**3GPP TSG-RAN4 Meeting #103-e *R4-220xxxx***

**Electronic Meeting, 9th May 2022 - 20th May 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **xxxx** | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  | | | | | | | | |
| *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 TS 38.133 Perf Maintenance Part-1 (Rel-17) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | MCC, Huawei | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Perf | | | | |  | ***Date:*** | | | 2022-5-24 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | **R4-2207648 Draft CR to FR1 DCI-based BWP switch TCs and FR2 CSI-RS based RLM**  1) A.4.5.6.1.1.1/A.6.5.6.1.2.1 Test Purpose and Environment specifies transmission of DCI format 1\_1 only; it seems that only DCI-based DL BWP switching is required.  Based on Table A.4.5.6.1.1.1-3/A.6.5.6.1.2.1-3 Note 4, for TDD, DL BWP is linked with a UL BWP; so DL BWP switching results to UL BWP switching as well. However, that is not the case for FDD; thus, FDD is not expected to perform DCI-based UL BWP switching.  Hence, we propose to remove specified DCI-based active UL BWP for FDD config in Test Parameters Table A.4.5.6.1.1.1-3/A.6.5.6.1.2.1-3.  2) Table structure of the table A.5.5.1.5.1-3 and A.5.5.1.6.1-3 are not aligned with Rel-15/16, and the parameter “EPRE ratio of PDCCH to PDCCH DMRS” is left blank. **R4-2207650 Draft CR to Cell reselection to FR1 intra-frequency NR case**  The test time(T2,T3) defined in the Table A.6.1.1.7.2-2 does not match the value described in the A.6.1.1.7.3 Test Requirements. **R4-2207750 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R17)**  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.  RAN4 agreed to add additional margin Ginter and D for inter-frequency relative accuracy test case. **R4-2207790 CR for Spatial relation info switch testcase maintenance (Rel-17)**  The spatial relation info for PUCCH also includes PL-RS. The current configurations for UL spatial relation info for PUCCH don’t include PL-RS **R4-2207950 draft Cat-A CR (R17) to SCell Activation Test Cases**  According to RAN1 spec, TS38.214, UE is supposed to drop CQI report before receiving at least one CSI-RS transmission occasion for channel measurement during SCell activation which conflicts with test description and criteria on CQI report during SCell activation.  An excerpt from TS38.214:  After the CSI report (re)configuration, serving cell activation, BWP change, or activation of SP-CSI, the UE reports a CSI report only after receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement no later than CSI reference resource and drops the report otherwise. **R4-2207952 draft Cat-A CR (R17) to SCell Activation Test Cases and SRS configuration**  **SCell Activation Test Cases:**  According to RAN1 spec, TS38.214, UE is supposed to drop CQI report before receiving at least one CSI-RS transmission occasion for channel measurement during SCell activation which conflicts with test description and criteria on CQI report during SCell activation.  An excerpt from TS38.214:  After the CSI report (re)configuration, serving cell activation, BWP change, or activation of SP-CSI, the UE reports a CSI report only after receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement no later than CSI reference resource and drops the report otherwise.  **SRS configuration:**  From RAN2 spec 38.331:  *resourceMapping*  *OFDM symbol location of the SRS resource within a slot including nrofSymbols (number of OFDM symbols), startPosition (value 0 refers to the last symbol, value 1 refers to the second last symbol, and so on) and repetitionFactor (see TS 38.214 [19], clause 6.2.1 and TS 38.211 [16], clause 6.4.1.4). The configured SRS resource does not exceed the slot boundary. If resourceMapping-r16 is signalled, UE shall ignore the resourceMapping (without suffix). For CLI SRS-RSRP measurement, the network always configures nrofSymbols and repetitionFactor to 'n1'.*  startPosition counts from the last symbol. In A.3.24, we have number of symbol = 4, but starting position is symbol 13, which is an incorrect configuration. Therefore, we change starting position to symbol 7 (value 5) for configuration tables in A.3.24. **R4-2207954 draft Cat-A CR (R17) to SCell Activation Test Cases NR-U**  According to RAN1 spec, TS38.214, UE is supposed to drop CQI report before receiving at least one CSI-RS transmission occasion for channel measurement during SCell activation which conflicts with test description and criteria on CQI report during SCell activation.  An excerpt from TS38.214:  After the CSI report (re)configuration, serving cell activation, BWP change, or activation of SP-CSI, the UE reports a CSI report only after receiving at least one CSI-RS transmission occasion for channel measurement and CSI-RS and/or CSI-IM occasion for interference measurement no later than CSI reference resource and drops the report otherwise. **R4-2208163 Draft CR on HST FR1 L1-RSRP test cases**  For the test cases (A.4.6.4.5 & A.6.6.4.5) of L1-RSRP measurement in HST FR1 scenario, the test requirements of delay are incorrect when DRX is changed.  In R4-2203574, the DRX is changed from DRX.8 to DRX.3 in test parameters setting, but the test requirements are not changed accordingly.  DRX.8 = 320ms  DRX.3 = 40ms  The cell detection time of DRX.8 is 1600ms. Change to 600 for DRX.3. The TL1-RSRP\_Measurement\_Period\_SSB should also update according to Table 9.5.4.1-1 by DRX.3. **R4-2208165 Draft CR on test case for cell reselection for power saving**  The cell power levels in A.7.1.1.5 and A.7.1.1.6 don’t take 7.5dB margin into account.  Names of thresholds are not same as in RAN2 spec **R4-2208166 Draft CR to add missing SMTC pattern**  In R17 spec, many test cases are configred as SMTC.6 in parameter setting, but the definition of SMTC pattern 6 is missing. **R4-2208169 Draft CR on radio link monitoring test cases in FR1**  For EN-DC FR1 RLM tests based on SSB, SSB configuration is set to SSB.1 FR1 or SSB.2 FR1, there is only one SSB in those configurations. If two SSB#0 and SSB#1 are used, the configuration should be SSB.3 FR1  For SA FR1 RLM tests based on SSB, SSB configuration is set to SSB.1 FR1 or SSB.2 FR1, there is only one SSB in those configurations. If two SSB#0 and SSB#1 are used, the configuration should be SSB.3 FR1 **R4-2208203 Draft CR on R16 NR positioning test cases of general configurations and measurement delay requirements**  The FR2 PRS configuration in A.3.31.2 is not appropriate (the minimum PRS BW for FR2 accuracy requirements is 32 PRBs, but the PRS configuration in the test case is 24 PRBs.)  Table A.6.6.12.1.1-2: the value of expected RSTD uncertainty is not aligned with other test cases.  The reference in table A.7.6.9.2.1-2 is incorrect.  The side condition for PRS-RSRP and UE Rx-Tx has been specified, so the FFS in clause B.2.14 need to be removed. **R4-2208205 Draft CR on R16 NR positioning test case of accuracy requirements**  PRS muting information is missing for accuracy requirements test cases.  For PRS-RSRP accuracy requirements test case, to test the different PRS BWs, the PRS configurations in test 1 and test 2 should be different and the other configuration should be same such as Es/Iot.  The PRS-RSRP relative accuracy requirements apply for the PRS resources within the same PRS resource set. So the PRS configuration in test cases should have two resources in the PRS resource set.  