| Resource Type | periodic | periodic | aperiodic | aperiodic |
| Resource Set Config |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on |
| aperiodicTriggeringOffset | n.a. | n.a. | 4 | 4 |
| trs-Info | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 1 for resource #1 | 1 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| powerControlOffset | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 |
| Period (slots) | slot10 | slot20 | n.a. | n.a. |
| Offset | 2 | 2 | n.a. | n.a. |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. |
| TCI.State.1 |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 |
| nrofPorts | 2 | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 10 for resource #1 | 10 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM |
| density | 1 | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 | 0 |
| nrofRBs | 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.3.14.2-3: 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 |
| Resource Type | periodic | periodic | aperiodic | aperiodic |
| Resource Set Config |  |  |  |  |
| nzp-CSI-ResourceSetId | 0 | 0 | 0 | 0 |
| repetition | n.a. | off | off | on |
| aperiodicTriggeringOffset | n.a. | n.a. | 4 | 4 |
| trs-Info | n.a. | n.a. | n.a. | n.a. |
| **Resource Config** |  |  |  |  |
| nzp-CSI-RS-ResourceId | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 1 for resource #1 | 1 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| powerControlOffset | 0 | 0 | 0 | 0 |
| powerControlOffsetSS | db0 | db0 | db0 | db0 |
| scramblingID | 0 | 0 | 0 | 0 |
| Period (slots) | slot40 | slot80 | n.a. | n.a. |
| Offset | 8 | 16 | n.a. | n.a. |
| qcl-InfoPeriodicCSI-RS | TCI.State.0 | TCI.State.0 | n.a. | n.a. |
| TCI.State.1 |
| frequencyDomainAllocation | 000001 | 0001 | 0001 | 0001 |
| nrofPorts | 2 | 1 | 1 | 1 |
| firstOFDMSymbolInTimeDomain | 5 for resource #0 | 6 for resource #0 | 6 for resource #0 | 0 for resource #0 |
| 1 for resource #1 |
| 2 for resource #2 |
| 3 for resource #3 |
| 10 for resource #1 | 10 for resource #1 | 4 for resource #4 |
| 5 for resource #5 |
| 6 for resource #6 |
| 7 for resource #7 |
| cdm-Type | FD-CDM2 | noCDM | noCDM | noCDM |
| density | 1 | 3 | 3 | 3 |
| startingRB | 0 | 0 | 0 | 0 |
| nrofRBs | 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. | | | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.4.5.2.3 E-UTRAN – NR FR1 interruptions during measurements on deactivated NR SCC in synchronous EN-DC

##### A.4.5.2.3.1 Test Purpose and Environment

The purpose of this test is to verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC specified in TS 38.133 clause 8.2.1.2. Supported test configurations for LTE PCell and NR PSCell are shown in table A.4.5.2.3.1-1. Supported test configurations for NR SCell are shown in table A.4.5.2.3.1-1A. Test configuration for LTE PCell and NR PSCell and test configuration for NR SCell are chosen independently.

The general test parameters and NR cell specific test parameters are given in Table A.4.5.2.3.1-2, A.4.5.2.3.1-3 and A.4.5.2.3.1-4 below. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.1-1. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is LTE PCell, Cell2 and Cell3 is NR PSCell and NR deactivated SCell. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2 and the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated NR SCells is received at the UE antenna connector. During T1, LTE PCell and NR PSCell are continuously scheduled in DL

Table A.4.5.2.3.1-1: Interruptions during measurements on deactivated NR SCC supported test configurations for LTE PCell and NR PSCell

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.4.5.2.3.1-1A: Interruptions during measurements on deactivated NR SCC supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration | |

Table A.4.5.2.3.1-2: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2, 3 | One is E-UTRAN RF channel and the other two are NR RF channels |
| Active PCell |  | Cell1 | PCell on E-UTRAN RF channel number 1. |
| Active PSCell |  | Cell2 | PSCell on NR RF channel number 2. |
| Configured deactivated SCell |  | Cell3 | Deactivated SCell on NR RF channel number 3. |
| CP length |  | Normal | Applicable to Cell1, Cell2 and Cell3 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |
| T1 | s | 10 |  |

Table A.4.5.2.3.1-3: NR cell specific test parameters for NR PSCell for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** |
| 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.2.1 |
| BWchannel | Config 1,4 |  | Note 8 |
| Config 2,5 | Note 8 |
| Config 3,6 | Note 8 |
| BWoccupied | Config 1,4 | RB | 52 Note 6 |
|  | Config 2,5 |  | 52 Note 6 |
|  | Config 3,6 |  | 106 Note 7 |
| Initial DL BWP Configuration | Config 1,4 |  | DLBWP.0.1 |
| Config 2,5 | DLBWP.0.1 |
| Config 3,6 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | Config 1,4 |  | DLBWP.1.1 |
| Config 2,5 | DLBWP.1.1 |
| Config 3,6 | DLBWP.1.1 |
| Initial UL BWP Configuration | Config 1,4 |  | ULBWP.0.1 |
| Config 2,5 | ULBWP.0.1 |
| Config 3,6 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | Config 1,4 |  | ULBWP.1.1 |
| Config 2,5 | ULBWP.1.1 |
| Config 3,6 | ULBWP.1.1 |
| PDSCH Reference measurement channel | Config 1,4 |  | SR.1.1 FDD |
| Config 2,5 | SR.1.1 TDD |
| Config 3,6 | SR.2.1 TDD |
| RMSI CORESET parameters | Config 1,4 |  | CR.1.1 FDD |
| Config 2,5 | CR.1.1 TDD |
| Config 3,6 | CR.2.1 TDD |
| PDCCH CORESET parameters | Config 1,4 |  | CCR.1.1 FDD |
| Config 2,5 | CCR.1.1 TDD |
| Config 3,6 | CCR.2.1 TDD |
| TRS configuration | Config 1,4 |  | TRS.1.1 FDD |
| Config 2,5 | TRS.1.1 TDD |
| Config 3,6 | TRS.1.2 TDD |
| OCNG Patterns | Config 1,2,4,5 |  | OP.1 Note 6 |
|  | Config 3,6 |  | OP.1 Note 7 |
| SMTC Configuration | |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 |
| Config 3,6 | SSB.2 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/  9.36MHz | -58.96 |
| Config 3,6 | dBm/  38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | | μs | 3 for intra-band EN-DC,  33 for inter-band EN-DC |
| Time offset to Cell2 Note 5 | | μs | - |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |



Table A.4.5.2.3.1-4: NR cell specific test parameters for NR SCell for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell3** |
| Frequency Range | |  | FR1 |
| Duplex mode | ConfigSCell 1 |  | FDD |
| ConfigSCell 2,3 | TDD |
| TDD configuration | ConfigSCell 1 |  | Not Applicable |
| ConfigSCell 2 | TDDConf.1.1 |
| ConfigSCell 3 | TDDConf.2.1 |
| BWchannel | ConfigSCell 1 |  | Note 8 |
| ConfigSCell 2 | Note 8 |
| ConfigSCell 3 | Note 8 |
| BWoccupied | ConfigSCell 1 | RB | 52 Note 6 |
|  | ConfigSCell 2 |  | 52 Note 6 |
|  | ConfigSCell 3 |  | 106 Note 7 |
| Initial DL BWP Configuration | ConfigSCell 1 |  | DLBWP.0.1 |
| ConfigSCell 2 | DLBWP.0.1 |
| ConfigSCell 3 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | ConfigSCell 1 |  | DLBWP.1.1 |
| ConfigSCell 2 | DLBWP.1.1 |
| ConfigSCell 3 | DLBWP.1.1 |
| Initial UL BWP Configuration | ConfigSCell 1 |  | ULBWP.0.1 |
| ConfigSCell 2 | ULBWP.0.1 |
| ConfigSCell 3 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | ConfigSCell 1 |  | ULBWP.1.1 |
| ConfigSCell 2 | ULBWP.1.1 |
| ConfigSCell 3 | ULBWP.1.1 |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | - |
| ConfigSCell 2 | - |
| ConfigSCell 3 | - |
| RMSI CORESET parameters | ConfigSCell 1 |  | CR.1.1 FDD |
| ConfigSCell 2 | CR.1.1 TDD |
| ConfigSCell 3 | CR.2.1 TDD |
| PDCCH CORESET parameters | ConfigSCell 1 |  | CCR.1.1 FDD |
| ConfigSCell 2 | CCR.1.1 TDD |
| ConfigSCell 3 | CCR.2.1 TDD |
| TRS configuration | ConfigSCell 1 |  | TRS.1.1 FDD |
| ConfigSCell 2 | TRS.1.1 TDD |
| ConfigSCell 3 | TRS.1.2 TDD |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 6 |
|  | ConfigSCell 3 |  | OP.1 Note 7 |
| SMTC Configuration | |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.1 FR1 |
| ConfigSCell 3 | SSB.2 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | ConfigSCell 1,2 | dBm/9.36MHz | -58.96 |
| ConfigSCell 3 | dBm/38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | | μs | 3 + Time offset to Cell2 for intra-band EN-DC,  33 + Time offset to Cell2 for inter-band EN-DC |
| Time offset to Cell2 Note 5 | | μs | 3 |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |

##### A.4.5.2.3.2 Test Requirements

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell.

If the NR PSCell is not in the same band as the deactivated SCell, the UE is only allowed to cause interruptions on NR PSCell immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table A.4.5.2.3.2-1.

If the NR PSCell is in the same band as the deactivated SCell, the UE is only allowed to cause an interruption on PSCell no earlier than 1 slot before an SMTC and no later than 1 slot after the SMTC. the interruption on NR PSCell shall not exceed the value defined in Table A.4.5.2.3.2-2.

Table A.4.5.2.3.2-1: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

Table A.4.5.2.3.2-2: Interruption duration if the NR PSCell is in the same band as the deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 2 + SMTC duration |
| 1 | 0.5 | 2 + SMTC duration |

For synchronous inter-band EN-DC, the UE is only allowed to cause interruptions on E-UTRA PCell immediately before and immediately after an SMTC. Each interruption on E-UTRA PCell shall not exceed 1 subframe.

For synchronous intra-band EN-DC, the UE is only allowed to cause an interruption on E-UTRA PCell no earlier than 1 subframe before an SMTC and no later than 1 subframe after the SMTC. The interruption on E-UTRA PCell shall not exceed SMTC duration + 2 subframes.

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

#### A.4.5.2.4 E-UTRAN – NR FR1 interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

##### A.4.5.2.4.1 Test Purpose and Environment

The purpose of this test is to verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC specified in TS 38.133 clause 8.2.1. Supported test configurations for LTE PCell and NR PSCell are shown in table A.4.5.2.4.1-1. Supported test configurations for NR SCell are shown in table A.4.5.2.4.1-1. Test configuration for LTE PCell and NR PSCell and test configuration for NR SCell are chosen independently.

The general test parameters and NR cell specific test parameters are given in Table A.4.5.2.4.1-2, A.4.5.2.4.1-3 and A.4.5.2.4.1-4 below. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.1-1. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is LTE PCell, Cell2 and Cell3 is NR PSCell and NR deactivated SCell. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2and the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated NR SCells is received at the UE antenna connector. During T1, LTE PCell and NR PSCell are continuously scheduled in DL.

Table A.4.5.2.4.1-1: Interruptions during measurements on deactivated NR SCC supported test configurations for LTE PCell and NR PSCell

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.4.5.2.4.1-1A: Interruptions during measurements on deactivated NR SCC supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration | |

Table A.4.5.2.4.1-2: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2, 3 | One is E-UTRAN RF channel and the other two are NR RF channels |
| Active PCell |  | Cell1 | PCell on E-UTRAN RF channel number 1. |
| Configured PSCell |  | Cell2 | PSCell on NR RF channel number 2. |
| Configured deactivated SCell |  | Cell3 | Deactivated SCell on NR RF channel number 3. |
| CP length |  | Normal | Applicable to Cell1, Cell2 and Cell3 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |
| T1 | s | 10 |  |

Table A.4.5.2.4.1-3: NR cell specific test parameters for NR PSCell for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell2 |
| 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.2.1 |
| BWchannel | Config 1,4 |  | Note 8 |
| Config 2,5 | Note 8 |
| Config 3,6 | Note 8 |
| BWoccupied | Config 1,4 | RB | 52 Note 6 |
|  | Config 2,5 |  | 52 Note 6 |
|  | Config 3,6 |  | 106 Note 7 |
| Initial BWP Configuration | Config 1,4 |  | DLBWP.0.1 |
| Config 2,5 | DLBWP.0.1 |
| Config 3,6 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | Config 1,4 |  | DLBWP.1.1 |
| Config 2,5 | DLBWP.1.1 |
| Config 3,6 | DLBWP.1.1 |
| Initial UL BWP Configuration | Config 1,4 |  | ULBWP.0.1 |
| Config 2,5 | ULBWP.0.1 |
| Config 3,6 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | Config 1,4 |  | ULBWP.1.1 |
| Config 2,5 | ULBWP.1.1 |
| Config 3,6 | ULBWP.1.1 |
| PDSCH Reference measurement channel | Config 1,4 |  | SR.1.1 FDD |
| Config 2,5 | SR.1.1 TDD |
| Config 3,6 | SR.2.1 TDD |
| RMSI CORESET parameters | Config 1,4 |  | CR.1.1 FDD |
| Config 2,5 | CR.1.1 TDD |
| Config 3,6 | CR.2.1 TDD |
| PDCCH CORESET parameters | Config 1,4 |  | CCR.1.1 FDD |
| Config 2,5 | CCR.1.1 TDD |
| Config 3,6 | CCR.2.1 TDD |
| TRS configuration | Config 1,4 |  | TRS.1.1 FDD |
| Config 2,5 | TRS.1.1 TDD |
| Config 3,6 | TRS.1.2 TDD |
| OCNG Patterns | Config 1,2,4,5 |  | OP.1 Note 6 |
|  | Config 3,6 |  | OP.1 Note 7 |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 |
| Config 3,6 | SSB.2 FR1 |
| SMTC Configuration |  |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 Hz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | -58.96 |
| Config 3,6 | dBm/38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | Config 1,2,4,5 | μs | 500 |
|  | Config 3,6 |  | 250 |
| Time offset to Cell2 Note 5 | | μs | - |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |



Table A.4.5.2.4.1-4: NR cell specific test parameters for NR SCell for E-UTRAN – NR interruptions during measurements on deactivated NR SCC in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell3 |
| Frequency Range | |  | FR1 |
| Duplex mode | ConfigSCell 1 |  | FDD |
| ConfigSCell 2,3 | TDD |
| TDD configuration | ConfigSCell 1 |  | Not Applicable |
| ConfigSCell 2 | TDDConf.1.1 |
| ConfigSCell 3 | TDDConf.2.1 |
| BWchannel | ConfigSCell 1 |  | Note 8 |
| ConfigSCell 2 | Note 8 |
| ConfigSCell 3 | Note 8 |
| BWoccupied | ConfigSCell 1 | RB | 52 Note 6 |
|  | ConfigSCell 2 |  | 52 Note 6 |
|  | ConfigSCell 3 |  | 106 Note 7 |
| Initial BWP Configuration | ConfigSCell 1 |  | DLBWP.0.1 |
| ConfigSCell 2 | DLBWP.0.1 |
| ConfigSCell 3 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | ConfigSCell 1 |  | DLBWP.1.1 |
| ConfigSCell 2 | DLBWP.1.1 |
| ConfigSCell 3 | DLBWP.1.1 |
| Initial UL BWP Configuration | ConfigSCell 1 |  | ULBWP.0.1 |
| ConfigSCell 2 | ULBWP.0.1 |
| ConfigSCell 3 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | ConfigSCell 1 |  | ULBWP.1.1 |
| ConfigSCell 2 | ULBWP.1.1 |
| ConfigSCell 3 | ULBWP.1.1 |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | - |
| ConfigSCell 2 | - |
| ConfigSCell 3 | - |
| RMSI CORESET parameters | ConfigSCell 1 |  | CR.1.1 FDD |
| ConfigSCell 2 | CR.1.1 TDD |
| ConfigSCell 3 | CR.2.1 TDD |
| PDCCH CORESET parameters | ConfigSCell 1 |  | CCR.1.1 FDD |
| ConfigSCell 2 | CCR.1.1 TDD |
| ConfigSCell 3 | CCR.2.1 TDD |
| TRS configuration | ConfigSCell 1 |  | TRS.1.1 FDD |
| ConfigSCell 2 | TRS.1.1 TDD |
| ConfigSCell 3 | TRS.1.2 TDD |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 6 |
|  | ConfigSCell 3 |  | OP.1 Note 7 |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.1 FR1 |
| ConfigSCell 3 | SSB.2 FR1 |
| SMTC Configuration |  |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | ConfigSCell 1,2 | dBm/ 9.36MHz | -58.96 |
| ConfigSCell 3 | dBm/ 38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | ConfigSCell 1,2 | μs | 500 + Time offset to Cell2 |
|  | ConfigSCell 3 |  | 250 + Time offset to Cell2 |
| Time offset to Cell2 Note 5 | | μs | 3 |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |

##### A.4.5.2.4.2 Test Requirements

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell.

If the NR PSCell is not in the same band as the deactivated SCell, the UE is only allowed to cause interruptions on NR PSCell immediately before and immediately after an SMTC. Each interruption on NR PSCell shall not exceed the value defined in Table A.4.5.2.4.2-1.

If the NR PSCell is in the same band as the deactivated SCell, the UE is only allowed to cause an interruption on PSCell no earlier than 1 slot before an SMTC and no later than 1 slot after the SMTC. the interruption on NR PSCell shall not exceed the value defined in Table A.4.5.2.4.2-2.