For UE Rx-Tx time difference accuracy requirements test case, to test the different PRS BWs, a sub-test should be added which is aligned with other test cases.  There is no different duration (T1 and T2) for PRS power configuration. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | **R4-2207648 Draft CR to FR1 DCI-based BWP switch TCs and FR2 CSI-RS based RLM**  Update Table A.4.5.6.1.1.1-3/A.6.5.6.1.2.1-3: - Config 1 Active UL BWP-2 Configuration: ULBWP.1.3 🡪 N/A  Conbine the cell of the parameter value for “EPRE ratio of PDCCH to PDCCH DMRS” in Table A.5.5.1.5.1-3 and A.5.5.1.6.1-3 with the parameters below (e.g. EPRE ratio of PBCH DMRS to SSS, etc.)  **R4-2207650 Draft CR to Cell reselection to FR1 intra-frequency NR case**  Change the test time value(T2,T3) to match the value described in the A.6.1.1.7.3 Test Requirements. **R4-2207750 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R17)**  Add Gmin and Gmax as in inter-frequency accuracy test in A.5.7.1.3 and A.7.7.1.3.  Add Ginter and D in inter-frequency relative accuracy test. **R4-2207790 CR for Spatial relation info switch testcase maintenance (Rel-17)**  Added Pathloss reference RS to PUCCH spatial relation **R4-2207950 draft Cat-A CR (R17) to SCell Activation Test Cases**  Added a condition where UE does not have to transmit a CSI report during SCell acivation. **R4-2207952 draft Cat-A CR (R17) to SCell Activation Test Cases and SRS configuration**  **SCell Activation Test Cases:**  Added a condition where UE does not have to transmit a CSI report during SCell acivation.  **SRS configuration:**  Correct startPosition in A.3.24 from 0 to 5 **R4-2207954 draft Cat-A CR (R17) to SCell Activation Test Cases NR-U**  Added a condition where UE does not have to transmit a CSI report during SCell acivation. **R4-2208163 Draft CR on HST FR1 L1-RSRP test cases**  Change the test requirements for delay by using DRX.3 but not DRX.8 configuration. **R4-2208165 Draft CR on test case for cell reselection for power saving**  Change cell power levels in A.7.1.1.5 and A.7.1.1.6, Es/Io and Io also update accordingly.  Change to correct parameter names **R4-2208166 Draft CR to add missing SMTC pattern**  Add SMTC pattern 6 in A.3.11.6 as R15 spec. **R4-2208169 Draft CR on radio link monitoring test cases in FR1**  For EN-DC FR1 RLM tests based on SSB, delete “and SSB#1”  For SA FR1 RLM tests based on SSB, delete “and SSB#1” **R4-2208203 Draft CR on R16 NR positioning test cases of general configurations and measurement delay requirements**  Correct the PRS configuration in A.3.31.2.  Correct the value of expected RSTD uncertainty in table A.6.6.12.1.1-2.  Correct the reference in table A.7.6.9.2.1-2.  Update the side condition for PRS-RSRP and UE Rx-Tx in clause B.2.14. **R4-2208205 Draft CR on R16 NR positioning test case of accuracy requirements**  Add PRS muting information for accuracy requirements test cases  Correct the PRS configurations and the power configurations for PRS-RSRP accuracy requirements test cases.  Add a sub-test for UE Rx-Tx time difference accuracy requirements test cases.  Correct the PRS power configuration for UE Rx-Tx time difference accuracy requirements test cases.  Other corrections. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | **R4-2207648 Draft CR to FR1 DCI-based BWP switch TCs and FR2 CSI-RS based RLM**  Incorrect implementation of conformace test **R4-2207650 Draft CR to Cell reselection to FR1 intra-frequency NR case**  Conflict with the test requirement **R4-2207750 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R17)**  UE would still need to pass A.5.7.1.3 and A.7.7.1.3, which cannot be correctly implemented. Test requirements in A.5.7.1.3 and A.7.7.1.3 would still be incorrect. **R4-2207790 CR for Spatial relation info switch testcase maintenance (Rel-17)**  Spatial relation info configuration for PUCCH will not be complete. **R4-2207950 draft Cat-A CR (R17) to SCell Activation Test Cases**  UE compliant with RAN1 spec could fail test cases. **R4-2207952 draft Cat-A CR (R17) to SCell Activation Test Cases and SRS configuration**  **SCell Activation Test Cases:**  UE compliant with RAN1 spec could fail test cases.  **SRS configuration:**  SRS configuration is incorrect. **R4-2207954 draft Cat-A CR (R17) to SCell Activation Test Cases NR-U**  UE compliant with RAN1 spec could fail test cases. **R4-2208163 Draft CR on HST FR1 L1-RSRP test cases**  The test requirements are inconsistent with core part. **R4-2208165 Draft CR on test case for cell reselection for power saving**  The cell reselection performed incorrectly **R4-2208166 Draft CR to add missing SMTC pattern**  Many test cases are configred as SMTC.6 but without definition of SMTC.6 in A.3.11 **R4-2208169 Draft CR on radio link monitoring test cases in FR1**  It is not aligned with the parameter setting tables. **R4-2208203 Draft CR on R16 NR positioning test cases of general configurations and measurement delay requirements**  The test cases for PRS measurement delay requirements are incomplete. **R4-2208205 Draft CR on R16 NR positioning test case of accuracy requirements**.  The test cases for PRS measurement accuracy requirements are incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | **R4-2207648 Draft CR to FR1 DCI-based BWP switch TCs and FR2 CSI-RS based RLM**  A.4.5.6.1.1, A.5.5.1.5, A.5.5.1.6, A.6.5.6.1.2  **Isolated impact analysis:**  No change to UE requirements, changes test parameters only. **R4-2207650 Draft CR to Cell reselection to FR1 intra-frequency NR case**  A.6.1.1.7  **Isolated impact analysis:**  No change to UE requirements, changes test parameters only. **R4-2207750 draftCR on applicabiltiy for test Cases involving E-UTRA/FR1 and FR2 carriers (R17)**  A.5.7.1.3 and A.7.7.1.3 **R4-2207790 CR for Spatial relation info switch testcase maintenance (Rel-17)**  A.3.23.2 **R4-2207950 draft Cat-A CR (R17) to SCell Activation Test Cases**  A.4.5.3.1.1, A.4.5.3.3, A.6.5.3.1, A.6.5.3.1.2, A.6.5.3.3, A.7.5.3.2.2 **R4-2207952 draft Cat-A CR (R17) to**  **SCell Activation Test Cases and SRS configuration**  A.3.24, A.4.5.3.4, A.7.5.3.3.2 **R4-2207954 draft Cat-A CR (R17) to SCell Activation Test Cases NR-U**  A.10.3.3.1, A.10.3.3.1.2, A.10.3.3.2.2, A.10.3.3.3.2, A.11.4.3.1.1, A.11.4.3.1.2, A.11.4.3.2.2, A.11.4.3.3.2, A.13.2.2.1.1, A.13.2.2.1.2, A.13.2.2.2.2, A.13.2.2.3.2 **R4-2208163 Draft CR on HST FR1 L1-RSRP test cases**  A.4.6.4.5 A.6.6.4.5 **R4-2208165 Draft CR on test case for cell reselection for power saving**  A.7.1.1.5 A.7.1.1.6 **R4-2208166 Draft CR to add missing SMTC pattern**  A.3.11.6 **R4-2208169 Draft CR on radio link monitoring test cases in FR1**  A.4.5.1.1 A.4.5.1.2 A.4.5.1.3 A.4.5.1.4  A.6.5.1.1 A.6.5.1.2 A.6.5.1.3 A.6.5.1.4 **R4-2208203 Draft CR on R16 NR positioning test cases of general configurations and measurement delay requirements**  A.3.31.2, A.6.6.12.1, A.7.6.9.2, B.2.14 **R4-2208205 Draft CR on R16 NR positioning test case of accuracy requirements**  A.6.7.13.2, A.6.7.14, A.6.7.15, A.7.7.10, A.7.7.11, A.7.7.12 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | In Table A.5.5.1.5.1-3 and Table A.5.5.1.6.1-3, the cell with the comments should be merged with the following cell (changes in R4-2207648). | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<<Unchanged sections skipped>>