Table A.4.5.2.4.2-1: Interruption duration if the NR PSCell is not in the same band as the deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

**Table A.4.5.2.4.2-2: Interruption duration if the NR PSCell is in the same band as the deactivated SCell**

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 2 + SMTC duration |
| 1 | 0.5 | 2 + SMTC duration |

For asynchronous inter-band EN-DC, the UE is only allowed to cause interruptions on E-UTRA PCell immediately before and immediately after an SMTC. Each interruption on E-UTRA PCell shall not exceed 2 subframe.

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

#### A.4.5.2.5 E-UTRAN – NR FR1 interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

##### A.4.5.2.5.1 Test Purpose and Environment

The purpose of this test is to verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated E-UTRAN SCC, the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC specified in TS38.133 clause 8. 2.1.2. Supported test configurations are shown in table A.4.5.2.5.1-1.

The general test parameters and NR cell specific test parameters are given in Table A.4.5.2.5.1-2 and A.4.5.2.5.1-3 below. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.1-1. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2 and the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated E-UTRAN SCells is received at the UE antenna connector. During T1, LTE PCell and NR PSCell are continuously scheduled in DL.

Table A.4.5.2.5.1-1: Interruptions during measurements on deactivated E-UTRAN SCC supported test configurations

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

Table A.4.5.2.5.1-2: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2 | One is E-UTRAN RF channel and the other is NR RF channel |
| Active PCell |  | Cell1 | PCell on E-UTRAN RF channel number 1. |
| Active PSCell |  | Cell2 | PSCell on NR RF channel number 2. |
| Configured deactivated SCell |  | Cell3 | Deactivated SCell on E-UTRAN RF channel number 1. |
| CP length |  | Normal | Applicable to Cell1, Cell2 and Cell3 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |
| T1 | s | 10 |  |

Table A.4.5.2.5.1-3: NR cell specific test parameters for E-UTRAN – NR interruptions during measurements on deactivated E-UTRAN SCC in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell2 |
| 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.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 |
| Initial DL BWP Configuration | Config 1,4 |  | DLBWP.0.1 |
| Config 2,5 | DLBWP.0.1 |
| Config 3,6 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | Config 1,4 |  | DLBWP.1.1 |
| Config 2,5 | DLBWP.1.1 |
| Config 3,6 | DLBWP.1.1 |
| Initial UL BWP Configuration | Config 1,4 |  | ULBWP.0.1 |
| Config 2,5 | ULBWP.0.1 |
| Config 3,6 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | Config 1,4 |  | ULBWP.1.1 |
| Config 2,5 | ULBWP.1.1 |
| Config 3,6 | ULBWP.1.1 |
| PDSCH Reference measurement channel | Config 1,4 |  | SR.1.1 FDD |
| Config 2,5 | SR.1.1 TDD |
| Config 3,6 | SR.2.1 TDD |
| RMSI CORESET parameters | Config 1,4 |  | CR.1.1 FDD |
| Config 2,5 | CR.1.1 TDD |
| Config 3,6 | CR.2.1 TDD |
| PDCCH CORESET parameters | Config 1,4 |  | CCR.1.1 FDD |
| Config 2,5 | CCR.1.1 TDD |
| Config 3,6 | CCR.2.1 TDD |
| TRS configuration | Config 1,4 |  | TRS.1.1 FDD |
| Config 2,5 | TRS.1.1 TDD |
| Config 3,6 | TRS.1.2 TDD |
| OCNG Patterns | |  | OP.1 |
| SMTC Configuration | |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 |
| Config 3,6 | SSB.2 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/  9.36MHz | -58.96 |
| Config 3,6 | dBm/  38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | | μs | 3 for intra-band EN-DC,  33 for inter-band EN-DC |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells | | | |

##### A.4.5.2.5.2 Test Requirements

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on NR PSCell. The UE is only allowed to cause one interruption on PCell and one interruption on PSCell. Each interruption on NR PSCell shall not exceed X defined in Table A.4.5.2.5.2-1 if the NR PSCell is not in the same band as the E-UTRAN deactivated SCell or Y in Table A.4.5.2.3.2-1 if the NR PSCell is in the same band as the E-UTRAN deactivated SCell.

**Table A.4.5.2.5.2-1: Interruption length X and Y at measurements on deactivated E-UTRA SCC**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **NR Slot length (ms)** | **Interruption length X slot** | **Interruption length Y slot** |
| **Sync** |
| 0 | 1 | 1 | 1+SMTC duration |
| 1 | 0.5 | 1 | 1+SMTC duration |

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell.

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

#### A.4.5.2.6 E-UTRAN – NR FR1 interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

##### A.4.5.2.6.1 Test Purpose and Environment

The purpose of this test is to verify E-UTRAN PCell and NR PSCell interruptions during the measurement on the deactivated NR SCC, the UE missed ACK/NACK does not exceed the limits. This test will verify the missed ACK/NACK rate for E-UTRAN PCell and NR PSCell in EN-DC specified in TS 38.133 clause 8.2.1. Supported test configurations are shown in table A.4.5.2.6.1-1.

The general test parameters and NR cell specific test parameters are given in Table A.4.5.2.6.1-1 and A.4.5.2.6.1-2 below. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.1-1. In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 and Cell3 is E-UTRAN PCell and E-UTRAN deactivated SCell, Cell2 is NR FR1 PSCell. Cell1 shall be configured as LTE PCell and Cell2 shall be configured as NR PSCell. The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2 and the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated NR SCells is received at the UE antenna connector. During T1, LTE PCell and NR PSCell are continuously scheduled in DL.

Table A.4.5.2.6.1-1: Interruptions during measurements on deactivated E-UTRAN SCC supported test configurations

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

Table A.4.5.2.6.1-2: General test parameters for E-UTRAN – NR interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2, 3 | One is NR RF channel and the other two are E-UTRAN RF channels |
| Active PCell |  | Cell1 | PCell on E-UTRAN RF channel number 1. |
| Configured PSCell |  | Cell2 | PSCell on NR RF channel number 2. |
| Configured deactivated SCell |  | Cell3 | Deactivated SCell on E-UTRAN RF channel number 3. |
| CP length |  | Normal | Applicable to Cell1, Cell2 and Cell3 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |
| T1 | s | 10 |  |

Table A.4.5.2.6.1-3: NR cell specific test parameters for E-UTRAN – NR interruptions during measurements on deactivated E-UTRAN SCC in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell2 |
| 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.2.1 |
| BWchannel | Config 1,4 |  | 10: NRB,c = 52 |
| Config 2,5 | 10: NRB,c = 52 |
| Config 3,6 | 40: NRB,c = 106 |
| Initial DL BWP Configuration | Config 1,4 |  | DLBWP.0.1 |
| Config 2,5 | DLBWP.0.1 |
| Config 3,6 | DLBWP.0.1 |
| Dedicated DL BWP Configuration | Config 1,4 |  | DLBWP.1.1 |
| Config 2,5 | DLBWP.1.1 |
| Config 3,6 | DLBWP.1.1 |
| Initial UL BWP Configuration | Config 1,4 |  | ULBWP.0.1 |
| Config 2,5 | ULBWP.0.1 |
| Config 3,6 | ULBWP.0.1 |
| Dedicated UL BWP Configuration | Config 1,4 |  | ULBWP.1.1 |
| Config 2,5 | ULBWP.1.1 |
| Config 3,6 | ULBWP.1.1 |
| PDSCH Reference measurement channel | Config 1,4 |  | SR.1.1 FDD |
| Config 2,5 | SR.1.1 TDD |
| Config 3,6 | SR.2.1 TDD |
| RMSI CORESET parameters | Config 1,4 |  | CR.1.1 FDD |
| Config 2,5 | CR.1.1 TDD |
| Config 3,6 | CR.2.1 TDD |
| PDCCH CORESET parameters | Config 1,4 |  | CCR.1.1 FDD |
| Config 2,5 | CCR.1.1 TDD |
| Config 3,6 | CCR.2.1 TDD |
| TRS configuration | Config 1,4 |  | TRS.1.1 FDD |
| Config 2,5 | TRS.1.1 TDD |
| Config 3,6 | TRS.1.2 TDD |
| OCNG Patterns | |  | OP.1 |
| SMTC Configuration | |  | SMTC.1 |
| TCI state | |  | TCI.State.0 |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 |
| Config 3,6 | SSB.2 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/  9.36MHz | -58.96 |
| Config 3,6 | dBm/  38.16MHz | -52.86 |
| Time offset to Cell1 Note 4 | Config 1,2,4,5 | μs | 500 |
|  | Config 3,6 |  | 250 |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell at the UE antenna connector including time alignment error between the two cells | | | |

##### A.4.5.2.6.2 Test Requirements

The UE shall be continuously scheduled in LTE PCell and NR PSCell during the entire length of T1. During the time duration T1 the UE shall transmit at least 99.5% of ACK/NACK on E-UTRAN PCell and NR PSCell. The UE is only allowed to cause one interruption on PCell and one interruption on PSCell. Each interruption on NR PSCell shall not exceed the value defined in Table A.4.5.2.4.2-1 and Table A.4.5.2.4.2-2.

Table A.4.5.2.6.2-1: Interruption duration if the NR PSCell is not in the same band as the E-UTRAN deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 2 |
| 1 | 0.5 | 2 |

Table A.4.5.2.6.2-2: Interruption duration if the NR PSCell is in the same band as the E-UTRAN deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 2 + SMTC duration |
| 1 | 0.5 | 2 + SMTC duration |

Each interruption on E-UTRAN PCell shall not exceed 1 subframe if the PCell is not in the same band as the deactivated SCell, or 5 subframes if the PCell is in the same band as the deactivated SCell.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.4.5.3.1 SCell Activation and deactivation of known SCell in FR1 for 160ms SCell measurement cycle

##### A.4.5.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 8.3, when the SCell in FR1 is known by the UE at the time of activation.

The supported test configurations for LTE PCell and NR PSCell are shown in table A.4.5.3.1.1-1 below. Supported test configurations for NR SCell are shown in table A.4.5.3.1.1-1A below. Test configuration for LTE PCell and NR PSCell and test configuration for NR SCell are chosen independently. The test parameters are given in Tables A.4.5.3.1.1-2 and cell-specific parameters in A.4.5.3.1.1-3 and A.4.5.3.1.1-4 below. The test consists of three successive time periods, with duration of T1, T2 and T3, 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 SCell (Cell 3) becomes configured on NR. The UE now starts monitoring the SCell. The test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a slot # denoted m, defines the start of time period T2. The UE shall be able to report valid CSI in PSCell for the activated SCell at latest in slot , as defined in clause 8.3. The UE shall start reporting CSI in PSCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot (m+k) 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, where is the interruption length given in section 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] section 7.32.

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a slot # denoted n, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a slot , as defined in clause 8.3. The starting point of any PSCell interruption due to the deactivation shall occur in the slot to , as defined in clause 8.3. The starting point of any E-UTRA PCell interruption due to the deactivation 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 n.

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

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

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

Table A.4.5.3.1.1-1: known FR1 SCell activation in non-DRX for 160ms SCell measurement cycle supported test configurations for LTE PCell and NR PSCell

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.4.5.3.1.1-1A: known FR1 SCell activation in non-DRX for 160ms SCell measurement cycle supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.4.5.3.1.1-2: General test parameters for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |
| --- | --- | --- | --- |
| **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. |
| Configured deactivated SCell |  | Cell 3 | Configured deactivated secondary cell on NR RF channel number 3 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| 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 PSCell shall be known and the SCell configured and detected. |
| T2 | s | 1 | During this time the UE shall activate the SCell. |
| T3 | s | 1 | During this time the UE shall deactivate the SCell. |
| THARQ | ms | k1NR slot length | k1 is a number of slots 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 |  | The delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing timefor CSI reporting (clause 5.2.2.5 in TS 38.214) and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2] |
| k | slot |  | As specified in clause 4.3 of TS 38.213 [3] |

Table A.4.5.3.1.1-3: Cell specific test parameters for NR PSCell for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | | |
| T1 | T2 | T3 |
| SSB ARFCN | |  | freq1 | | |
| 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 | Note 7 | | |
| Config 2,5 | Note 7 | | |
| Config 3,6 | Note 7 | | |
| BWoccupied | Config 1,4 | RB | 52 Note 5 | | |
|  | Config 2,5 |  | 52 Note 5 | | |
|  | Config 3,6 |  | 106 Note 6 | | |
| 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 measurement channel | Config 1,4 |  | SR.1.1 FDD | | |
| Config 2,5 | SR.1.1 TDD | | |
| Config 3,6 | SR.2.1 TDD | | |
| RMSI CORESET Reference Channel | Config 1,4 |  | CR.1.1 FDD | | |
| Config 2,5 | CR.1.1 TDD | | |
| Config 3,6 | CR.2.1 TDD | | |
| RMC CORESET Reference Channel | Config 1,4 |  | CCR.1.1 FDD | | |
| Config 2,5 |  | CCR.1.1 TDD | | |
| Config 3,6 |  | CCR.2.1 TDD | | |
| TRS configuration | Config 1,4 |  | TRS.1.1 FDD | | |
| Config 2,5 |  | TRS.1.1 TDD | | |
| Config 3,6 |  | TRS.1.2 TDD | | |
| OCNG Patterns | Config 1,2,4,5 |  | OP.1 Note 5 | | |
|  | Config 3,6 |  | OP.1 Note 6 | | |
| SMTC configuration | |  | SMTC.1 | | |
| SSB configuration | Config 1,2,4,5 |  | SSB.1 FR1 | | |
| Config 3,6 | SSB.2 FR1 | | |
| CSI-RS configuration for CSI reporting | Config 1,4 |  | CSI-RS.1.1 FDD | | |
| Config 2,5 |  | CSI-RS.1.1 TDD | | |
| Config 3,6 |  | CSI-RS.2.1 TDD | | |
| PDSCH/PDCCH subcarrier spacing | Config 1,2,4,5 | kHz | 15 | | |
| Config 3,6 | 30 | | |
| reportConfigType | Config 1-6 |  | periodic | | |
| reportQuantity | Config 1-6 |  | cri-RI-PMI-CQI | | |
| CSI reporting periodicity | Config 1,2,4,5 | slot | 5 | | |
|  | Config 3,6 |  | 10 | | |
| CSI reporting offset | Config 1,2,4,5 | slot | 2 | | |
|  | Config 3,6 |  | 4 | | |
| 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 | -104 | | |
| Note2 | Config 1,2,4,5 | dBm/SCS | -104 | | |
| Config 3,6 | -101 | | |
|  | | dB | 17 | | |
|  | | dB | 17 | | |
| SS-RSRP Note3 | Config 1,2,4,5 | dBm/SCS | -87 | | |
| Config 3,6 | -84 | | |
| SCH\_RP Note 3 | | dBm/15 kHz | -87 | | |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | -58.96 | | |
| Config 3,6 | dBm/38.16MHz | -52.87 | | |
| 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 within BWoccupied.  Note 3: SS-RSRP, Io 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.]  Note 5: All UL/DL transmission shall be confined within BWchannel\_actual-occupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWchannel\_actual-occupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | | | |



Table A.4.5.3.1.1-4: Cell specific test parameters for NR SCell for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 3 | | |
| T1 | T2 | T3 |
| SSB ARFCN | |  | freq2 | | |
| Duplex mode | ConfigSCell 1 |  | FDD | | |
| ConfigSCell 2,3 | TDD | | |
| TDD configuration | ConfigSCell 1 |  | Not Applicable | | |
| ConfigSCell 2 | TDDConf.1.1 | | |
| ConfigSCell 3 | TDDConf.2.1 | | |
| BWchannel | ConfigSCell 1 | MHz | Note 7 | | |
| ConfigSCell 2 | Note 7 | | |
| ConfigSCell 3 | Note 7 | | |
| BWoccupied | ConfigSCell 1 | RB | 52 Note 5 | | |
|  | ConfigSCell 2 |  | 52 Note 5 | | |
|  | ConfigSCell 3 |  | 106 Note 6 | | |
| DL initial BWP configuration | ConfigSCell 1-3 |  | DLBWP.0.1 | | |
| DL dedicated BWP configuration | ConfigSCell 1-3 |  | DLBWP.1.1 | | |
| UL initial BWP configuration | ConfigSCell 1-3 |  | ULBWP.0.1 | | |
| UL dedicated BWP configuration | ConfigSCell 1-3 |  | ULBWP.1.1 | | |
| DRX Cycle | | ms | Not Applicable | | |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | SR.1.1 FDD | | |
| ConfigSCell 2 | SR.1.1 TDD | | |
| ConfigSCell 3 | SR.2.1 TDD | | |
| RMSI CORESET Reference Channel | ConfigSCell 1 |  | CR.1.1 FDD | | |
| ConfigSCell 2 | CR.1.1 TDD | | |
| ConfigSCell 3 | CR.2.1 TDD | | |
| RMC CORESET Reference Channel | ConfigSCell 1 |  | CCR.1.1 FDD | | |
| ConfigSCell 2 |  | CCR.1.1 TDD | | |
| ConfigSCell 3 |  | CCR.2.1 TDD | | |
| TRS configuration | ConfigSCell 1 |  | TRS.1.1 FDD | | |
| ConfigSCell 2 |  | TRS.1.1 TDD | | |
| ConfigSCell 3 |  | TRS.1.2 TDD | | |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 5 | | |
|  | ConfigSCell 3 |  | OP.1 Note 6 | | |
| SMTC configuration | |  | SMTC.1 | | |
| SSB configuration | ConfigSCell 1,2 |  | SSB.1 FR1 | | |
| ConfigSCell 3 | SSB.2 FR1 | | |
| CSI-RS configuration for CSI reporting | ConfigSCell 1 |  | CSI-RS.1.1 FDD | | |
| ConfigSCell 2 |  | CSI-RS.1.1 TDD | | |
| ConfigSCell 3 |  | CSI-RS.2.1 TDD | | |
| PDSCH/PDCCH subcarrier spacing | ConfigSCell 1,2 | kHz | 15 | | |
| ConfigSCell 3 | 30 | | |
| reportConfigType | ConfigSCell 1-3 |  | periodic | | |
| reportQuantity | ConfigSCell 1-3 |  | cri-RI-PMI-CQI | | |
| CSI reporting periodicity | ConfigSCell 1,2 | slot | 5 | | |
|  | ConfigSCell 3 |  | 10 | | |
| CSI reporting offset | ConfigSCell 1,2 | slot | 2 | | |
|  | ConfigSCell 3 |  | 4 | | |
| 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 Note 1 | |
| Note2 | | dBm/15kHz | -104 | | |
| Note2 | ConfigSCell 1,2 | dBm/SCS | -104 | | |
| ConfigSCell 3 | -101 | | |
|  | | dB | 17 | | |
|  | | dB | 17 | | |
| SS-RSRPNote3 | ConfigSCell 1,2 | dBm/SCS | -87 | | |
| ConfigSCell 3 | -84 | | |
| SCH\_RP Note 3 | | dBm/15 kHz | -87 | | |
| IoNote3 | ConfigSCell 1,2 | dBm/9.36MHz | -58.96 | | |
| ConfigSCell 3 | dBm/38.16MHz | -52.87 | | |
| 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 within BWoccupied.  Note 3: SS-RSRP, Io 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.]  Note 5: All UL/DL transmission shall be confined within BWchannel\_actual-occupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWchannel\_actual-occupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | | | |

##### A.4.5.3.1.2 Test Requirements

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

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

During T2 interruption of PSCell during 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.

During T3 the starting point of interruption of PSCell during SCell deactivation shall not happen outside the slot to , as defined in clause 8.3 and the starting point of interruption of E-UTRA PCell during SCell deactivation shall not happen outside the subframe to subframe .

The interruption of PSCell shall not be more than the values specified for EN-DC in Clause 8.2.1.2.4.

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 T2 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.

#### A.4.5.3.2 SCell Activation and deactivation of known SCell in FR1 for 640ms SCell measurement cycle

##### A.4.5.3.2.1 Test Purpose and Environment

The purpose of this test case is the same as for the test defined in clause A.4.5.3.1.1. The supported test configurations are the same as defined in clause A.4.5.3.1.1. The test parameters are the same except those described in the following clause. The listed parameter values in Tables A.4.5.3.2.1-1 will replace the values of corresponding parameters in Tables A.4.5.3.1.1-2.

Table A.4.5.3.2.1-1: General test parameters for known FR1 SCell activation case, 640ms SCell measurement cycle

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

##### A.4.5.3.2.2 Test Requirements

The test requirements defined in clause A.4.5.3.1.2 shall apply to this test case, except Tactivation\_time will be replaced with the value TFirstSSB\_MAX + Trs + 5ms.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.4.5.6.1.2 E-UTRAN – NR PSCell FR1 DL active BWP switch with FR1 SCell in non-DRX in synchronous EN-DC

###### A.4.5.6.1.2.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement defined in clause 8.6, and interruption requirements for NR victim cell defined in clause 8.2.1.2.7 and interruption requirement for E-UTRA victim cell defined in clause 7.32.2.7 of TS 36.133 [15]. Supported test configurations for LTE PCell and NR PSCell are shown in Table A.4.5.6.1.2.1-1. Supported test configurations for NR SCell are shown in table A.4.5.6.1.2.1-1A. Test configuration for LTE PCell and NR PSCell and test configuration for NR SCell are chosen independently.

The test scenario comprises of one E-UTRA PCell (Cell 1), one PSCell (Cell 2) and one SCell (Cell 3) as given in Table A.4.5.6.1.2.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of PSCell and SCell are specified in Table A.4.5.6.1.2.1-3 and Table A.4.5.6.1.2.1-4 below.

PDCCHs indicating new transmissions shall be sent continuously on E-UTRA 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 BWP is switching on Cell 3 and the time duration of T2.

Before the test starts,

- UE is connected to Cell 1 (E-UTRA 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 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.

- 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.

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

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

- UE is configured with a *bwp-InactivityTimer* timer value for SCell.

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 SCell DL BWP switch, sent from the test equipment to the UE, is received at the UE side in SCell’s slot # denoted *i*. The UE shall switch its bandwidth part from BWP-1 to BWP-2.

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of SCell’s DL slot (*i+*TBWPswitchDela*y*) as defined in clause 8.6 and starts to report valid ACK/NACK for the SCell on PSCell no later than on the first UL slot that occurs after the beginning of slot (*i+*TBWPswitchDelay*+*k1). The UE shall be continuously scheduled on SCell’s BWP-2 starting from the first DL slot that occurs after the beginning of slot (*i+*TBWPswitchDelay).

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

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

During T2, the test equipment won’t transmit DCI format for PDSCH reception on SCell(Cell 3).

During T3,

The time period T3 starts from the slot #*j*, where j is the first slot of the subframe immediately after *bwp-InactivityTimer* timer expires. The UE shall switch its bandwidth part from BWP-2 back to the default bandwidth part – BWP-1.

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of SCell’s DL slot (*j+*TBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK for the SCell on PSCell no later than on the first UL slot that occurs after the beginning of slot (*j+*TBWPswitchDelay+k1). The UE shall be continuously scheduled on SCell’s BWP-1 starting from the first DL slot that occurs after the beginning of slot (*j+*TBWPswitchDelay).

E-UTRA PCell(Cell 1) interruption due to BWP switch of SCell shall occur within the BWP switch delay.

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

The test equipment verifies the DL BWP switch time in SCell by counting the slots from the time when the BWP switch command is received or *bwp-InactivityTimer* timer expires till an ACK/NACK is received.

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 E-UTRA PCell and PSCell during BWP switch of SCell, respectively.

Table A.4.5.6.1.2.1-1: DL BWP switch supported test configurations for LTE PCell and NR PSCell

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: A UE which fulfils the requirements in test case A.4.5.6.1.2 can skip the test cases in A.4.5.6.1.1.  Note 3: Void  Note 4: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration | |

Table A.4.5.6.1.2.1-1A: DL BWP switch supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 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.4.5.6.1.2 can skip the test cases in A.4.5.6.1.1.  Note 3: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration | |

Table A.4.5.6.1.2.1-2: General test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| 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 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. |
| 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 |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |
| T3 | s | 0.2 |  |

Table A.4.5.6.1.2.1-3: NR Cell specific test parameters for NR PSCell for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 2** |
| 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.2.1 |
| BWchannel | Config 1,2,3,4,5,6 |  | Note 7 |
| BWoccupied | Config 1,2,4,5 | RB | 52 Note 5 |
|  | Config 3,6 |  | 106 Note 6 |
| Active BWP ID | |  | 0 |
| Initial DL BWP Configuration | Config 1,2,3,4,5,6 |  | DLBWP.0.2 |
| Active DL BWP-0 Configuration | Config 1,2,3,4,5,6 |  | DLBWP.0.2 |
| Active DL BWP-1 Configuration | Config 1,2,3,4,5,6 |  | N.A. |
| Active DL BWP-2 Configuration | Config 1,2,3,4,5,6 |  | N.A. |
| Initial UL BWP Configuration | Config 1,2,3,4,5,6 |  | ULBWP.0.2 |
| Active UL BWP-0 Configuration | Config 1,2,3,4,5,6 |  | ULBWP.0.2 |
| Active UL BWP-1 Configuration | Config 1,2,3,4,5,6 |  | N.A. |
| Active UL BWP-2 Configuration | Config 1,2,3,4,5,6 |  | N.A. |
| PDSCH Reference measurement channel | Config 1,4 |  | SR.1.1 FDD |
| Config 2,5 | SR.1.1 TDD |
| Config 3,6 | SR.2.1 TDD |
| RMSI CORESET parameters | Config 1,4 |  | CR.1.1 FDD |
| Config 2,5 | CR.1.1 TDD |
| Config 3,6 | CR.2.1 TDD |
| Dedicated CORESET parameters | Config 1,4 |  | CCR.1.2 FDD |
| Config 2,5 | CCR.1.2 TDD |
| Config 3,6 | CCR.2.4 TDD |
| OCNG Patterns | Config 1,2,4,5 |  | OP.1 Note 5 |
|  | Config 3,6 |  | OP.1 Note 6 |
| 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 | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | -58.96 |
| Config 3,6 | dBm/38.16MHz | -52.86 |
| 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 within BWoccupied.  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].  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |



Table A.4.5.6.1.2.1-4: NR Cell specific test parameters for NR SCell for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 3** |
| Frequency Range | |  | FR1 |
| Duplex mode | ConfigSCell 1 |  | FDD |
| ConfigSCell 2,3 | TDD |
| TDD configuration | ConfigSCell 1 |  | Not Applicable |
| ConfigSCell 2 | TDDConf.1.1 |
| ConfigSCell 3 | TDDConf.2.1 |
| BWchannel | ConfigSCell 1,2,3 |  | Note 7 |
| BWoccupied | ConfigSCell 1,2 | RB | 52 Note 5 |
|  | ConfigSCell 3 |  | 106 Note 6 |
| Active BWP ID | |  | 1,2 |
| Initial DL BWP Configuration | ConfigSCell 1,2,3 |  | DLBWP.0.2 |
| Active DL BWP-0 Configuration | ConfigSCell 1,2,3 |  | N.A. |
| Active DL BWP-1 Configuration | ConfigSCell 1,2,3 |  | DLBWP.1.3 |
| Active DL BWP-2 Configuration | ConfigSCell 1,2,3 |  | DLBWP.1.1 |
| Initial UL BWP Configuration | ConfigSCell 1,2,3 |  | N.A. |
| Active UL BWP-0 Configuration | ConfigSCell 1,2,3 |  | N.A. |
| Active UL BWP-1 Configuration | ConfigSCell 1,2,3 |  | N.A. |
| Active UL BWP-2 Configuration | ConfigSCell 1,2,3 |  | N.A. |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | SR.1.1 FDD |
| ConfigSCell 2 | SR.1.1 TDD |
| ConfigSCell 3 | SR.2.1 TDD |
| RMSI CORESET parameters | ConfigSCell 1 |  | CR.1.1 FDD |
| ConfigSCell 2 | CR.1.1 TDD |
| ConfigSCell 3 | CR.2.1 TDD |
| Dedicated CORESET parameters | ConfigSCell 1 |  | CCR.1.2 FDD |
| ConfigSCell 2 | CCR.1.2 TDD |
| ConfigSCell 3 | CCR.2.4 TDD |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 5 |
|  | ConfigSCell 3 |  | OP.1 Note 6 |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.1 FR1 |
| ConfigSCell 3 | SSB.2 FR1 |
| SMTC Configuration | |  | SMTC.1 |
| TRS Configuration | ConfigSCell 1 |  | TRS.1.1 FDD |
| ConfigSCell 2 |  | TRS.1.1 TDD |
| ConfigSCell 3 |  | TRS.1.2 TDD |
| Antenna Configuration | |  | 1x2 |
| Propagation Condition | |  | AWGN |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | ConfigSCell 1,2 | dBm/9.36MHz | -58.96 |
| ConfigSCell 3 | dBm/38.16MHz | -52.86 |
| 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 within BWoccupied.  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].  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |

###### A.4.5.6.1.2.2 Test Requirements

During T1, the UE shall start to send the ACK/NACK for SCell on PSCell from the first UL slot that occurs after the beginning of DL slot (*i+*TBWPswitchDelay*+*k1).

During T3, the UE shall start to send the ACK/NACK for SCell on PSCell from the first UL slot that occurs after the beginning of DL slot (*j+*TBWPswitchDelay*+*k1).

Where, k1 is the timing between DL data receiving and acknowledgement as specified in [7].

Depending on UE capability *bwp-SwitchingDelay* [2], UE shall finish BWP switch within the time duration TBWPswitchDelay defined in Table 8.6.2-1.

All of the above test requirements shall be fulfilled in order for the observed SCell active 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 E-UTRA PCell during SCell active BWP switch shall not happen outside the BWP switch delay.

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

The interruption of E-UTRA 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].

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 PSCell shall not be longer than the interruption duration specified for active BWP switch in clause 8.6.2.

All of the above test requirements shall be fulfilled in order for the observed E-UTRA PCell and PSCell active BWP switch interruption to be counted as correct.

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

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK/NACK in the first UL slot that occurs after the beginning of DL slot (*i+*TBWPswitchDelay+k1), (*j+*TBWPswitchDelay+k1), then the UE shall use the next available uplink resource for reporting the corresponding ACK/NACK.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.5.6.1.3 EN-DC event triggered reporting test with per-UE gaps under non-DRX

##### A.5.6.1.3.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.5.6.1.3.1-1.

**Table A.5.6.1.3.1-1: supported test configurations**

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

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 and Cell 3 are given in Table A.5.6.1.3.1-2 ~ 4 below.

There are two BWPs configured in Cell 2, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 2. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

In the measurement control information, a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

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

Table A.5.6.1.3.1-2: General test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Value | Comment |
| Active cell |  | 1~4 | E-UTRAN PCell (Cell 1)  PSCell (Cell 2) |  |
| Neighbour cell |  | 1~4 | Cell 3 | Cell to be identified. |
| RF Channel Number |  | 1~4 | 1: Cell 1  2: Cell 2 and Cell 3 | One TDD carrier frequency is used for the NR cells and one TDD or FDD carrier frequency is used for E-UTRAN cell. |
| Gap type |  | 1~4 | Per-UE gaps |  |
| Measurement gap repitition periodicity | ms | 1~4 | 40 |  |
| Measurement gap length | ms | 1~4 | 6 |  |
| Measurement gap offset | ms | 1~4 | 39 |  |
| SMTC configuration |  | 1~4 | SMTC.1 |  |
| CSI-RS parameters |  | 1~4 | CSI-RS.3.2 TDD resource #0 | Resource #1 is not used |
| A3-Offset | dB | 1~4 | -11 |  |
| CP length |  | 1~4 | Normal |  |
| Hysteresis | dB | 1~4 | 0 |  |
| Time To Trigger | s | 1~4 | 0 |  |
| Filter coefficient |  | 1~4 | 0 | L3 filtering is not used |
| DRX |  | 1~4 | OFF |  |
| Time offset between Cell 1 and Cell 2 |  | 1~4 | 3 μs | Synchronous EN-DC |
| Time offset between Cell 2 and Cell 3 |  | 1~4 | 3 μs | Synchronous cells |
| T1 | s | 1~4 | 5 |  |
| T2 | s | 1~4 | 5 |  |

Table A.5.6.1.3.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | | Cell 3 | |
| T1 | T2 | | T1 | T2 |
| TDD configuration |  | 1~4 | TDDConf.3.1 | | | TDDConf.3.1 | |
| BWchannel | MHz | 1~4 | 100: NRB,c = 66 | | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1,2 | 24 | | | 24 | |
| 3,4 | 48 | | | 48 | |
| Intial BWP configuration |  | 1~4 | DLBWP.0.1  ULBWP.0.1 | | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1~4 | DLBWP.1.2 | | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1~4 | ULBWP.1.2 | | | ULBWP.1.1 | |
| RLM-RS |  | 1~4 | CSI-RS | | | SSB | |
| PDSCH RMC configuration |  | 1,2 | SR.3.2 TDD | | | N/A | |
| 3,4 | SR.3.3 TDD | | |
| RMSI CORESET RMC configuration |  | 1,2 | CR.3.1 TDD | | | N/A | |
| 3,4 | CR.3.2 TDD | | | N/A | |
| Dedicated CORESET RMC configuration |  | 1,2 | CCR.3.1 TDD | | | N/A | |
| 3,4 | CCR.3.7 TDD | | | N/A | |
| TRS configuration |  | 1~4 | TRS.2.1 TDD | | | N/A | |
| PDSCH/PDCCH TCI state |  | 1~4 | TCI.State.2 | | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1~4 | 120 | | | 120 | |
| OCNG Patterns |  | 1~4 | OP.5 | | | N/A | |
| cellIndividualOffset | dB | 1~4 | N/A | | | 16 | |
| SSB |  | 1, 2 | SSB.3 FR2 | | | SSB.7 FR2 | |
| 3, 4 | SSB.4 FR2 | | | SSB.8 FR2 | |
| Propagation Condition |  | 1~4 | AWGN | | AWGN | | |

Table A.5.6.1.3.1-4: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps without DRX

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | | Cell 3 | | | |
|  |  |  | T1 | T2 | | T1 | | T2 | |
| AoA setup |  | 1~4 | Setup 3 defined in A.3.15.3 | | | | | | |
|  |  |  | **AoA1** | | | **AoA2** | | | |
| Assumption for UE beamsNote 4 |  | 1~4 | Rough | | | Rough | | | |
| Es | dBm/SCS | 1, 2 | -89 | | -89 | | -Infinity | | -89 |
| 3, 4 | -86 | | -86 | | -Infinity | | -86 |
| BB Note 5 | dB | 1~4 | -0.12 | -0.12 | | -Infinity | | -0.12 | |
| SSB\_RP | dBm/SCS | 1, 2 | -89 | -89 | | -Infinity | | -89 | |
|  |  | 3, 4 | -86 | -86 | | -Infinity | | -86 | |
|  | dBm/95.04MHz | 1,2 | -64.41 | -64.41 | | -Infinity | | -64.41 | |
| 3,4 | -61.41 | -61.41 | | -Infinity | | -61.41 | |
| Time multiplexing of the downlink transmissions from each AoA | | 1~4 | Defined in Figure A.5.6.1.3.1-1 | | | | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Void  Note 3: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | | | | |



Figure A.5.6.1.3.1-1: Time multiplexed downlink transmissions (Config 1,2 example)

##### A.5.6.1.3.2 Test Requirements

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

- 3.2s for a UE supporting power class 1,

- 1.92s for a UE supporting power class 2, 3 and 4

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

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

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

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

#### A.5.6.1.4 EN-DC event triggered reporting test with per-UE gaps under DRX

##### A.5.6.1.4.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.5.6.1.4.1-1.

Table A.5.6.1.4.1-1: supported test configurations

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

There are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on the same frequency as the PSCell. The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 and Cell 3 are given in Table A.5.6.1.4.1-2 ~ 6.