<<Start of change>>

## A.3.11 SMTC Configurations

### A.3.11.1 SMTC pattern 1: SMTC period = 20 ms with SMTC duration = 1 ms

Table A.3.11.1-1: SMTC.1: SMTC Pattern 1 for SMTC period = 20 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 20 ms |
| SMTC offset | 0 ms |
| SMTC duration | 1 ms |

### A.3.11.2 SMTC pattern 2: SMTC period = 20 ms with SMTC duration = 5 ms

Table A.3.11.2-1: SMTC.2: SMTC Pattern 2 for SMTC period = 20 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 20 ms |
| SMTC offset | 0 ms |
| SMTC duration | 5 ms |

### A.3.11.3 SMTC pattern 3: SMTC period = 160 ms with SMTC duration = 1 ms

Table A.3.11.3-1: SMTC.3: SMTC Pattern 3 for SMTC period = 20 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 160 ms |
| SMTC offset | 0 ms |
| SMTC duration | 1 ms |

### A.3.11.4 SMTC pattern 4: SMTC period = 20 ms with SMTC duration = 1 ms

Table A.3.11.4-1: SMTC.4: SMTC Pattern 4 for SMTC period = 20 ms and duration = 1 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 20 ms |
| SMTC offset | 10 ms |
| SMTC duration | 1 ms |

### A.3.11.5 SMTC pattern 5: SMTC period = 20 ms with SMTC duration = 5 ms

Table A.3.11.5-1: SMTC.5: SMTC Pattern 5 for SMTC period = 20 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 20 ms |
| SMTC offset | 10 ms |
| SMTC duration | 5 ms |

### A.3.11.6 SMTC pattern 6: SMTC period = 20 ms with SMTC duration = 5 ms

Table A.3.11.6-1: SMTC.6: SMTC Pattern 6 for SMTC period = 20 ms and duration = 5 ms

|  |  |
| --- | --- |
| SMTC Parameters | Values |
| SMTC periodicity | 20 ms |
| SMTC offset | 17 ms |
| SMTC duration | 5 ms |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.3.23.2 Spatial Relation

Table A.3.23.2-1: PUCCH Spatial Relation

|  |  |  |
| --- | --- | --- |
| Parameter | PUCCH.SRI.0 | PUCCH.SRI.1 |
| pucch-SpatialRelationInfoId | Id0 | Id1 |
| referenceSignal | SSB0 | SSB1 |
| PUCCH-PathlossReferenceRS | SSB0 | SSB1 |
| Note 1: referenceSignal configurations towards which the spatial relation are configured in a test-specific manner. | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

Table A.3.24-1: Sounding Reference Symbol Configuration for SCS=15kHz

|  |  |  |  |
| --- | --- | --- | --- |
|  | SRS.1 TDD | POS-SRS.1 |  |
| Field | Value |  | Comment |
| c-SRS | 12 | Same as NRB,c in the test case |  |
| b-SRS | 0 | n.a. |  |
| b-hop | 0 | n.a. | Frequency hopping is disabled |
| groupOrSequenceHopping | neither | neither | No group or sequence hopping |
| freqDomainPosition | 0 | 0 | Frequency domain position of SRS |
| freqDomainShift | 0 | 0 |  |
| pathlossReferenceRS  ssb-Index | 0 | 0 | SSB #0 is used for SRS path loss estimation |
| usage | antennaSwitching | n.a. |  |
| startPosition | 5 | 5 | resourceMapping setting |
| nrofSymbols | 4 | 4 | SRS symbols belong to the same SRS resource. |
| repetitionFactor | n1 | n.a. | without repetition. |
| transmissionComb | n2 | n4 |  |
| combOffset | 0 | 0 | transmissionComb setting |
| cyclicShift | 0 | 0 |  |
| nrofSRS-Ports | port1 | port1 | Number of antenna ports used for SRS resource transmission |
| resourceType | Periodic | Periodic |  |
| periodicityAndOffset-p | sl40, 2 | sl160, 20 | SRS transmission periodicity |

Table A.3.24-2: Sounding Reference Symbol Configuration for SCS=30kHz

|  |  |  |  |
| --- | --- | --- | --- |
|  | SRS.2 TDD | POS-SRS.2 |  |
| Field | Value |  | Comment |
| c-SRS | 24 | Same as NRB,c in the test case |  |
| b-SRS | 0 | n.a. |  |
| b-hop | 0 | n.a. | Frequency hopping is disabled |
| groupOrSequenceHopping | neither | neither | No group or sequence hopping |
| freqDomainPosition | 0 | 0 | Frequency domain position of SRS |
| freqDomainShift | 0 | 0 |  |
| pathlossReferenceRS  ssb-Index | 0 | 0 | SSB #0 is used for SRS path loss estimation |
| usage | antennaSwitching | n.a. |  |
| startPosition | 5 | 5 | resourceMapping setting |
| nrofSymbols | 4 | 4 | SRS symbols belong to the same SRS resource. |
| repetitionFactor | n1 | n.a. | without repetition. |
| transmissionComb | n2 | n4 |  |
| combOffset-n2 | 0 | 0 | transmissionComb setting |
| cyclicShift-n2 | 0 | 0 |  |
| nrofSRS-Ports | port1 | port1 | Number of antenna ports used for SRS resource transmission |
| resourceType | Periodic | Periodic |  |
| periodicityAndOffset-p | sl80, 4 | Sl320, 40 | SRS transmission periodicity |

Table A.3.24-3: Sounding Reference Symbol Configuration for SCS=120kHz

|  |  |  |  |
| --- | --- | --- | --- |
|  | SRS.3 TDD | POS-SRS.3 |  |
| Field | Value |  | Comment |
| c-SRS | 17 | Same as NRB,c in the test case |  |
| b-SRS | 0 | n.a. |  |
| b-hop | 0 | n.a. | Frequency hopping is disabled |
| groupOrSequenceHopping | neither | neither | No group or sequence hopping |
| freqDomainPosition | 0 | 0 | Frequency domain position of SRS |
| freqDomainShift | 0 | 0 |  |
| pathlossReferenceRS  ssb-Index | 0 | 0 | SSB #0 is used for SRS path loss estimation |
| usage | antennaSwitching | n.a. |  |
| startPosition | 5 | 5 | resourceMapping setting |
| nrofSymbols | 4 | 4 | SRS symbols belong to the same SRS resource. |
| repetitionFactor | n1 | n.a. | without repetition. |
| transmissionComb | n2 | n4 |  |
| combOffset-n2 | 0 | 0 | transmissionComb setting |
| cyclicShift-n2 | 0 | 0 |  |
| nrofSRS-Ports | port1 | port1 | Number of antenna ports used for SRS resource transmission |
| resourceType | Periodic | Periodic |  |
| periodicityAndOffset-p | sl320, 16 | Sl1280, 160 | SRS transmission periodicity |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.3.31.2. PRS Configurations for FR2