During the test, Cell 2 and Cell 3 are transmitted from the direction determined according to A3.8.

There are two BWPs configured in Cell 2, BWP1 which contains the cell defining SSB, and BWP2 which does not contain any SSB of Cell 2. During the whole test, BWP2 is always scheduled as the active BWP for the UE.

In the measurement control information, a measurement object is configured for the frequency of the PSCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used.

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

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.5.6.1.4.1-2: General test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Value | | Comment |
| Test 1 | Test 2 |
| Active cell |  | 1~4 | E-UTRAN PCell (Cell 1)  PSCell (Cell 2) | |  |
| Neighbour cell |  | 1~4 | Cell 3 | | Cell to be identified. |
| RF Channel Number |  | 1~4 | 1: Cell 1  2: Cell 2 and Cell 3 | | One TDD carrier frequency is used for the NR cells and one TDD or FDD carrier frequency is used for E-UTRAN cell. |
| Gap type |  | 1~4 | Per-UE gaps | |  |
| Measurement gap repitition periodicity | ms | 1~4 | 40 | |  |
| Measurement gap length | ms | 1~4 | 6 | |  |
| Measurement gap offset | ms | 1~4 | 39 | |  |
| SMTC configuration |  | 1~4 | SMTC.1 | |  |
| CSI-RS parameters |  | 1~4 | CSI-RS.3.2 TDD resource #0 | | Resource #1 is not used |
| A3-Offset | dB | 1~4 | -6 | |  |
| CP length |  | 1~4 | Normal | |  |
| Hysteresis | dB | 1~4 | 0 | |  |
| Time To Trigger | s | 1~4 | 0 | |  |
| Filter coefficient |  | 1~4 | 0 | | L3 filtering is not used |
| DRX |  | 1~4 | DRX.1 | DRX.7 | DRX related parameters are defined in Table A.5.6.1.4.1-5 |
| Time offset between Cell 1 and Cell 2 |  | 1~4 | 3 μs | | Synchronous EN-DC |
| Time offset between Cell 2 and Cell 3 |  | 1~4 | 3 μs | | Synchronous cells |
| T1 | s | 1~4 | 5 | |  |
| T2 | s | 1~4 | 10 | 52 |  |

Table A.5.6.1.4.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1~4 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 1~4 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1~4 | 66 | | 66 | |
| Intial BWP configuration |  | 1~4 | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1~4 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1~4 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1~4 | CSI-RS | | SSB | |
| PDSCH RMC configuration |  | 1,2 | SR.3.2 TDD | | N/A | |
| 3,4 | SR.3.3 TDD | |
| RMSI CORESET RMC configuration |  | 1,2 | CR.3.1 TDD | | N/A | |
| 3,4 | CR.3.2 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1,2 | CCR.3.1 TDD | | N/A | |
| 3,4 | CCR.3.7 TDD | | N/A | |
| TRS configuration |  | 1~4 | TRS.2.1 TDD | | N/A | |
| PDSCH/PDCCH TCI state |  | 1~4 | TCI.State.2 | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1~4 | 120 | | 120 | |
| OCNG Patterns |  | 1~4 | OP.1 | | OP.1 | |
| SSB |  | 1, 2 | SSB.3 FR2 | | SSB.3 FR2 | |
| 3, 4 | SSB.4 FR2 | | SSB.4 FR2 | |
| Propagation Condition |  | 1~4 | AWGN | | AWGN | |

Table A.5.6.1.4.1-4: NR Cell specific test parameters for intra-frequency event triggered reporting for EN-DC with TDD PSCell in FR2 with per-UE gaps with DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Config | Cell 2 | | Cell 3 | |
|  |  |  | T1 | T2 | T1 | T2 |
| AoA setup |  | 1~4 | Setup 1 defined in A.3.15.1 | | | |
| Assumption for UE beamsNote 4 |  | 1~4 | Rough | | Rough | |
| BB Note 5 | dB | 1~4 | 3.77 | -1.52 | -Infinity | -1.52 |
| Note 2 | dBm/15 KHz | 1~4 | -98 | | | |
| Note 2 | dBm/SCS | 1, 2 | -89 | | | |
|  |  | 3, 4 | -86 | | | |
| SSB\_RP | dBm/SCS | 1, 2 | -85 | -85 | -Infinity | -85 |
|  |  | 3, 4 | -82 | -82 | -Infinity | -82 |
|  | dB | 1~4 | 4 | 4 | -Infinity | 4 |
|  | dBm/95.04MHz | 1~4 | -54.53 | -52.18 | See Cell 2 columns | |
| 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: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

**Table A.5.6.1.4.1-5: Void**

**Table A.5.6.1.4.1-6: Void**

##### A.5.6.1.4.2 Test Requirements

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- 7.2s for a UE supporting power class 1,

- 4.32s for a UE supporting power class 2, 3 and 4

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- 51.20s for a UE supporting power class 1,

- 30.72s for a UE supporting power class 2, 3 and 4

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.5.6.3.3 CSI-RS based L1-RSRP measurement when DRX is not used

##### A.5.6.3.3.1 Test Purpose and Environment

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

Table A.5.6.3.3.1-1: Applicable NR configurations for FR2 CSI-RS based L1-RSRP test

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

##### A.5.6.3.3.2 Test parameters

There are two cells in the test, E-UTRAN PCell (Cell 1) and FR1 PSCell (Cell 2). The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 are given in Table A.5.6.3.3.2-1 and Table A.5.6.3.3.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the CSI-RS and report aperiodically. The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-RSRP on aperiodic CSI-RS resources. UE is also configured to measure L1-RSRP based on SSB. After 480ms from the beginning of the test, the DCI trigger comes in slot 1 of a frame and UE provides the report back based on the reporting configuration as defined in Table A.5.6.3.3.2-1.

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

Table A.5.6.3.3.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1~2 |  | freq1 |
| Duplex mode | 1~2 |  | TDD |
| TDD Configuration | 1~2 |  | TDDConf.3.1 |
| BWchannel | 1~2 | MHz | 100: NRB,c = 66 |
| Data RBs allocated | 1~2 |  | 66 |
| PDSCH Reference measurement channel | 1~2 |  | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1~2 |  | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1~2 |  | CCR.3.7 TDD |
| SSB configuration | 1~2 |  | SSB.1 FR2 |
| CSI-RS configuration | 1~2 |  | CSI-RS.3.3 TDD |
| OCNG Patterns | 1~2 |  | OP.1 |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~2 |  | SMTC.1 |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 |
| DRX configuration | 1~2 |  | Off |
| reportConfigType | 1~2 |  | aperiodic |
| reportQuantity | 1~2 |  | cri-RSRP |
| Number of reported RS | 1~2 |  | 2 |
| qcl-Info | 1~2 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~2 |  | 8 |
| Propagation condition | 1~2 |  | AWGN |
| T1 | 1~2 | s | 5 |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | |

Table A.5.6.3.3.2-1: CSI-RS specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **CSI-RS#0** | **CSI-RS#1** |
| Angle of arrival configuration | 1~2 |  | Setup 1 according to A.3.15.1 | |
| Assumption for UE beamsNote 4 | 1~2 |  | Rough | |
| Note1 | 1~2 | dBm/15kHz | -105 | |
| Note1 | 1~2 | dBm/SSB SCS | -95.97 | |
|  | 1~2 | dB | 0 | 9 |
| CSI-RS RSRP Note2 | 1~2 | dBm/SSB SCS | -95.97 | -86.97 |
| Io Note2 | 1~2 | dBm/95.04MHz | -63.97 | -57.47 |
|  | 1~2 | dB | 0 | 9 |
| Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | |

##### A.5.6.3.3.3 Test Requirements

After 480ms from the beginning of the test, the UE shall send L1-RSRP report at slot 8 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in clause 10.1.20.1. The reported L1-RSRP value shall include the Rx antenna gain in the range of -10 to +20 dB.

For absolute accuracy of CSI-RS0 and absolute accuracy of CSI-RS1, the UE is deemed to meet the requirement if the reported L1-RSRP is in the range shown in Table A.5.6.3.3.3-1.

For relative accuracy of CSI-RS0 compared with CSI-RS1, the UE is deemed to meet the requirement if the difference in reported L1-RSRP meets the requirements in Table 10.1.20.2.2-1.

Table A.5.6.3.3.3-1: L1-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3 |
| CSI-RS0 | CSI-RS \_RP0 -δ + Gmin ≤ Reported RSRP(dBm) ≤CSI-RS \_RP0 +δ + Gmax |
| CSI-RS1 | CSI-RS \_RP1 -δ + Gmin ≤ Reported RSRP(dBm) ≤CSI-RS \_RP1 +δ + Gmax |
| Note 1: CSI-RS\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the CSI-RS n under consideration  Note 2: δ is the RSRP absolute accuracy requirement from Table 10.1.20.2.1-1, selected according to the Io used in the test  Note 3: Gmin and Gmax are the minimum and maximum UE gain values from Table B.2.1.5.1-1, selected according to the UE power class | |

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

#### A.5.6.3.4 CSI-RS based L1-RSRP measurement when DRX is used

##### A.5.6.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement. This test will partly verify the L1-RSRP measurement requirements in clause 9.5.4.2, with the testing configurations for NR cells in Table A.5.6.3.4.1-1.

Table A.5.6.3.4.1-1: Applicable NR configurations for FR2 CSI-RS based L1-RSRP test

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

##### A.5.6.3.4.2 Test parameters

There are two cells in the test, E-UTRAN PCell (Cell 1) and FR1 PSCell (Cell 2). The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 are given in Table A.5.6.3.4.2-1 and Table A.5.6.3.4.2-2 below.

In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on the CSI-RS and report aperiodically. The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-RSRP on aperiodic CSI-RS resources. UE is also configured to measure L1-RSRP based on SSB. After 1440ms from the beginning of the test, the DCI trigger comes in slot 1 of a frame and UE provides the report back based on the reporting configuration as defined in Table A.5.6.3.4.2-1.

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

Table A.5.6.3.4.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~2 |  | freq1 |
| Duplex mode | 1~2 |  | TDD |
| TDD Configuration | 1~2 |  | TDDConf.3.1 |
| BWchannel | 1~2 | MHz | 100: NRB,c = 66 |
| Data RBs allocated | 1~2 |  | 66 |
| PDSCH Reference measurement channel | 1~2 |  | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1~2 |  | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1~2 |  | CCR.3.7 TDD |
| SSB configuration | 1~2 |  | SSB.1 FR2 |
| CSI-RS configuration | 1~2 |  | CSI-RS.3.3 TDD |
| OCNG Patterns | 1~2 |  | OP.1 |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~2 |  | SMTC.1 |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 |
| DRX configuration | 1~2 |  | DRX.3 |
| reportConfigType | 1~2 |  | aperiodic |
| reportQuantity | 1~2 |  | cri-RSRP |
| Number of reported RS | 1~2 |  | 2 |
| qcl-Info | 1~2 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~2 |  | 8 |
| Propagation condition | 1~2 |  | AWGN |
| T1 | 1~2 | s | 5 |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | |

Table A.5.6.3.4.2-1: CSI-RS specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | CSI-RS#0 | CSI-RS#1 |
| Angle of arrival configuration | 1~2 |  | Setup 1 according to A.3.15.1 | |
| Assumption for UE beamsNote 4 | 1~2 |  | Rough | |
| Note1 | 1~2 | dBm/15kHz | -105 | |
| Note1 | 1~2 | dBm/SSB SCS | -95.97 | |
|  | 1~2 | dB | 0 | 9 |
| CSI-RS RSRP Note2 | 1~2 | dBm/SSB SCS | -95.97 | -86.97 |
| Io Note2 | 1~2 | dBm/95.04MHz | -63.97 | -57.47 |
|  | 1~2 | dB | 0 | 9 |
| Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | |

##### A.5.6.3.4.3 Test Requirements

After1440ms from the beginning of the test, the UE shall send L1-RSRP report at slot 8 from the reception of DCI triggering the L1-RSRP measurement. The L1-RSRP report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the accuracy requirements defined in clause 10.1.20.1.

For absolute accuracy of CSI-RS0 and absolute accuracy of CSI-RS1, the UE is deemed to meet the requirement if the reported L1-RSRP is in the range shown in Table A.5.6.3.4.3-1.

For relative accuracy of CSI-RS0 compared with CSI-RS1, the UE is deemed to meet the requirement if the difference in reported L1-RSRP meets the requirements in Table 10.1.20.2.2-1.

Table A.5.6.3.4.3-1: L1-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3 |
| CSI-RS0 | CSI-RS \_RP0 -δ + Gmin ≤ Reported RSRP(dBm) ≤CSI-RS \_RP0 +δ + Gmax |
| CSI-RS1 | CSI-RS \_RP1 -δ + Gmin ≤ Reported RSRP(dBm) ≤CSI-RS \_RP1 +δ + Gmax |
| Note 1: CSI-RS\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the CSI-RS n under consideration  Note 2: δ is the RSRP absolute accuracy requirement from Table 10.1.20.2.1-1, selected according to the Io used in the test  Note 3: Gmin and Gmax are the minimum and maximum UE gain values from Table B.2.1.5.1-1, selected according to the UE power class | |

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.5.5.8.1 MAC-CE based active TCI state switch

A.5.5.8.1.1 E-UTRAN – NR PSCell FR2 active TCI state switch for a known TCI state

A.5.5.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the active TCI state switch delay requirement defined in clause 8.10.3Supported test configurations are shown in Table A.5.5.8.1.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), and one NR PSCell (Cell 2) as given in Table A.5.5.8.1.1.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell is specified in Table A.5.5.8.1.1.1-3 below. The OTA related test parameters for FR2 is shown in Table A.5.5.8.1.1.1-4.

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

Before the test starts,

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

- UE is configured with 2 different TCI states for PSCell, PDCCH TCI state 0 (QCL’d to SSB0) and TCIstate 1 (QCL’d to SSB1), in Cell 2 before starting the test.

- UE is indicated in TCI state 0 as the active PDCCH TCI state

The test consists of two time periods, T1 and T2. Figure A.5.5.8.1.1.1-1 and Figure A.5.5.8.1.1.1-2 show the Time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival. During T1 only SSB to which PDCCH-TCI-state0 is QCL’d is transmitted. At the beginning of T2, the SSB corresponding to TCI state 1 starts transmitting. The UE is configured to provide periodic L1-RSRP reports. In slot n which is within 1280ms of UE providing L1-RSRP report with results for both SSB0 and SSB1, UE receives a MAC-CE command indicating a switch to TCI state 1. *tci-PresentInDCI* is not configured in the PDSCH configuration, i.e. TCI state for the PDSCH is identical to the PDCCH TCI state.

The test equipment verifies that UE can be scheduled on PSCell on TCI state 0 till n+ THARQ +3 ms.The test equipment also verifies the TCI state switch time in PSCell by scheduling the UE on TCI state 1 after n+ THARQ +3 ms + (Tfirst-SSB + TSSB-proc) .

**Table A.5.5.8.1.1.1-1: 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 | |

**Table A.5.5.8.1.1.1-2: General test parameters for TCI state switch**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| E-UTRA RF Channel Number |  | 1 | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2 | One 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. |
| CP length |  | Normal |  |
| DRX |  | OFF | For both PCell and PSCell |
| 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. |
| Cell2 timing offset to cell1 | μs | 3 | Synchronous EN-DC |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |

**Table A.5.5.8.1.1.1-3: NR Cell specific test parameters for TCI state switch**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Cell 2** |
| Frequency Range |  | FR2 |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 |
| Initial DL BWP Configuration |  | DLBWP.0.2 |
| Dedicated DL BWP Configuration |  | DLBWP.1.1 |
| Initial UL BWP Configuration |  | ULBWP.0.2 |
| Dedicated UL BWP Configuration |  | ULBWP.1.1 |
| PDSCH Reference measurement channel |  | SR.3.2 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD |
| OCNG Patterns |  | OP.5 |
| SSB Configuration |  | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 |
| TCI State 0 |  | TCI.State.2 |
| TCI State 1 |  | TCI.State.3 |
| TRS Configuration |  | TRS.2.1 TDD  TRS.2.2 TDD |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low |
| 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 a constant total transmitted power spectral density is achieved for all OFDM symbols. | | |

**Table A.5.5.8.1.1.1-4: OTA related test parameters for TCI state switch**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 2** | | | |
| **SSB0** | | **SSB1** | |
| **T1** | **T2** | **T1** | **T2** |
| Angle of arrival configuration |  | Setup 3 according to clause A.3.15.3 | | | |
| AoA1 | | AoA2 | |
| Assumption for UE beams Note 6 |  | Rough | | Rough | |
| Ês | dBm/SCS | -80.6 | -80.6 | -Infinity | -80.6 |
| SSB-RP Note 2 | dBm/SCS | -80.6 | -80.6 | -Infinity | -80.6 |
| BB Note 7 | dB | 8.3 | 8.3 | -Infinity | 8.3 |
| Io Note2 | dBm/95.04 MHz Note4 | -56.0 | -56.0 | - Infinity | -56.0 |
| Note 1: Void  Note 2: SSB-RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the center of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation.  Note 7: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | |

****

**Figure A.5.5.8.1.1.1-1: Time multiplexed downlink transmissions during T1**

****

**Figure A.5.5.8.1.1.1-2: Time multiplexed downlink transmissions during T2**

A.5.5.8.1.1.2 Test Requirements

During T2, UE shall send L1-RSRP report with results for both SSB0 and SSB1.