#### A.3.31.2.1. PRS pattern 1 in FR2: SCS=120 KHz

Table A.3.31.2.1-1: PRS.1 FR2: PRS Pattern 1 for SCS=120 KHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PRS Parameters | Values | | | | | |
| Reference channel | PRS.1.1 FR2 | PRS.1.2 FR2 | PRS.1.3 FR2 | | PRS.1.4 FR2 | |
| Resource index in resource set | 0 | 0 | 0 | 1 | 0 | 1 |
| PRS periodicity | 160ms | | | | | |
| PRS Resource set slot offset Note 1 | 10 ms | | | | | |
| PRS Resource slot offset (slot) Note 1 | 0 | 4 | 0 | | 4 | |
| PRS RE offset Note 1 | 0 | | 0 | 1 | 0 | 1 |
| SCS | 120kHz | | | | | |
| PRS comb size | 2 | 4 | 2 | | 4 | |
| Number of PRS symbol | 4 | 4 | 4 | | 4 | |
| Repetion factor | 2 | 1 | 2 | | 1 | |
| PRS resource time gap (slot) | 1 | 1 | 1 | | 1 | |
| RB numbers containing PRS within channel BW | 0-31 | 0-127 | 0-31 | | 0-127 | |
| PRS Start PRB | 0 | | | | | |
| Note 1: Unless otherwise specified in the test case | | | | | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.4.5.1.1 Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with SSB-based RLM RS in non-DRX mode

##### A.4.5.1.1.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.4.5.1.1.1-1. The test parameters are given in Tables A.4.5.1.1.1-2, A.4.5.1.1.1-3, and A.4.5.1.1.1-4 below. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.4.5.1.1.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.4.5.1.1.1-1: Supported test configurations for FR1 PSCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.4.5.1.1.1-2: General test parameters for FR1 out-of-sync testing in non-DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active E-UTRA PCell | | |  | Cell 1 |
| E-UTRA RF Channel Number | | |  | 1 |
| Active PSCell | | |  | Cell 2 |
| RF Channel Number | | |  | 2 |
| Duplex mode | | Config 1, 4 |  | FDD |
|  | | Config 2, 3, 5, 6 |  | TDD |
| BWchannel | | Config 1, 4 | MHz | 10: NRB,c = 52 |
|  | | Config 2, 5 |  | 10: NRB,c = 52 |
|  | | Config 3, 6 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.1.1 |
| TDD Configuration | | Config 1, 4 |  | Not Applicable |
|  | | Config 2, 5 |  | TDDConf.1.1 |
|  | | Config 3, 6 |  | TDDConf.2.1 |
| CORESET | | Config 1, 4 |  | CR.1.1 FDD |
| Reference Channel | | Config 2, 5 |  | CR.1.1 TDD |
|  | | Config 3, 6 |  | CR.2.1 TDD |
| SSB Configuration | | Config 1, 4 |  | SSB.1 FR1 |
|  | | Config 2, 5 |  | SSB.1 FR1 |
|  | | Config 3, 6 |  | SSB.2 FR1 |
| SMTC | | Config 1, 2, 4, 5 |  | SMTC.1 |
| Configuration | | Config 3, 6 |  | SMTC.1 |
| PDSCH/PDCCH | | Config 1, 2, 4, 5 |  | 15 kHz |
| subcarrier spacing | | Config 3, 6 |  | 30 kHz |
| PRACH Configuration | | Config 1, 2, 4, 5 |  | Table A.3.8.2.1-1 |
|  | | Config 3, 6 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync | DCI format | |  | 1-0 |
| transmission parameters | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS for CSI | | Config 1, 4 |  | CSI-RS.1.1 FDD |
| reporting | | Config 2, 5 |  | CSI-RS.1.1 TDD |
|  | | Config 3, 6 |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1, 4 |  | TRS.1.1 FDD |
|  | | Config 2, 5 |  | TRS.1.1 TDD |
|  | | Config 3, 6 |  | TRS.1.2 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.48 |
| T3 | | | s | 0.48 |
| D1 | | | s | 0.44 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | |

Table A.4.5.1.1.1-3: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in non-DRX mode

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

Table A.4.5.1.1.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

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

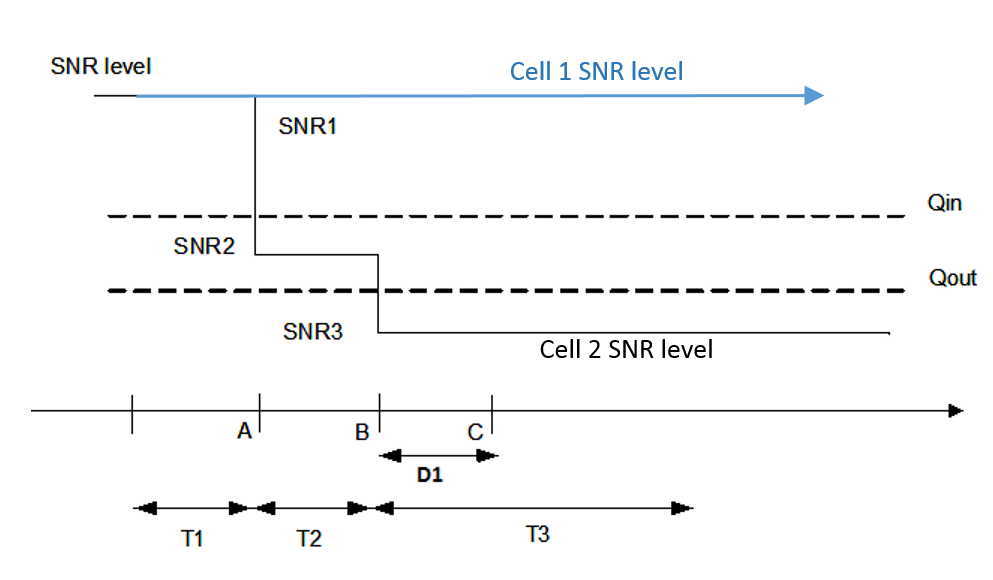
****

Figure A.4.5.1.1.1-1: SNR variation for out-of-sync testing

##### A.4.5.1.1.2 Test Requirements

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

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

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

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

#### A.4.5.1.2 Radio Link Monitoring In-sync Test for FR1 PSCell configured with SSB-based RLM RS in non-DRX mode

##### A.4.5.1.2.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.4.5.1.2.1-1. The test parameters are given in Tables A.4.5.1.2.1-2, and A.4.5.1.2.1-3 below. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.1.2.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms.