After receiving MAC-CE command in slot n, UE shall:

- be able to continue to receive on TCI state 0 till n+ THARQ +3 ms

- be able to start receiving on TCI state 1 after n+ THARQ +5 ms + Tfirst-SSB

A.5.5.8.2 RRC based active TCI state switch

A.5.5.8.2.1 E-UTRAN – NR PSCell FR2 active TCI state switch for a known TCI state

A.5.5.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify the active TCI state switch delay requirement defined in clause 8.10.3Supported test configurations are shown in Table A.5.5.8.2.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), and one NR PSCell (Cell 2) as given in Table A.5.5.8.2.1.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell is specified in Table A.5.5.8.2.1.1-3 below. The OTA related test parameters for FR2 is shown in Table A.5.5.8.2.1.1-4.

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

Before the test starts,

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

- UE is configured with 1 TCI state for PSCell, PDCCH-TCI-state0 (QCL’d to SSB0)

- UE is indicated in TCI state0 as the active TCI state

The test consists of two time periods, T1 and T2. Figure A.5.5.8.2.1.1-1 and Figure A.5.5.8.2.1.1-2 show the Time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival. During T1 only SSB to which TCI-state0 is QCL’d is transmitted. At the beginning of T2, the SSB corresponding to TCI-state1 starts transmitting. The UE is configured to provide periodic L1-RSRP reports. In slot n which is within 1280 ms of UE providing L1-RSRP report with results for both SSB0 and SSB1, UE receives a RRC command indicating a switch to TCI-state1.

The test equipment verifies the TCI state switch time in PSCell by scheduling the UE on TCI state 1 after n+ TRRC\_processing  + Tfirst-SSB + 2ms.

**Table A.5.5.8.2.1.1-1: 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 | |

**Table A.5.5.8.2.1.1-2: General test parameters for TCI state switch**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| E-UTRA RF Channel Number |  | 1 | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2 | One 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. |
| CP length |  | Normal |  |
| DRX |  | OFF | For both PCell and PSCell |
| 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. |
| Cell2 timing offset to cell1 | μs | 3 | Synchronous EN-DC |
| T1 | s | 0.2 |  |
| T2 | s | 2 |  |

**Table A.5.5.8.2.1.1-3: NR Cell specific test parameters for TCI state switch**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Cell 2** |
| Frequency Range |  | FR2 |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 |
| Initial DL BWP Configuration |  | DLBWP.0.2 |
| Dedicated DL BWP Configuration |  | DLBWP.1.1 |
| Initial UL BWP Configuration |  | ULBWP.0.2 |
| Dedicated UL BWP Configuration |  | ULBWP.1.1 |
| PDSCH Reference measurement channel |  | SR.3.2 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD |
| OCNG Patterns |  | OP.5 |
| SSB Configuration |  | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 |
| TCI State 0 |  | TC. State.2 |
| TCI State 1 |  | TCI.State.3 |
| TRS Configuration |  | TRS.2.1 TDD  TRS.2.2 TDD |
| reportConfigType |  | ssb-Index-RSRP |
| reportConfigType |  | periodic |
| Number of reported RS |  | 2 |
| L1-RSRP reporting period | slot | 640 |
| timeRestrictionForChannelMeasurements |  | configured |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low |
| 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 a constant total transmitted power spectral density is achieved for all OFDM symbols. | | |

**Table A.5.5.8.2.1.1-4: OTA related test parameters for TCI state switch**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 2** | | | |
| **SSB0** | | **SSB1** | |
| **T1** | **T2** | **T1** | **T2** |
| Angle of arrival configuration |  | Setup 3 according to clause A.3.15.3 | | | |
| AoA1 | | AoA2 | |
| Assumption for UE beamsNote 6 |  | Rough | | Rough | |
| Ês | dBm/SCS | -80.6 | -80.6 | -Infinity | -80.6 |
| SSB-RP Note 2 | dBm/SCS | -80.6 | -80.6 | -Infinity | -80.6 |
| BB Note 7 | dB | 8.3 | 8.3 | -Infinity | 8.3 |
| Io Note2 | dBm/95.04 MHz Note4 | -56.0 | -56.0 | - Infinity | -56.0 |
| Note 1: Void  Note 2: SSB-RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the center of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 7: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | |

****

**Figure A.5.5.8.2.1.1-1: Time multiplexed downlink transmissions during T1**

****

**Figure A.5.5.8.2.1.1-2: Time multiplexed downlink transmissions during T2**

A.5.5.8.2.1.2 Test Requirements

During T2, UE shall send L1-RSRP report with both SSB0 and SSB1.

After receiving RRC command in slot n, UE shall be able to start receiving on TCI state 1 after n+ TRRC\_processing  + Tfirst-SSB + 2ms.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.5.7.1.2.3 Test Requirements

The SS-RSRP measurement accuracy for Cell 2 and Cell 3 shall fulfil the absolute requirements in clause 10.1.5.1.1 and the relative requirements in clause 10.1.5.1.2.

Test 1:

Absolute accuracy of Cell 2 and absolute accuracy of Cell 3. The UE is deemed to meet the requirement if the reported SS-RSRP is in the range shown in Table A.5.7.1.2.3-1.

Relative accuracy of Cell 3 compared with Cell 2. The UE is deemed to meet the requirement if the difference in reported SS-RSRP meets the requirements in A.5.7.1.2.3-2.

Test 2:

Absolute accuracy of Cell 2 and absolute accuracy of Cell 3. The UE is deemed to meet the requirement if the reported SS-RSRP is in the range shown in Table A.5.7.1.2.3-1.

Relative accuracy of Cell 3 compared with Cell 2. The UE is deemed to meet the requirement if the difference in reported SS-RSRP meets the requirements in A.5.7.1.2.3-2.

Table A.5.7.1.2.3-1: SS-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4 |
| Cell 2 | SSB\_RP2 -δ +Gmin +X ≤ Reported RSRP(dBm) ≤ SSB\_RP2 +δ +Gmax |
| Cell 3 | SSB\_RP3 -δ +Gmin ≤ Reported RSRP(dBm) ≤ SSB\_RP3 +δ+Gmax |
| Note 1: SSB\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the cell n under consideration  Note 2: δ is the RSRP absolute accuracy requirement from Table 10.1.5.1.1-1, selected according to the Io used in the test  Note 3: Gmin and Gmax are the minimum and maximum UE gain values from Table B.2.1.5.1-1, selected according to the UE power class  Note 4: X is the Spherical coverage gain difference in dB, derived as (UE Refsens - UE Spherical coverage) from TS 38.101-2 [19] clauses 7.3.2 and 7.3.4, selected according to the UE power class and operating band. X is always a negative value. | |

Table A.5.7.1.2.3-2: SS-RSRP relative accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4, 5, 6 |
| Cell 3 – Cell 2 | SSB\_RP3 - SSB\_RP2 -δ - D - Ginter ≤ Reported RSRP(dB) ≤ SSB\_RP3 - SSB\_RP2 +δ + Ginter–(X) |
| Note 1: SSB\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the cell n under consideration  Note 2: δ is the RSRP relative accuracy requirement from Table 10.1.5.1.2-1  Note 3: Void  Note 4: X is the Spherical coverage gain difference in dB, derived as (UE Refsens - UE Spherical coverage) from TS 38.101-2 [19] clauses 7.3.2 and 7.3.4, selected according to the UE power class and operating band. X is always a negative value.  Note 5: D is the margin due to mis-alignment between fine beam and rough beam. D is the Rough Beam gain reduction in Rx beam peak direction from Table B.2.1.5.3-1, selected according to the UE power class. D is always a positive value.  Note 6: Ginter is the margin due to different antenna gain caused by frequency separation. Ginter is from Table B.2.1.5.2-1, selected according to the UE power class, and is always a positive value. | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.6.5.1.5.2 Test Requirements

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

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 no later than time point C (D1 ms after the start of the time duration T3) on the PCell.

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

#### A.6.5.1.7 Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with CSI-RS-based RLM in DRX mode

##### A.6.5.1.7.1 Test Purpose and Environment

<skip unchanged parts>



Figure A.6.5.1.7.1-1: SNR variation for CSI-RS out-of-sync testing

##### A.6.5.1.7.2 Test Requirements

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

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 (PCell) at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 (PCell) no later than time point C (D1 ms after the start of the time duration T3) on the PCell.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.6.5.2.1 Interruptions during measurements on deactivated NR SCC in FR1

A.6.5.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE missed ACK/NACK rate does not exceed the limits at NR PSCell interruptions during the measurement on the deactivated NR SCC. This test will verify the missed ACK/NACK rate for PCell in standalone NR specified in clause 8.2.2.2. Supported test configurations for NR PCell are shown in table A.6.5.2.1.1-1. Supported test configurations for NR SCell are shown in table A.6.5.2.1.1-1A. Test configuration for NR PCell and test configuration for NR SCell are chosen independently.

The general test parameters and NR cell specific test parameters are given in Table A.6.5.2.1.1-2, A.6.5.2.1.1-3 and A.6.5.2.1.1-4 below. In the test there are two cells: Cell1 and Cell2. Cell1 is PCell, Cell2 is an NR deactivated SCell. Cell1 shall be configured as PCell and Cell2 shall be configured as SCell.

The test consists of one time period, with duration of T1. Prior to the start of the time duration T1, the UE is connected to Cell1 and Cell2 and the RRC message including *measCycleSCell* or *allowInterruptions* for the deactivated NR SCells is received at the UE antenna connector. During T1, PCell is continuously scheduled in DL.

Table A.6.5.2.1.1-1: Interruptions during measurements on deactivated NR SCC supported test configurations for NR PCell

|  |  |  |  |
| --- | --- | --- | --- |
| Config | Description | | |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode | | |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode | | |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode | | |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | | | |

Table A.6.5.2.1.1-1A: Interruptions during measurements on deactivated NR SCC supported test configurations for NR SCell

|  |  |
| --- | --- |
| ConfigSCell | Description |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.6.5.2.1.1-2: General test parameters for interruptions during measurements on deactivated NR SCC in standalone NR

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| RF Channel Number |  | 1, 2 | Two NR RF channels |
| Active PCell |  | Cell1 | PCell on NR RF channel number 1. |
| Configured deactivated SCell |  | Cell2 | Deactivated SCell on NR RF channel number 2. |
| CP length |  | Normal | Applicable to Cell1 and Cell2 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| SCell measurement cycle (measCycleSCell) | ms | 640 |  |
| T1 | s | 10 |  |

Table A.6.5.2.1.1-3: NR cell specific test parameters for NR PCell for interruptions during measurements on deactivated NR SCC in standalone NR

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell1** |
| Frequency Range | |  | FR1 |
| Duplex mode | Config 1 |  | FDD |
| Config 2,3 | TDD |
| TDD configuration | Config 1 |  | Not Applicable |
| Config 2 | TDDConf.1.1 |
|  | Confiq 3 |  | TDDConf.2.1 |
| BWchannel | Config 1,2 |  | Note 9 |
| Config 3 | Note 9 |
| BWoccupied | Config 1,2 | RB | 52 Note 7 |
|  | Config 3 |  | 106 Note 8 |
| Initial DL BWP Configuration | Config 1,2,3 |  | DLBWP.0.1 |
| Dedicated DL BWP Configuration | Config 1,2,3 |  | DLBWP.1.1 |
| Initial UL BWP Configuration | Config 1,2,3 |  | ULBWP.0.1 |
| Dedicated UL BWP Configuration | Config 1,2,3 |  | ULBWP.1.1 |
| PDSCH Reference measurement channel | Config 1 |  | SR.1.1 FDD |
| Config 2 | SR.1.2 TDD |
| Config 3 | SR.2.1 TDD |
| CSI-RS for tracking | Config 1 |  | TRS.1.1 FDD |
|  | Config 2 |  | TRS.1.1 TDD |
|  | Config 3 |  | TRS.1.2 TDD |
| RMSI CORESET parameters | Config 1 |  | CR.1.1 FDD |
| Config 2 | CR.1.1 TDD |
| Config 3 | CR.2.1 TDD |
| Dedicated CORESET parameters | Config 1 |  | CCR.1.1 FDD |
| Config 2 | CCR.1.1 TDD |
| Config 3 | CCR.2.1 TDD |
| OCNG Patterns | Config 1,2 |  | OP.1Note 7 |
|  | Config 3 |  | OP.1 Note 8 |
| SMTC Configuration | |  | SMTC.1 |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 |
| Config 3 | SSB.2 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| NocNote 2 | Config 1,2 | dBm/SCS | -104 |
| Config 3 | -101 |
| IoNote3 | Config 1,2 | dBm/9.36MHz | -58.96 |
| Config 3 | dBm/38.16MHz | -52.86 |
| Time offset to Cell1 Note 5 | | μs | - |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Void  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in clause 12 of TS 38.213 [3].  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 9: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |



Table A.6.5.2.1.1-4: NR cell specific test parameters for NR SCell for interruptions during measurements on deactivated NR SCC in standalone NR

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** |
| Frequency Range | |  | FR1 |
| Duplex mode | ConfigSCell 1 |  | FDD |
| ConfigSCell 2,3 | TDD |
| TDD configuration | ConfigSCell 1 |  | Not Applicable |
| ConfigSCell 2 | TDDConf.1.1 |
|  | ConfiqSCell 3 |  | TDDConf.2.1 |
| BWchannel | ConfigSCell 1,2 |  | Note 9 |
| ConfigSCell 3 | Note 9 |
| BWoccupied | ConfigSCell 1,2 | RB | 52 Note 7 |
|  | ConfigSCell 3 |  | 106 Note 8 |
| Initial DL BWP Configuration | ConfigSCell 1,2,3 |  | DLBWP.0.1 |
| Dedicated DL BWP Configuration | ConfigSCell 1,2,3 |  | DLBWP.1.1 |
| Initial UL BWP Configuration | ConfigSCell 1,2,3 |  | N/A |
| Dedicated UL BWP Configuration | Config 1,2,3 |  | N/A |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | SR.1.1 FDD |
| ConfigSCell 2 | SR.1.2 TDD |
| ConfigSCell 3 | SR.2.1 TDD |
| CSI-RS for tracking | ConfigSCell 1 |  | TRS.1.1 FDD |
|  | ConfigSCell 2 |  | TRS.1.1 TDD |
|  | ConfigSCell 3 |  | TRS.1.2 TDD |
| RMSI CORESET parameters | ConfigSCell 1 |  | CR.1.1 FDD |
| ConfigSCell 2 | CR.1.1 TDD |
| ConfigSCell 3 | CR.2.1 TDD |
| Dedicated CORESET parameters | ConfigSCell 1 |  | CCR.1.1 FDD |
| ConfigSCell 2 | CCR.1.1 TDD |
| ConfigSCell 3 | CCR.2.1 TDD |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 7 |
|  | ConfigSCell 3 |  | OP.1 Note 8 |
| SMTC Configuration | |  | SMTC.4 |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.5 FR1 |
| ConfigSCell 3 | SSB.6 FR1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| NocNote 2 | | dBm/15 kHz | -104 |
| SS-RSRP Note 3 | | dBm/15 kHz | -87 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| NocNote 2 | ConfigSCell 1,2 | dBm/SCS | -104 |
| ConfigSCell 3 | -101 |
| IoNote3 | ConfigSCell 1,2 | dBm/9.36MHz | -58.96 |
| ConfigSCell 3 | dBm/38.16MHz | -52.86 |
| Time offset to Cell1 Note 5 | | μs | 3 |
| 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 modeled as AWGN of appropriate power for Noc to be fulfilled within BWoccupied.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselvess.  Note 4: Void  Note 5: Receive time difference between slot boundaries of signals received from the two cells at the UE antenna connector including time alignment error between the two cells.  Note 6: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2 defined in clause 12 of TS 38.213 [3].  Note 7: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 8: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 9: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |

A.6.5.2.1.2 Test Requirements

If the NR PCell is not in the same band as the deactivated SCell, the UE is only allowed to cause interruptions on NR PCell immediately before and immediately after an SMTC. Each interruption on NR PCell shall not exceed the value defined in Table A.6.5.2.1.2-1.

If the NR PCell is in the same band as the deactivated SCell, the UE is only allowed to cause an interruption on PCell no earlier than 1 slot before an SMTC and no later than 1 slot after the SMTC. the interruption on NR PCell shall not exceed the value defined in Table A.6.5.2.1.2-2.

Table A.6.5.2.1.2-1: Interruption duration if the PCell is not in the same band as the deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 1 |
| 1 | 0.5 | 1 |

Table A.6.5.2.1.2-2: Interruption duration if the PCell is in the same band as the deactivated SCell

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms) | Interruption length |
| 0 | 1 | 2 + SMTC duration |
| 1 | 0.5 | 2 + SMTC duration |

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.6.5.3.1 SCell Activation and deactivation of known SCell in FR1 in non-DRX for 160ms SCell measurement cycle

##### A.6.5.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 8.3, when the SCell in FR1 is known by the UE at the time of activation.

The supported test configurations for NR PCell are shown in table A.6.5.3.1.1-1 below. Supported test configurations for NR SCell are shown in table A.6.5.3.1.1-1A. Test configuration for NR PCell and test configuration for NR SCell are chosen independently. The test parameters are given in Tables A.6.5.3.1.1-2 and cell-specific parameters in A.6.5.3.1.1-3 and A.6.5.3.1.1-4 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two NR carriers, each with one cell. Both cells have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1, but is not aware of Cell2. The UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

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

The point in time at which the MAC message is received at the UE antenna connector, in slot # denoted n, defines the start of time period T2. The UE shall be able to report valid CSI in PCell for the activated SCell at latest in slot , as defined in clause 8.3. The UE shall start reporting CSI in PCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the slot to , as defined in clause 8.3, where is the interruption length given in section 8.2.

Time period T3 starts when a MAC message for deactivation of SCell, sent from the test equipment to the UE in a slot # denoted m, is received at the UE antenna connector. The UE shall carry out deactivation of the SCell in a slot , as defined in clause 8.3, and The starting point of any PCell interruption due to the deactivation shall occur in the slot to , as defined in clause 8.3.

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

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

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

Table A.6.5.3.1.1-1: known FR1 SCell activation in non-DRX for 160ms SCell measurement cycle supported test configurations for NR PCell

|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.6.5.3.1.1-1A: known FR1 SCell activation in non-DRX for 160ms SCell measurement cycle supported test configurations for NR SCell

|  |  |
| --- | --- |
| **ConfigSCell** | **Description** |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

Table A.6.5.3.1.1-2: General test parameters for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| RF Channel Number |  | 1,2 | Two NR radio channel (1, 2) are used for this test |
| Active PCell |  | Cell 1 | Primary cell on NR RF channel number 1. |
| Configured deactivated SCell |  | Cell 2 | Configured deactivated secondary cell on NR RF channel number 2 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| Cell-individual offset for cells on NR channel number | dB | 0 | Individual offset for cells on primary component carrier. |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| Cell2 timing offset to cell1 | μs | 0 |  |
| Time alignment error between cell2 and cell1 | 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 PSCell shall be known and the SCell configured and detected. |
| T2 | s | 1 | During this time the UE shall activate the SCell. |
| T3 | s | 1 | During this time the UE shall deactivate the SCell. |
| THARQ | ms | Config 1: 2  Config 2: 3  Config 3: 2.5 | k1NR slot length  k1 is a number of slots and is indicated by the PDSCH-to-HARQ-timing-indicator field in the DCI format, if present, or provided by *dl-DataToUL-ACK*, the value of k should be the minimum value defined in TS 38.213 [3] that will meet the timing constraints of this test case. |
| TCSI\_Reporting | ms | 15 | The delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting (clause 5.2.2.5 in TS 38.214) and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2] |

Table A.6.5.3.1.1-3: Cell specific test parameters for NR PCell for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | | |
| T1 | T2 | T3 |
| 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 1,2 | MHz | Note 7 | | |
| Config 3 | Note 7 | | |
| BWoccupied | Config 1,2 | RB | 52 Note 5 | | |
|  | Config 3 |  | 106 Note 6 | | |
| Initial BWP configuration | |  | DLBWP.0.2 | | |
| TCI state | |  | TCI.State.0 | | |
| TRS Configuration | Config 1 |  | TRS.1.1 FDD | | |
| Config 2 | TRS.1.1 TDD | | |
| Config 3 | TRS.1.2 TDD | | |
| PDSCH Reference measurement channel | Config 1 |  | SR.1.1 FDD | | |
| Config 2 | SR.1.1 TDD | | |
| Config 3 | SR.2.1 TDD | | |
| Dedicated CORESET parameters | Config 1 |  | CCR.1.1 FDD | | |
| Config 2 | CCR.1.1 TDD | | |
| Config 3 | 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 Patterns | Config 1,2 |  | OP.1Note 5 | | |
|  | Config 3, |  | OP.1 Note 6 | | |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 | | |
| Config 3 | SSB.2 FR1 | | |
| CSI-RS configuration for CSI reporting (Note 8) | Config 1 |  | CSI-RS.1.1 FDD | | |
| Config 2 |  | CSI-RS.1.1 TDD | | |
| Config 3 |  | CSI-RS.2.1 TDD | | |
| SMTC configuration | |  | SMTC.1 | | |
| reportConfigType | |  | periodic | | |
| reportQuantity | |  | cri-RI-PMI-CQI | | |
| CSI reporting periodicity | Config 1,2 | slot | 5 | | |
| Config 3 | 10 | | |
| CSI reporting offset | Config 1,2 | slot | 3 | | |
| Config 3 | 5 | | |
| 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 | Config 1,2 | dBm/SCS | -104 | | |
| Config 3 | -101 | | |
|  | | dB | 17 | | |
|  | | dB | 17 | | |
| SS-RSRPNote3 | Config 1,2 | dBm/SCS | -87 | | |
| Config 3 | -84 | | |
| SCH\_RP Note 3 | | dBm/15 kHz | -87 | | |
| Io Note3 | Config 1,2 | dBm/  9.36MHz | -58.96 | | |
| Config 3 | dBm/  38.16MHz | -52.87 | | |
| 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 within BWoccupied.  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.  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel.  Note 8: On top of the reference configurations, CSI-RS offset should be set to meet the CSI reference resource timing definition in TS 38.214 cl. 5.2.2.5. | | | | | |



Table A.6.5.3.1.1-4: Cell specific test parameters for NR SCell for known FR1 SCell activation case, 160ms SCell measurement cycle

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | | |
| T1 | T2 | T3 |
| Duplex mode | ConfigSCell 1 |  | FDD | | |
| ConfigSCell 2,3 | TDD | | |
| TDD configuration | ConfigSCell 1 |  | Not applicable | | |
| ConfigSCell 2 | TDDConf.1.1 | | |
| ConfigSCell 3 | TDDConf.2.1 | | |
| BWchannel | ConfigSCell 1,2 | MHz | Note 7 | | |
| ConfigSCell 3 | Note 7 | | |
| BWoccupied | ConfigSCell 1,2 | RB | 52 Note 5 | | |
|  | ConfigSCell 3 |  | 106 Note 6 | | |
| Initial BWP configuration | |  | DLBWP.0.2 | | |
| TCI state | |  | TCI.State.0 | | |
| TRS Configuration | ConfigSCell 1 |  | TRS.1.1 FDD | | |
| ConfigSCell 2 | TRS.1.1 TDD | | |
| ConfigSCell 3 | TRS.1.2 TDD | | |
| PDSCH Reference measurement channel | ConfigSCell 1 |  | N/A | | |
| ConfigSCell 2 | N/A | | |
| ConfigSCell 3 | N/A | | |
| Dedicated CORESET parameters | ConfigSCell 1 |  | N/A | | |
| ConfigSCell 2 | N/A | | |
| ConfigSCell 3 | N/A | | |
| RMSI CORESET parameters | ConfigSCell 1 |  | N/A | | |
| ConfigSCell 2 | N/A | | |
| ConfigSCell 3 | N/A | | |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1Note 5 | | |
|  | ConfigSCell 3, |  | OP.1 Note 6 | | |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.1 FR1 | | |
| ConfigSCell 3 | SSB.2 FR1 | | |
| CSI-RS configuration for CSI reporting Note 8 | ConfigSCell 1 |  | CSI-RS.1.1 FDD | | |
| ConfigSCell 2 |  | CSI-RS.1.1 TDD | | |
| ConfigSCell 3 |  | CSI-RS.2.1 TDD | | |
| SMTC configuration | |  | SMTC.1 | | |
| reportConfigType | |  | N/A | | |
| reportQuantity | |  | N/A | | |
| CSI reporting periodicity | ConfigSCell 1,2 | slot | N/A | | |
| ConfigSCell 3 | N/A | | |
| CSI reporting offset | ConfigSCell 1,2 | slot | N/A | | |
| ConfigSCell 3 | 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 SSS Note 1 | |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |
| Note2 | ConfigSCell 1,2 | dBm/SCS | -104 | | |
| ConfigSCell 3 | -101 | | |
|  | | dB | 17 | | |
|  | | dB | 17 | | |
| SS-RSRPNote3 | ConfigSCell 1,2 | dBm/SCS | -87 | | |
| ConfigSCell 3 | -84 | | |
| SCH\_RP Note 3 | | dBm/15 kHz | -87 | | |
| Io Note3 | ConfigSCell 1,2 | dBm/  9.36MHz | -58.96 | | |
| ConfigSCell 3 | dBm/  38.16MHz | -52.87 | | |
| 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 within BWoccupied.  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.  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel.  Note 8: On top of the reference configurations, CSI-RS offset should be set to meet the CSI reference resource timing definition in TS 38.214 cl. 5.2.2.5. | | | | | |

##### A.6.5.3.1.2 Test Requirements

During T2 the UE shall send the first CSI report for SCell in the first available uplink resource after at least one CSI-RS transmission occasion for channel measurement and reporting after slot (). UE is allowed to postpone CSI report to next available UL resource if an available uplink resource is subject to interruption.During T2 the UE shall start sending CSI reports for SCell with non-zero CQI index at latest in a slot , Tactivation\_time = TFirstSSB+ 5ms, as defined in clause 8.3.

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

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

During T3 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 T2 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 change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.6.5.6.1.1 NR FR1- NR FR1 DL active BWP switch of SCell with non-DRX in SA

A.6.5.6.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement defined in clause 8.6, and interruption requirement on other active serving cell defined in clause 8.2.2.2.5.

The supported test configurations for PCell are shown in Table A.6.5.6.1.1.1-1 below. Supported test configurations for NR SCell are shown in table A.6.5.6.1.1.1-1A below. Test configuration for NR PCell and test configuration for NR SCell are chosen independently. The test scenario comprises of one NR PCell (Cell 1) and one SCell (Cell 2) as given in Table A.6.5.6.1.1.1-2. NR Cell-specific parameters are specified in Table A.6.5.6.1.1.1-3 and Table A.6.5.6.1.1.1-4 below.

PDCCHs indicating new transmissions shall be sent continuously on SCell (Cell 2) to ensure that the UE would have ACK/NACK sending except for the time duration when BWP is switching on Cell 2 and the time duration of T2.

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

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

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

- UE is configured with a *bwp-InactivityTimer* timer value for SCell.

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 SCell DL BWP switch, sent from the test equipment to the UE, is received at the UE side in SCell’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 no later than the first DL slot that occurs after the beginning of SCell’s DL slot (*i+*TBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK for the SCell on PCell no later than the first UL slot that occurs after the beginning of slot (*i+*TBWPswitchDelay+k1). The UE shall be continuously scheduled on SCell’s BWP-2 no later than the first DL slot that occurs after the beginning of slot (*i+*TBWPswitchDelay).

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

During T2, the test equipment won’t transmit DCI format for PDSCH reception on SCell (Cell 2).

During T3,

The time period T3 starts from the slot #*j*, where j is the first slot of the subframe immediately after *bwp-InactivityTimer* timer expires. The UE should switch its bandwidth part from BWP-2 back to the default bandwidth part – BWP-1.

The UE shall be able to receive PDSCH no later than the first DL slot that occurs after the beginning of SCell’s slot (*j+*TBWPswitchDelay) as defined in clause 8.6 and starts to report valid ACK/NACK for the SCell on PCell at latest on the first UL slot that occurs after the beginning of slot (*j+*TBWPswitchDelay+k1). The UE shall be continuously scheduled on SCell’s BWP-1 no later than the first DL slot that occurs after the beginning of slot (*j+*TBWPswitchDelay).

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

The test equipment verifies the DL BWP switch time in SCell by counting the slots from the time when the BWP switch command is received or *bwp-InactivityTimer* timer expires till an ACK/NACK is received.

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 BWP switch of SCell, respectively.

**Table A.6.5.6.1.1.1-1: DL BWP switch supported test configurations for NR PCell**



|  |  |
| --- | --- |
| **Config** | **Description** |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

**Table A.6.5.6.1.1.1-1A: DL BWP switch supported test configurations for NR SCell**

|  |  |
| --- | --- |
| **ConfigSCell** | **Description** |
| 1 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, ≥10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, ≥40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: The UE is only required to be tested in one with smallest aggregated channel bandwidth from supported band combinations which is composed of CCs ≥ the bandwidth (BWchannel) defined in each test configuration, | |

**Table A.6.5.6.1.1.1-2: General test parameters for DL BWP switch in SA**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| 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 |  | OFF | For both PCell and SCell |
| *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 SCC. |
| Cell2 timing offset to cell1 | μs | 3 | Time alignment error as specified in TS 38.104 [13] clause 6.5.3.1. |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |
| T3 | s | 0.2 |  |

**Table A.6.5.6.1.1.1-3: NR Cell specific test parameters for NR PCell for DL BWP switch in SA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 1** |
| Frequency Range | |  | FR1 |
| Duplex mode | Config 1 |  | FDD |
|  | Config 2,3 |  | TDD |
| TDD configuration | Config 1 |  | Not Applicable |
|  | Config 2 |  | TDDConf.1.1 |
|  | Config 3 |  | TDDConf.1.2 |
| BWchannel | Config 1,2 |  | Note 7 |
|  | Config 3 |  | Note 7 |
| BWoccupied | Config 1,2 | RB | 52 Note 5 |
|  | Config 3 |  | 106 Note 6 |
| Active BWP ID | |  | 0 |
| Initial DL BWP Configuration | |  | DLBWP.0.2Note4 |
| Initial UL BWP Configuration | |  | ULBWP.0.2Note4 |
| Active DL BWP-0 Configuration | |  | DLBWP.0.2Note4 |
| Active DL BWP-1 Configuration | |  | N.A. |
| Active DL BWP-2 Configuration | |  | N.A. |
| Active UL BWP-0 Configuration | |  | ULBWP.0.2Note4 |
| Active UL BWP-1 Configuration | |  | N.A. |
| Active UL BWP-2 Configuration | |  | N.A. |
| PDSCH Reference | Config 1 |  | SR.1.1 FDD |
| measurement channel | Config 2 |  | SR.1.1 TDD |
|  | Config 3 |  | SR.2.1 TDD |
| RMSI CORESET | Config 1 |  | CR.1.1 FDD |
| parameters | Config 2 |  | CR.1.1 TDD |
|  | Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET | Config 1 |  | CCR.1.2 FDD |
| parameters | Config 2 |  | CCR.1.2 TDD |
|  | Config 3 |  | CCR.2.4 TDD |
| TRS Configuration | Config 1 |  | TRS.1.1 FDD |
|  | Config 2 |  | TRS.1.1 TDD |
|  | Config 3 |  | TRS.1.2 TDD |
| OCNG Patterns | Config 1,2 |  | OP.1 Note 5 |
|  | Config 3 |  | OP.1 Note 6 |
| SSB Configuration | Config 1,2 |  | SSB.1 FR1 |
|  | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | |  | SMTC.1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |  |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |
| EPRE ratio of PDSCH to PDSCH | |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |
| NocNote 2 | Config 1,2 | dBm/SCS | -104 |
|  | Config 3 |  | -101 |
| NocNote 2 | | dBm/15KHz | -104 |
| SS-RSRP Note 3 | Config 1,2 | dBm/SCS | -87 |
|  | Config 3 |  | -84 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2 | dBm/  9.36MHz | -58.96 |
|  | Config 3 | dBm/  38.16MHz | -52.86 |
| 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 Noc to be fulfilled within BWoccupied.  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].  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |



**Table A.6.5.6.1.1.1-4: NR Cell specific test parameters for NR SCell for DL BWP switch in SA**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** |
| Frequency Range | |  | FR1 |
| Duplex mode | ConfigSCell 1 |  | FDD |
|  | ConfigSCell 2,3 |  | TDD |
| TDD configuration | ConfigSCell 1 |  | Not Applicable |
|  | ConfigSCell 2 |  | TDDConf.1.1 |
|  | ConfigSCell 3 |  | TDDConf.1.2 |
| BWchannel | ConfigSCell 1,2 |  | Note 7 |
|  | ConfigSCell 3 |  | Note 7 |
| BWoccupied | ConfigSCell 1,2 | RB | 52 Note 5 |
|  | ConfigSCell 3 |  | 106 Note 6 |
| Active BWP ID | |  | 1, 2 |
| Initial DL BWP Configuration | |  | DLBWP.0.2Note4 |
| Initial UL BWP Configuration | |  | N.A. |
| Active DL BWP-0 Configuration | |  | N.A. |
| Active DL BWP-1 Configuration | |  | DLBWP.1.1Note4 |
| Active DL BWP-2 Configuration | |  | DLBWP.1.3Note4 |
| Active UL BWP-0 Configuration | |  | N.A. |
| Active UL BWP-1 Configuration | |  | N.A. |
| Active UL BWP-2 Configuration | |  | N.A. |
| PDSCH Reference | ConfigSCell 1 |  | SR.1.1 FDD |
| measurement channel | ConfigSCell 2 |  | SR.1.1 TDD |
|  | ConfigSCell 3 |  | SR.2.1 TDD |
| RMSI CORESET | ConfigSCell 1 |  | CR.1.1 FDD |
| parameters | ConfigSCell 2 |  | CR.1.1 TDD |
|  | ConfigSCell 3 |  | CR.2.1 TDD |
| Dedicated CORESET | ConfigSCell 1 |  | CCR.1.2 FDD |
| parameters | ConfigSCell 2 |  | CCR.1.2 TDD |
|  | ConfigSCell 3 |  | CCR.2.4 TDD |
| TRS Configuration | ConfigSCell 1 |  | TRS.1.1 FDD |
|  | ConfigSCell 2 |  | TRS.1.1 TDD |
|  | ConfigSCell 3 |  | TRS.1.2 TDD |
| OCNG Patterns | ConfigSCell 1,2 |  | OP.1 Note 5 |
|  | ConfigSCell 3 |  | OP.1 Note 6 |
| SSB Configuration | ConfigSCell 1,2 |  | SSB.1 FR1 |
|  | ConfigSCell 3 |  | SSB.2 FR1 |
| SMTC Configuration | |  | SMTC.1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | |  |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |
| EPRE ratio of PDSCH to PDSCH | |  |  |
| EPRE ratio of OCNG DMRS to SSS Note 1 | |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | |  |  |
| NocNote 2 | ConfigSCell 1,2 | dBm/SCS | -104 |
|  | ConfigSCell 3 |  | -101 |
| NocNote 2 | | dBm/15KHz | -104 |
| SS-RSRP Note 3 | ConfigSCell 1,2 | dBm/SCS | -87 |
|  | ConfigSCell 3 |  | -84 |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | ConfigSCell 1,2 | dBm/  9.36MHz | -58.96 |
|  | ConfigSCell 3 | dBm/  38.16MHz | -52.86 |
| 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 Noc to be fulfilled within BWoccupied.  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].  Note 5: All UL/DL transmission shall be confined within BWoccupied (i.e. 10 MHz, 52 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 6: All UL/DL transmission shall be confined within BWoccupied (i.e. 40 MHz, 106 RBs) from FC,low, and Io is independent of the BWchannel configured.  Note 7: NRB,c. is derived from Table 5.3.2-1 in TS38.101-1[2] with configured BWchannel. | | | |

A.6.5.6.1.1.2 Test Requirements

During T1, the UE shall start to send the ACK/NACK for SCell on PCell from the first UL slot that occurs after the beginning of DL slot (*i+*TBWPswitchDelay+k1).