Table A.4.5.1.2.1-1: Supported test configurations for FR1 PSCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.4.5.1.2.1-2: General test parameters for FR1 in-sync testing in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active E-UTRA PCell | | | |  | Cell 1 |
| E-UTRA RF Channel Number | | | |  | 1 |
| Active PSCell | | | |  | Cell 2 |
| RF Channel Number | | | |  | 2 |
| Duplex mode | | | Config 1, 4 |  | FDD |
|  | | | Config 2, 3, 5, 6 |  | TDD |
| BWchannel | | | Config 1, 4 | MHz | 10: NRB,c = 52 |
|  | | | Config 2, 5 |  | 10: NRB,c = 52 |
|  | | | Config 3, 6 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.1.1 |
| TDD | | | Config 1, 4 |  | Not Applicable |
| Configuration | | | Config 2, 5 |  | TDDConf.1.1 |
|  | | | Config 3, 6 |  | TDDConf.2.1 |
| CORESET | | | Config 1, 4 |  | CR.1.1 FDD |
| Reference | | | Config 2, 5 |  | CR.1.1 TDD |
| Channel | | | Config 3, 6 |  | CR.2.1 TDD |
| SSB | | | Config 1, 4 |  | SSB.1 FR1 |
| Configuration | | | Config 2, 5 |  | SSB.1 FR1 |
|  | | | Config 3, 6 |  | SSB.2 FR1 |
| SMTC Configuration | | | Config 1, 2, 4, 5 |  | SMTC.1 |
|  | | | Config 3, 6 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier | | | Config 1, 2, 4, 5 |  | 15 kHz |
| spacing | | | Config 3, 6 |  | 30 kHz |
| PRACH Configuration | | | Config 1, 2, 4, 5 |  | Table  A.3.8.2.1-1 |
|  | | | Config 3, 6 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX | | | |  | *OFF* |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 1000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS for | | Config 1, 4 | |  | CSI-RS.1.1 FDD |
| CSI reporting | | Config 2, 5 | |  | CSI-RS.1.1 TDD |
|  | | Config 3, 6 | |  | CSI-RS.2.1 TDD |
| CSI-RS for | | Config 1, 4 | |  | TRS.1.1 FDD |
| tracking | | Config 2, 5 | |  | TRS.1.1 TDD |
|  | | Config 3, 6 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.24 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | | |

Table A.4.5.1.2.1-3: Cell specific test parameters for FR1 (Cell 2) for in-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on | Config 1, 4 | dB | 1 | -7 | -15 | -4.5 | 1 |
| RLM-RS | Config 2, 5 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 3, 6 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1, 4 | dBm/15 kHz | -98 | | | | |
|  | Config 2, 5 |  | -98 | | | | |
|  | Config 3, 6 |  | -98 | | | | |
|  | Config 1, 4 | dBm/SCS | -98 | | | | |
|  | Config 2, 5 |  | -98 | | | | |
|  | Config 3, 6 |  | -95 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.4.5.1.2.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

Table A.4.5.1.2.1-4: Void

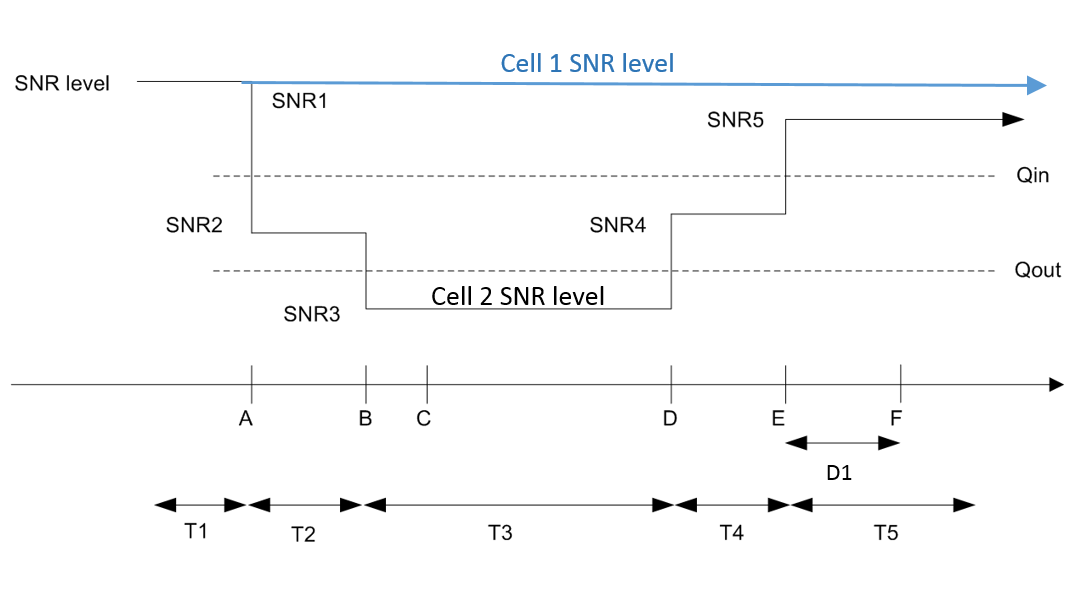
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Figure A.4.5.1.2.1-1: SNR variation for in-sync testing