During T3, the UE shall start to send the ACK/NACK for SCell on PCell from the first UL slot that occurs after the beginning of DL slot (*j+*TBWPswitchDelay+k1).

Where, k1 is the timing between DL data receiving and acknowledgement as specified in [7].

Depending on UE capability *bwp-SwitchingDelay* [2], UE shall finish BWP switch within the time duration *TBWPswitchDelay* defined in Table 8.6.2-1.

All of the above test requirements shall be fulfilled in order for the observed SCell active 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 T3, the start time of PCell interruption 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 8.2.2.2.5.

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

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

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK/NACK in the first UL slot that occurs after the beginning of DL slot (*i+* TBWPswitchDelay+k1), (*j+* TBWPswitchDelay+k1), then the UE shall use the next available uplink resource for reporting the corresponding ACK/NACK.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.7.1.1.1 Cell reselection to FR2 intra-frequency NR case

##### A.7.1.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements specified in clause 4.2.2.3.

##### A.7.1.1.1.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.7.1.1.1.2-1, A.7.1.1.1.2-2 and A.7.1.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

**Table A.7.1.1.1.2-1: Supported test configurations**

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

**Table A.7.1.1.1.2-2: General test parameters for intra frequency NR cell re-selection test case**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test configuration** | **Value** | **Comment** |
| Initial condition | Active cell |  | 1, 2 | Cell1 |  |
| T2 end condition | Active cell |  | 1, 2 | Cell2 |  |
| Neighbour cells |  | 1, 2 | Cell1 |  |
| Final condition | Active cell |  | 1, 2 | Cell1 |  |
| Neighbour cell |  | 1, 2 | Cell2 |  |
| RF Channel Number | |  | 1, 2 | 1 |  |
| Time offset between cells | |  | 1, 2 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SMTC configuration | |  | 1, 2 | SMTC.1 |  |
| DRX cycle length | | s | 1, 2 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1, 2 | 190 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1, 2 | Not configured |  |
| T1 | | s | 1, 2 | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 1, 2 | 135 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 1, 2 | 35 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

**Table A.7.1.1.1.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case in AWGN**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | |
|  |  | T1 | T2 | T3 | T1 | T2 | T3 |
| TDD configuration |  | 1, 2 | TDDConf.3.1 | | | TDDConf.3.1 | | |
| PDSCH RMC |  | 1 | SR.3.1 TDD | | | SR.3.1 TDD | | |
| configuration |  | 2 | SR.3.1 TDD | | | SR.3.1 TDD | | |
| RMSI CORESET |  | 1 | CR.3.1 TDD | | | CR.3.1 TDD | | |
| RMC configuration |  | 2 | CR.3.1 TDD | | | CR.3.1 TDD | | |
| Dedicated CORESET |  | 1 | CCR.3.1 TDD | | | CCR.3.1 TDD | | |
| RMC configuration |  | 2 | CCR.3.1 TDD | | | CCR.3.1 TDD | | |
| SSB configuration |  | 1 | SSB.3 FR2 | | | SSB.7 FR2 | | |
|  |  | 2 | SSB.4 FR2 | | | SSB.8 FR2 | | |
| OCNG Pattern |  | 1, 2 | OP.4 | | | OP.4 | | |
| BWchannel | MHz | 1, 2 | 100: NRB,c = 66 | | | 100: NRB,c = 66 | | |
| Data RBs allocated |  | 1, 2 | 66 | | | 66 | | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -138 | | | -138 | | |
|  |  | 2 | -135 | | | -135 | | |
| Pcompensation | dB | 1, 2 | 0 | | | 0 | | |
| Qhysts | dB | 1, 2 | 0 | | | 0 | | |
| Qoffsets, n | dB | 1, 2 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2 | SS-RSRP | | | SS-RSRP | | |
| AoA setup |  | 1, 2 | Setup 1 defined in A.3.15.1 | | | Setup 1 defined in A.3.15.1 | | |
| Beam assumptionNote 4 |  | 1,2 | Rough | | | Rough | | |
| Note 5 | dB | 1 | 7.45 | -3.55 | 0.95 | -infinity | 0.95 | -3.55 |
|  |  | 2 |
| Note2 | dBm/SCS | 1 | -93 | | | | | |
|  |  | 2 | -90 | | | | | |
| Note2 | dBm/15 kHz | 1 | -102 | | | | | |
|  |  | 2 |  | | | | | |
|  | dB | 1 | 8 | -3 | 1.5 | -infinity | 1.5 | -3 |
|  |  | 2 |
| SS-RSRP Note3 | dBm/SCS | 1 | -85 | -96 | -91.5 | -infinity | -91.5 | -96 |
|  |  | 2 | -82 | -93 | -88.5 | -infinity | -88.5 | -93 |
| Io on SSB symbols of each cell | dBm/95.04 MHz | 1 | -60.53 | -67.40 | -65.34 | -69.17 | -65.34 | -67.40 |
| 2 | -57.52 | -64.39 | -62.33 | -66.16 | -62.33 | -64.39 |
| Treselection | s | 1, 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 1, 2 | 50 | | | 50 | | |
| Propagation Condition |  | 1, 2 | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | | | |

##### A.7.1.1.1.3 Test Requirements

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

The cell re-selection delay to a newly detectable cell shall be less than 130 s.

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

The cell re-selection delay to an already detected cell shall be less than 27 s.

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

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

Where:

Tdetect, NR\_Intra See Table 4.2.2.3-1 in clause 4.2.2.3

Tevaluate, NR\_ intra See Table 4.2.2.3-1 in clause 4.2.2.3

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

This gives a total of 129.28 s, allow 130 s for the cell re-selection delay to a newly detectable cell and 26.88 s for the cell re-selection delay to an already detected cell in the test case, which we allow 27 s.

#### A.7.1.1.2 Cell reselection to FR2 inter-frequency NR case

##### A.7.1.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements specified in clause 4.2.2.4.

##### A.7.1.1.2.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers respectively as given in tables A.7.1.1.2.2-1, A.7.1.1.2.2-2 and A.7.1.1.2.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1. Furthermore, UE has not registered with network for the tracking area containing cell 2.

**Table A.7.1.1.2.2-1: Supported test configurations**

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

**Table A.7.1.1.2.2-2: General test parameters for FR2 inter frequency NR cell re-selection test case**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test configuration** | **Value** | **Comment** |
| Initial condition | Active cell |  | 1, 2 | Cell2 | The UE camps on cell 2 in the initial phase and during T1 period the UE reselects to cell 1 |
| Neighbour cell |  | 1, 2 | Cell1 |
| T1 end condition | Active cell |  | 1, 2 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
| Neighbour cells |  | 1, 2 | Cell2 |
| T3 end condition | Active cell |  | 1, 2 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T3 |
| Neighbour cell |  | 1, 2 | Cell1 |
| RF Channel Number | |  | 1, 2 | 1, 2 |  |
| Time offset between cells | |  | 1, 2 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1 | SSB.1 FR2 |  |
| 2 | SSB.2 FR2 |  |
| SMTC configuration | |  | 1, 2 | SMTC.1 |  |
| DRX cycle length | | s | 1, 2 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1, 2 | 190 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1, 2 | Not configured |  |
| T1 | | s | 1, 2 | 35 | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1, 2 | >7 | During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3. |
| T3 | | s | 1, 2 | 95 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

**Table A.7.1.1.2.2-3: Cell specific test parameters for FR2 inter frequency NR cell re-selection test case in AWGN**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | | **Cell 2** | | |
| **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| TDD configuration |  | 1, 2 | TDDConf.3.1 | | | TDDConf.3.1 | | |
| PDSCH RMC configuration |  | 1, 2 | SR.3.1 TDD | | | SR.3.1 TDD | | |
| RMSI CORESET parameters |  | 1, 2 | CR.3.1 TDD | | | CR.3.1 TDD | | |
| RMSI CORESET RMC configuration |  | 1, 2 | CCR.3.1 TDD | | | CCR.3.1 TDD | | |
| OCNG Pattern |  | 1, 2 | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -140 | | | -140 | | |
| 2 | -137 | | | -137 | | |
| Pcompensation | dB | 1, 2 | 0 | | | 0 | | |
| Qhysts | dB | 1, 2 | 0 | | | 0 | | |
| Qoffsets, n | dB | 1, 2 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2 | SS-RSRP | | | SS-RSRP | | |
| AoA setup |  | 1, 2 | Setup 1 defined in A.3.15.1 | | | Setup 1 defined in A.3.15.1 | | |
| Beam assumptionNote 4 |  | 1,2 | Rough | | | Rough | | |
| Note 5 | dB | 1 | 9.95 | 9.95 | 7.45 | -11.05 | -infinity | 7.95 |
| 2 |
| Note2 | dBm/SCS | 1 | -93 | | | -93 | | |
| 2 | -90 | | | -90 | | |
| Note2 | dBm/15 kHz | 1 | -102 | | | -102 | | |
| 2 |
|  | dB | 1 | 10.5 | 10.5 | 8 | -10.5 | -infinity | 8.5 |
| 2 |
| SS-RSRP Note3 | dBm/SCS | 1 | —82.5 | -82.5 | -85 | -103.5 | -infinity | -84.5 |
| 2 | -79.5 | -79.5 | -82 | -100.5 | -infinity | -81.5 |
| Io | dBm/95.04 MHz | 1, 2 | -53.11 | -53.11 | -55.34 | -63.61 | -63.98 | -54.91 |
| Treselection | s | 1, 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2 | 50 | | | 50 | | |
| Threshx, highP | dB | 1, 2 | 48 | | | 48 | | |
| Threshserving, lowP | dB | 1, 2 | 44 | | | 44 | | |
| Threshx, lowP | dB | 1, 2 | 50 | | | 50 | | |
| Propagation Condition |  | 1, 2 | AWGN | | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | | | |

##### A.7.1.1.2.3 Test Requirements

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

The cell re-selection delay to a higher priority cell shall be less than 87 s.

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

The cell re-selection delay to a lower priority cell shall be less than 27 s.

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

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

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, NR\_ inter See Table 4.2.2.4-1 in clause 4.2.2.4

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

This gives a total of 86.88 s, allow 87 s for the cell re-selection delay to a higher priority cell and 26.88 s for the cell re-selection delay to a lower priority cell in the test case, which we allow 27 s.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.7.5.1.5.2 Test Requirements

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

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 no later than time point C (D1 second after the start of the time duration T3) on the PCell.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.7.5.1.7.2 Test Requirements

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

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 (PCell) at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 1.

The UE shall stop transmitting uplink signal in Cell 1 (PCell) no later than time point C (D1 secondafter the start of the time duration T3) on the PCell.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.7.5.8.1 MAC-CE based active TCI state switch

A.7.5.8.1.1 NR PCell FR2 active TCI state switch for a known TCI state

A.7.5.8.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the active TCI state switch delay requirement defined in clause 8.10.3. Supported test configuration is shown in Table A.7.5.8.1.1.1-1.

The test scenario comprises of one NR PCell (Cell 1) as given in Table A.7.5.8.1.1.1-2. Cell-specific parameters of NR PCell are specified in Table A.7.5.8.1.1.1-3 below. The OTA related test parameters for FR2 are shown in Table A.7.5.8.1.1.1-4.

PDCCHs indicating new transmissions shall be sent continuously on PCell to ensure that the UE would have ACK/NACK sending.

Before the test starts,

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

- UE is configured with 2 different TCI states for PCell, PDCCH TCI state 0 (QCL’d to SSB0) and TCIstate 1 (QCL’d to SSB1), in Cell 1 before starting the test.

- UE is indicated in TCI state 0 as the active PDCCH TCI state

The test consists of two time periods, T1 and T2. Figure A.7.5.8.1.1.1-1 and Figure A.7.5.8.1.1.1-2 show the Time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival. During T1 only SSB to which PDCCH-TCI-state0 is QCL’d is transmitted. At the beginning of T2, the SSB corresponding to TCI state 1 starts transmitting. The UE is configured to provide periodic L1-RSRP reports. In slot n which is within 1280ms of UE providing L1-RSRP report with results for both SSB0 and SSB1, UE receives a MAC-CE command indicating a switch to TCI state 1. *tci-PresentInDCI* is not configured in the PDSCH configuration, i.e. TCI state for the PDSCH is identical to the PDCCH TCI state.

The test equipment verifies that UE can be scheduled on PCell on TCI state 0 till n+ THARQ +3 ms. The test equipment also verifies the TCI state switch time in PCell by scheduling the UE on TCI state 1 after n+ THARQ +3 ms + (Tfirst-SSB + TSSB-proc) .

**Table A.7.5.8.1.1.1-1: Supported test configurations**

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

**Table A.7.5.8.1.1.1-2: General test parameters for TCI state switch**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active PCell |  | Cell 1 | PCell on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |

**Table A.7.5.8.1.1.1-3: NR Cell specific test parameters for TCI state switch**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** |
| Frequency Range |  | FR2 |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 |
| Data RBs allocated |  | 66 |
| Initial DL BWP Configuration |  | DLBWP.0.2 |
| Dedicated DL BWP Configuration |  | DLBWP.1.1 |
| Initial UL BWP Configuration |  | ULBWP.0.2 |
| Dedicated UL BWP Configuration |  | ULBWP.1.1 |
| PDSCH Reference measurement channel |  | SR.3.2 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD |
| OCNG Patterns |  | OP.5 |
| SSB Configuration |  | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 |
| TCI State 0 |  | TC. State.2 |
| TCI State 1 |  | TCI.State.3 |
| TRS Configuration |  | TRS.2.1 TDD  TRS.2.2 TDD |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low |
| 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 a constant total transmitted power spectral density is achieved for all OFDM symbols. | | |

**Table A.7.5.8.1.1.1-4: OTA related test parameters for TCI state switch**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | | | |
|  |  | **SSB0** | | **SSB1** | | |
|  |  | **T1** | **T2** | **T1** | | **T2** |
| Angle of arrival configuration |  | Setup 3 According to clause A.3.15.3 | | | | |
|  |  | AoA1 | | | AoA2 | |
| Assumption for UE beams Note 6 |  | Rough | | | Rough | |
| Ês | dBm/SCS | -80.6 | -80.6 | -Infinity | | -80.6 |
| SSB-RP Note 2 | dBm/SCS | -80.6 | -80.6 | -Infinity | | -80.6 |
| BB Note 7 | dB | 8.3 | 8.3 | -Infinity | | 8.3 |
| Io Note2 | dBm/95.04 MHz Note4 | -56.0 | -56.0 | - Infinity | | -56.0 |
| Note 1: Void  Note 2: SSB-RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the center of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation.  Note 7: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

****

**Figure A.7.5.8.1.1.1-1: Time multiplexed downlink transmissions during T1**

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**Figure A.7.5.8.1.1.1-2: Time multiplexed downlink transmissions during T2**

A.7.5.8.1.1.2 Test Requirements

During T2, UE shall send L1-RSRP report with results for both SSB0 and SSB1.

After receiving MAC-CE command in slot n, UE shall:

- be able to continue to receive on TCI state 0 till n+ THARQ +3 ms

- be able to start receiving on TCI state 1 after n+ THARQ +5 ms + Tfirst-SSB

A.7.5.8.2 RRC based active TCI state switch

A.7.5.8.2.1 NR PCell FR2 active TCI state switch for a known TCI state

A.7.5.8.2.1.1 Test Purpose and Environment

The purpose of this test is to verify the active TCI state switch delay requirement defined in clause 8.10.3. Supported test configuration is shown in Table A.7.5.8.2.1.1-1.

The test scenario comprises of one NR PCell as given in Table A.7.5.8.2.1.1-2. Cell-specific parameters of NR PCell is specified in Table A.7.5.8.2.1.1-3 below. The OTA related test parameters for FR2 is shown in Table A.7.5.8.2.1.1-4.

PDCCHs indicating new transmissions shall be sent continuously on PCell to ensure that the UE would have ACK/NACK sending.

Before the test starts,

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

- UE is configured with 1 TCI state for PCell, PDCCH-TCI-state0 (QCL’d to SSB0)

- UE is indicated in TCI state0 as the active TCI state

The test consists of two time periods, T1 and T2. Figure A.7.5.8.2.1.1-1 and Figure A.7.5.8.2.1.1-2 show the Time multiplexed (allocation in Frequency is symbolic) downlink transmissions from each Angle of Arrival. During T1 only SSB to which TCI-state0 is QCL’d is transmitted. At the beginning of T2, the SSB corresponding to TCI-state1 starts transmitting. The UE is configured to provide periodic L1-RSRP reports. In slot n which is within 1280 ms of UE providing L1-RSRP report with results for both SSB0 and SSB1, UE receives a RRC command indicating a switch to TCI-state1.