##### A.4.5.1.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

#### A.4.5.1.3 Radio Link Monitoring Out-of-sync Test for FR1 PSCell configured with SSB-based RLM RS in DRX mode

##### A.4.5.1.3.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.4.5.1.3.1-1. The test parameters are given in Tables A.4.5.1.3.1-2 and A.4.5.1.3.1-3. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.4.5.1.3.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.4.5.1.3.1-1: Supported test configurations for FR1 PSCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.4.5.1.3.1-2: General test parameters for FR1 out-of-sync testing in DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active E-UTRA PCell | | |  | Cell 1 |
| E-UTRA RF Channel Number | | |  | 1 |
| Active PSCell | | |  | Cell 2 |
| RF Channel Number | | |  | 2 |
| Duplex mode | | Config 1, 4 |  | FDD |
|  | | Config 2, 3, 5, 6 |  | TDD |
| BWchannel | | Config 1, 4 | MHz | 10: NRB,c = 52 |
|  | | Config 2, 5 |  | 10: NRB,c = 52 |
|  | | Config 3, 6 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.1.1 |
| TDD | | Config 1, 4 |  | Not Applicable |
| Configuration | | Config 2, 5 |  | TDDConf.1.1 |
|  | | Config 3, 6 |  | TDDConf.2.1 |
| CORESET | | Config 1, 4 |  | CR.1.1 FDD |
| Reference | | Config 2, 5 |  | CR.1.1 TDD |
| Channel | | Config 3, 6 |  | CR.2.1 TDD |
| SSB | | Config 1, 4 |  | SSB.1 FR1 |
| Configuration | | Config 2, 5 |  | SSB.1 FR1 |
|  | | Config 3, 6 |  | SSB.2 FR1 |
| SMTC | | Config 1, 2, 4, 5 |  | SMTC.1 |
| Configuration | | Config 3, 6 |  | SMTC.1 |
| PDSCH/PDCCH | | Config 1, 2, 4, 5 |  | 15 kHz |
| subcarrier spacing | | Config 3, 6 |  | 30 kHz |
| PRACH | | Config 1, 2, 4, 5 |  | Table A.3.8.2.1-1 |
| Configuration | | Config 3, 6 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync | DCI format | |  | 1-0 |
| transmission parameters | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX Configuration | | |  | DRX.3 |
| Gap pattern ID | | |  | N.A. |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS for CSI | | Config 1, 4 |  | CSI-RS.1.1 FDD |
| reporting | | Config 2, 5 |  | CSI-RS.1.1 TDD |
|  | | Config 3, 6 |  | CSI-RS.2.1 TDD |
| CSI-RS for | | Config 1, 4 |  | TRS.1.1 FDD |
| tracking | | Config 2, 5 |  | TRS.1.1 TDD |
|  | | Config 3, 6 |  | TRS.1.2 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.68 |
| T3 | | | s | 0.68 |
| D1 | | | s | 0.64 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | |

Table A.4.5.1.3.1-3: Cell specific test parameters for FR1 (Cell 2) for out-of-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on | Config 1, 4 | dB | 1 | -7 | -15 |
| RLM-RS | Config 2, 5 |  | 1 | -7 | -15 |
|  | Config 3, 6 |  | 1 | -7 | -15 |
|  | Config 1, 4 | dBm/15kHz | -98 | | |
|  | Config 2, 5 |  | -98 | | |
|  | Config 3, 6 |  | -98 | | |
|  | Config 1, 4 | dBm/SCS | -98 | | |
|  | Config 2, 5 |  | -98 | | |
|  | Config 3, 6 |  | -95 | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.4.5.1.3.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6. | | | | | |