The test equipment verifies the TCI state switch time in PCell by scheduling the UE on TCI state 1 after n+ TRRC\_processing  + Tfirst-SSB + 2ms.

**Table A.7.5.8.2.1.1-1: Supported test configurations**

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

**Table A.7.5.8.2.1.1-2: General test parameters for TCI state switch**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | **Comment** |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active PCell |  | Cell 1 | PCell on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |

**Table A.7.5.8.2.1.1-3: NR Cell specific test parameters for TCI state switch**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** |
| Frequency Range |  | FR2 |
| Duplex mode |  | TDD |
| TDD configuration |  | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 |
| Data RBs allocated |  | 66 |
| Initial DL BWP Configuration |  | DLBWP.0.2 |
| Dedicated DL BWP Configuration |  | DLBWP.1.1 |
| Initial UL BWP Configuration |  | ULBWP.0.2 |
| Dedicated UL BWP Configuration |  | ULBWP.1.1 |
| PDSCH Reference measurement channel |  | SR.3.2 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD |
| OCNG Patterns |  | OP.5 |
| SSB Configuration |  | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 |
| TCI State 0 |  | TC. State.2 |
| TCI State 1 |  | TCI.State.3 |
| reportConfigType |  | ssb-Index-RSRP |
| reportConfigType |  | periodic |
| Number of reported RS |  | 2 |
| L1-RSRP reporting period | slot | 640 |
| timeRestrictionForChannelMeasurements |  | configured |
| TRS Configuration |  | TRS.2.1 TDD  TRS.2.2 TDD |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low |
| 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 the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | |

**Table A.7.5.8.2.1.1-4: OTA related test parameters for TCI state switch**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | | | |
| **SSB0** | | **SSB1** | | |
| **T1** | **T2** | **T1** | | **T2** |
| Angle of arrival configuration |  | Setup 3 According to clause A.3.15.3 | | | | |
| AoA1 | | | AoA2 | |
| Assumption for UE beams Note 6 |  | Rough | | | Rough | |
| Ês | dBm/SCS | -80.6 | -80.6 | -Infinity | | -80.6 |
| SSB-RP Note 2 | dBm/SCS | -80.6 | -80.6 | -Infinity | | -80.6 |
| BB Note 7 | dB | 8.3 | 8.3 | -Infinity | | 8.3 |
| Io Note2 | dBm/95.04 MHz Note4 | -56.0 | -56.0 | - Infinity | | -56.0 |
| Note 1: Void  Note 2: SSB-RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the center of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation.  Note 7: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

****

**Figure A.7.5.8.2.1.1-1: Time multiplexed downlink transmissions during T1**

****

**Figure A.7.5.8.2.1.1-2: Time multiplexed downlink transmissions during T2**

A.7.5.8.2.1.2 Test Requirements

During T2, UE shall send L1-RSRP report with both SSB0 and SSB1.

After receiving RRC command in slot n, UE shall be able to start receiving on TCI state 1 after n+ TRRC\_processing  + Tfirst-SSB + 2ms.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.7.6.1.3 SA event triggered reporting test with per-UE gaps under non-DRX

##### A.7.6.1.3.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.7.6.1.3.1-1.

**Table A.7.6.1.3.1-1: supported test configurations**

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

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for the Cell 1 and Cell 2 are given in Table A.7.6.1.3.1-2 ~ 4 below.

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

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

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

**Table A.7.6.1.3.1-2: General test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps without DRX**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Value** | **Comment** |
| Active cell |  | 1, 2 | PCell (Cell 1) |  |
| Neighbour cell |  | 1, 2 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | One TDD carrier frequency is used for the NR cells. |
| Gap type |  | 1, 2 | Per-UE gaps |  |
| Measurement gap repitition periodicity | ms | 1, 2 | 40 |  |
| Measurement gap length | ms | 1, 2 | 6 |  |
| Measurement gap offset | ms | 1, 2 | 39 |  |
| SMTC configuration |  | 1, 2 | SMTC.1 |  |
| CSI-RS parameters |  | 1, 2 | CSI-RS.3.2 TDD resource #0 | Resource #1 is not used |
| A3-Offset | dB | 1, 2 | -11 |  |
| CP length |  | 1, 2 | Normal |  |
| Hysteresis | dB | 1, 2 | 0 |  |
| Time To Trigger | s | 1, 2 | 0 |  |
| Filter coefficient |  | 1, 2 | 0 | L3 filtering is not used |
| DRX |  | 1, 2 | OFF |  |
|  |  |  |  |  |
| Time offset between Cell 1 and Cell 2 |  | 1, 2 | 3 μs | Synchronous cells |
| T1 | s | 1, 2 | 5 |  |
| T2 | s | 1, 2 | 5 |  |

**Table A.7.6.1.3.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps without DRX**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1, 2 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 1, 2 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1 | 24 | | 24 | |
| 2 | 48 | | 48 | |
| Intial BWP configuration |  | 1, 2 | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | CSI-RS | | SSB | |
| PDSCH RMC configuration |  | 1 | SR.3.2 TDD | | N/A | |
| 2 | SR.3.3 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | CR.3.1 TDD | |
| 2 | CR.3.2 TDD | | CR.3.2 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | CCR.3.1 TDD | |
| 2 | CCR.3.7 TDD | | CCR.3.7 TDD | |
| TRS configuration |  | 1, 2 | TRS.2.1 TDD | | N/A | |
| PDSCH/PDCCH TCI states |  | 1, 2 | TCI.State.2 | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 120 | | 120 | |
| OCNG Patterns |  | 1, 2 | OP.5 | | N/A | |
| cellIndividualOffset | dB | 1~2 | N/A | | 16 | |
| SSB |  | 1 | SSB.3 FR2 | | SSB.7 FR2 | |
| 2 | SSB.4 FR2 | | SSB.8 FR2 | |
| Propagation Condition |  | 1, 2 | AWGN | | AWGN | |

**Table A.7.6.1.3.1-4: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps without DRX**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | 1, 2 | Setup 3 defined in A.3.15.3 | | | |
| AoA1 | | AoA2 | |
| Beam AssumptionNote 4 |  | 1,2 | Rough | | Rough | |
| Es | dBm/SCS | 1 | -89 | -89 | -Infinity | -89 |
| 2 | -86 | -86 | -Infinity | -86 |
| BB Note 5 | dB | 1, 2 | -0.12 | -0.12 | -Infinity | -0.12 |
| SSB\_RP | dBm/SCS | 1 | -89 | -89 | -Infinity | -89 |
| 2 | -86 | -86 | -Infinity | -86 |
|  | dBm/95.04MHz | 1 | -64.41 | -64.41 | -Infinity | -64.41 |
| 2 | -61.41 | -61.41 | -Infinity | -61.41 |
| Time multiplexing of the downlink transmissions from each AoA | | 1 | Defined in Figure A.7.6.1.3.1-1 | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 2: Void  Note 3: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |



Figure A.7.6.1.3.1-1: Time multiplexed downlink transmissions (Config 1 example)

##### A.7.6.1.3.2 Test Requirements

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

- 3.2s for a UE supporting power class 1,

- 1.92s for a UE supporting power class 2, 3 and 4

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

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

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

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

#### A.7.6.1.4 SA event triggered reporting test with per-UE gaps under DRX

##### A.7.6.1.4.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the TDD intra-frequency cell search requirements in clause 9.2.5.1 and 9.2.5.2. Supported test configurations are shown in table A.7.6.1.4.1-1.

**Table A.7.6.1.4.1-1: supported test configurations**

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

There are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for the Cell 1 and Cell 2 are given in Table A.7.6.1.4.1-2, A.7.6.1.4.1-3 and A.7.6.1.4.1-4 below.

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

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

The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

**Table A.7.6.1.4.1-2: General test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps with DRX**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Value** | | **Comment** |
| **Test 1** | **Test 2** |
| Active cell |  | 1, 2 | PCell (Cell 1) | |  |
| Neighbour cell |  | 1, 2 | Cell 2 | | Cell to be identified. |
| RF Channel Number |  | 1, 2 | 1: Cell 1 and Cell 2 | | One TDD carrier frequency is used for the NR cells. |
| Gap type |  | 1, 2 | Per-UE gaps | |  |
| Measurement gap repitition periodicity | ms | 1, 2 | 40 | |  |
| Measurement gap length | ms | 1, 2 | 6 | |  |
| Measurement gap offset | ms | 1, 2 | 39 | |  |
| SMTC configuration |  | 1, 2 | SMTC.1 | |  |
| CSI-RS parameters |  | 1, 2 | CSI-RS.3.2 TDD resource #0 | | Resource #1 is not used |
| A3-Offset | dB | 1, 2 | -6 | |  |
| CP length |  | 1, 2 | Normal | |  |
| Hysteresis | dB | 1, 2 | 0 | |  |
| Time To Trigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.1 | DRX.7 | DRX related parameters are defined in Table A.7.6.1.2.1-5 |
|  |  |  |  | |  |
| Time offset between Cell 1 and Cell 2 |  | 1, 2 | 3 μs | | Synchronous cells |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | 10 | 52 |  |

**Table A.7.6.1.4.1-3: NR Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps with DRX**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1, 2 | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 1, 2 | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Data RBs allocated |  | 1, 2 | 66 | | 66 | |
| Intial BWP configuration |  | 1, 2 | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2 | DLBWP.1.2 | | DLBWP.1.1 | |
| Active UL BWP configuration |  | 1, 2 | ULBWP.1.2 | | ULBWP.1.1 | |
| RLM-RS |  | 1, 2 | SCSI-RS | | SSB | |
| PDSCH RMC configuration |  | 1 | SR.3.2 TDD | | N/A | |
| 2 | SR.3.3 TDD | |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | | CR.3.1 TDD | |
| 2 | CR.3.2 TDD | | CR.3.2 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | | CCR.3.1 TDD | |
| 2 | CCR.3.7 TDD | | CCR.3.7 TDD | |
| TRS configuration |  | 1, 2 | TRS.2.1 TDD | | N/A | |
| PDSCH/PDCCH TCI state |  | 1, 2 | TCI.State.2 | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 120 | | 120 | |
| OCNG Patterns |  | 1, 2 | OP.1 | | OP.1 | |
| SSB |  | 1 | SSB.3 FR2 | | SSB.3 FR2 | |
| 2 | SSB.4 FR2 | | SSB.4 FR2 | |
| Propagation Condition |  | 1, 2 | AWGN | | AWGN | |

**Table A.7.6.1.4.1-4: NR OTA Cell specific test parameters for intra-frequency event triggered reporting for SA with TDD PCell in FR2 with per-UE gaps with DRX**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Config** | **Cell 1** | | **Cell 2** | |
| **T1** | **T2** | **T1** | **T2** |
| AoA setup |  | 1, 2 | Setup 1 defined in A.3.15.1 | | | |
| Beam AssumptionNote 4 |  | 1,2 | Rough | | | |
| BB Note 5 | dB | 1, 2 | 3.77 | -1.52 | -Infinity | -1.52 |
| Note 2 | dBm/15 KHz | 1, 2 | -98 | | | |
| Note 2 | dBm/SCS | 1 | -89 | | | |
| 2 | -86 | | | |
| SSB\_RP | dBm/SCS | 1 | -85 | -85 | -Infinity | -85 |
| 2 | -82 | -82 | -Infinity | -82 |
|  | dB | 1, 2 | 4 | 4 | -Infinity | 4 |
|  | dBm/95.04MHz | 1, 2 | -54.53 | -52.18 | See Cell 2 columns | |
| 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: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 5: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBP from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

Table A.7.6.1.4.1-5: Void

Table A.7.6.1.4.1-6:Void

##### A.7.6.1.4.2 Test Requirements

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- 7.2s for a UE supporting power class 1,

- 4.32s for a UE supporting power class 2, 3 and 4

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

- 51.2s for a UE supporting power class 1,

- 30.72s for a UE supporting power class 2, 3 and 4

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.7.7.1.2.3 Test Requirements

The SS-RSRP measurement accuracy for Cell 1 and Cell 2 shall fulfil the absolute requirements in clause 10.1.5.1.1 and the relative requirements in clause 10.1.5.1.2.

Test 1:

Absolute accuracy of Cell 1 and absolute accuracy of Cell 2. The UE is deemed to meet the requirement if the reported SS-RSRP is in the range shown in Table A.7.7.1.2.3-1.

Relative accuracy of Cell 2 compared with Cell 1. The UE is deemed to meet the requirement if the difference in reported SS-RSRP meets the requirements in A.7.7.1.2.3-2.

Test 2:

Absolute accuracy of Cell 1 and absolute accuracy of Cell 2. The UE is deemed to meet the requirement if the reported SS-RSRP is in the range shown in Table A.7.7.1.2.3-1.

Relative accuracy of Cell 2 compared with Cell 1. The UE is deemed to meet the requirement if the difference in reported SS-RSRP meets the requirements in A.7.7.1.2.3-2.

Table A.7.7.1.2.3-1: SS-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4 |
| Cell 1 | SSB\_RP1 -δ +Gmin +X ≤ Reported RSRP(dBm) ≤ SSB\_RP1 +δ +Gmax |
| Cell 2 | SSB\_RP2 -δ +Gmin ≤ Reported RSRP(dBm) ≤ SSB\_RP2 +δ+Gmax |
| Note 1: SSB\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the cell n under consideration  Note 2: δ is the RSRP absolute accuracy requirement from Table 10.1.5.1.1-1, selected according to the Io used in the test  Note 3: Gmin and Gmax are the minimum and maximum UE gain values from Table B.2.1.5.1-1, selected according to the UE power class  Note 4: X is the Spherical coverage gain difference in dB, derived as (UE Refsens - UE Spherical coverage) from TS 38.101-2 [19] clauses 7.3.2 and 7.3.4, selected according to the UE power class and operating band. X is always a negative value. | |

Table A.7.7.1.2.3-2: SS-RSRP relative accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4, 5, 6 |
| Cell 2 – Cell 1 | SSB\_RP2 - SSB\_RP1 -δ - D - Ginter ≤ Reported RSRP(dB) ≤ SSB\_RP2 - SSB\_RP1 +δ + Ginter–(X) |
| Note 1: SSB\_RPn is the equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone configured in the test for the cell n under consideration  Note 2: δ is the RSRP relative accuracy requirement from Table 10.1.5.1.2-1  Note 3: Void  Note 4: X is the Spherical coverage gain difference in dB, derived as (UE Refsens - UE Spherical coverage) from TS 38.101-2 [19] clauses 7.3.2 and 7.3.4, selected according to the UE power class and operating band. X is always a negative value.  Note 5: D is the margin due to mis-alignment between fine beam and rough beam. D is the Rough Beam gain reduction in Rx beam peak direction from Table B.2.1.5.3-1, selected according to the UE power class. D is always a positive value.  Note 6: Ginter is the margin due to different antenna gain caused by frequency separation. Ginter is from Table B.2.1.5.2-1, selected according to the UE power class, and is always a positive value. | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### B.2.1.5 Gain to SS-RSRP measurement point for FR2

#### B.2.1.5.1 Gain to SS-RSRP measurement point for Rx Beam Peak angle of arrival

In clause 5.1.1 of TS 38.215 [4] SS-RSRP is defined to be measured based on the combined signal from antenna elements corresponding to a given receiver branch. The reference point for requirement parameters from the UE perspective is the input of the UE antenna array. The gain “G” relates the combined signal from antenna elements corresponding to a given receiver branch to the reference point for requirement parameters.

The gain “G” affects absolute signal level values reported by the UE.

図形, 正方形

自動的に生成された説明

**Figure B.2.1.5.1-1: Gain and Reference point for requirement parameters**

The gain range for each power class is specified in Table B.2.1.5.1-1.

Table B.2.1.5.1-1: UE gain G, Rx beam peak direction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | UE Power class | | | |
|  | 1 | 2 | 3 | 4 |
| Minimum, dBi | FFS | FFS | -10 | FFS |
| Maximum, dBi | FFS | FFS | +20 | FFS |

Gain range in spherical coverage directions may be lower than in Rx beam peak direction, according to the difference between the EIS spherical coverage value specified in TS 38.101-2 [19] clause 7.3.4 and the Reference sensitivity level specified in TS 38.101-2 [19] clause 7.3.2.

#### B.2.1.5.2 Gain to SS-RSRP measurement point for different frequency

In any specific direction, the UE gain G may be different depending on frequencies. The gain “Ginter” affects relative signal level values reported by the UE when measuring between different frequencies and is specified in Table B.2.1.5.2-1 for each power class.

Table B.2.1.5.2-1: UE gain difference between inter-frequencies Ginter

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | UE Power class | | | |
|  | 1 | 2 | 3 | 4 |
| Maximum difference, dB | FFS | FFS | 3 | FFS |

#### B.2.1.5.3 Alignment of Rough beam to Rx beam Peak

The definition of Rx Beam Peak in TS 38.101-2 [19] clause 7.3.2 is based on Throughput at Reference sensitivity power level, and assumes use of Fine beams. In many RRM scenarios the UE can use Rough beams, but the largest Rough beam gain direction may not be aligned to the Fine beam Peak direction.

When the Rx Beam Peak is selected and defined based on Fine Beams, the rough beam gain in that direction may be lower than the largest rough beam gain in another direction within Spherical Coverage. The term “D” is the maximum allowed rough beam gain reduction, and is specified in Table B.2.1.5.3-1 for each power class.

Table B.2.1.5.3-1: Rough Beam gain reduction “D” in Rx Beam Peak direction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | UE Power class | | | |
|  | 1 | 2 | 3 | 4 |
| Maximum gain reduction, dB | FFS | FFS | 5.5 | FFS |

<<End of change>>