Table A.4.5.1.3.1-4: Void

Table A.4.5.1.3.1-5: Void

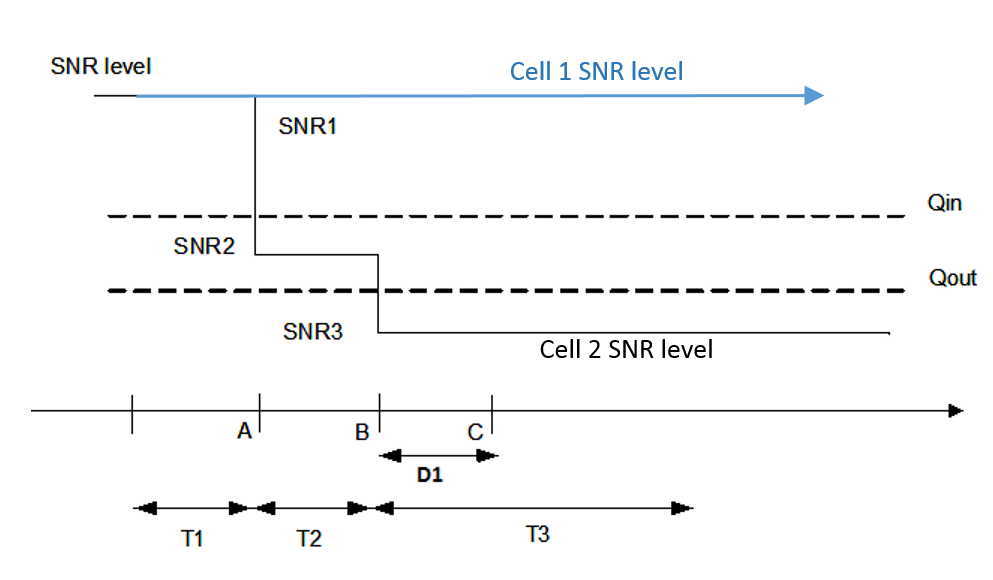
****

Figure A.4.5.1.3.1-1: SNR variation for out-of-sync testing

##### A.4.5.1.3.2 Test Requirements

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

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

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

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

#### A.4.5.1.4 Radio Link Monitoring In-sync Test for FR1 PSCell configured with SSB-based RLM RS in DRX mode

##### A.4.5.1.4.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.4.5.1.4.1-1. The test parameters are given in Tables A.4.5.1.4.1-2, and A.4.5.1.4.1-3. There are two cells, Cell 1 is the E-UTRAN PCell, and Cell 2 is the PSCell, in the test. The E-UTRAN PCell setting refers to Table A.3.7.2.1-1. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.1.4.1-1 shows the variation of the downlink SNR in the active Cell 2 to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1 and Cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.4.5.1.4.1-1: Supported test configurations for FR1 PSCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.4.5.1.4.1-2: General test parameters for FR1 in-sync testing in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active E-UTRA PCell | | | |  | Cell 1 |
| E-UTRA RF Channel Number | | | |  | 1 |
| Active PSCell | | | |  | Cell 2 |
| RF Channel Number | | | |  | 2 |
| Duplex mode | | | Config 1, 4 |  | FDD |
|  | | | Config 2, 3, 5, 6 |  | TDD |
| BWchannel | | | Config 1, 4 | MHz | 10: NRB,c = 52 |
|  | | | Config 2, 5 |  | 10: NRB,c = 52 |
|  | | | Config 3, 6 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2, 3, 4, 5, 6 |  | ULBWP.1.1 |
| TDD Configuration | | | Config 1, 4 |  | Not Applicable |
|  | | | Config 2, 5 |  | TDDConf.1.1 |
|  | | | Config 3, 6 |  | TDDConf.2.1 |
| CORESET Reference | | | Config 1, 4 |  | CR.1.1 FDD |
| Channel | | | Config 2, 5 |  | CR.1.1 TDD |
|  | | | Config 3, 6 |  | CR.2.1 TDD |
| SSB Configuration | | | Config 1, 4 |  | SSB.1 FR1 |
|  | | | Config 2, 5 |  | SSB.1 FR1 |
|  | | | Config 3, 6 |  | SSB.2 FR1 |
| SMTC Configuration | | | Config 1, 2, 4, 5 |  | SMTC.1 |
|  | | | Config 3, 6 |  | SMTC.1 |
| PDSCH/PDCCH | | | Config 1, 2, 4, 5 |  | 15 kHz |
| subcarrier spacing | | | Config 3, 6 |  | 30 kHz |
| PRACH Configuration | | | Config 1, 2, 4, 5 |  | Table A A.3.8.2.1-1 |
|  | | | Config 3, 6 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync | DCI format | | |  | 1-0 |
| transmission parameters | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync | DCI format | | |  | 1-0 |
| transmission parameters | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX Configuration | | | |  | DRX.3 |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 1000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS for CSI | | Config 1, 4 | |  | CSI-RS.1.1 FDD |
| reporting | | Config 2, 5 | |  | CSI-RS.1.1 TDD |
|  | | Config 3, 6 | |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1, 4 | |  | TRS.1.1 FDD |
|  | | Config 2, 5 | |  | TRS.1.1 TDD |
|  | | Config 3, 6 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.64 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts.  Note 3: E-UTRAN is in non-DRX mode under test. | | | | | |

Table A.4.5.1.4.1-3: Cell specific test parameters for FR1 (Cell 2) for in-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on | Config 1, 4 | dB | 1 | -7 | -15 | -4.5 | 1 |
| RLM-RS | Config 2, 5 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 3, 6 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1, 4 | dBm/15 kHz | -98 | | | | |
|  | Config 2, 5 |  | -98 | | | | |
|  | Config 3, 6 |  | -98 | | | | |
|  | Config 1, 4 | dBm/SCS | -98 | | | | |
|  | Config 2, 5 |  | -98 | | | | |
|  | Config 3, 6 |  | -95 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.4.5.1.4.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

**Table A.4.5.1.4.1-4: Void**

**Table A.4.5.1.4.1-5: Void**

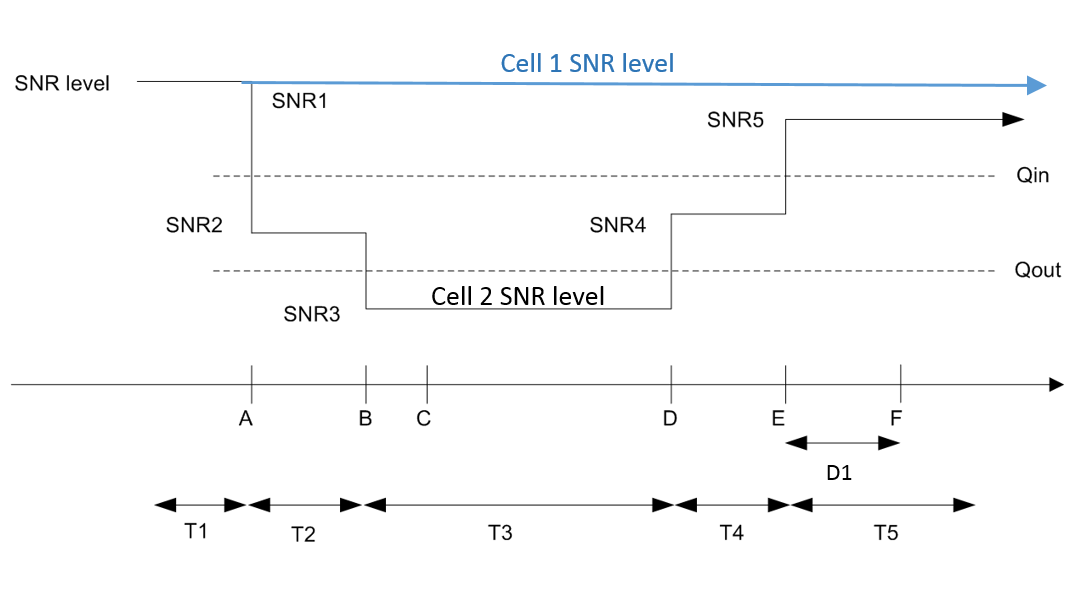
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Figure A.4.5.1.4.1-1: SNR variation for in-sync testing

##### A.4.5.1.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### 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 are shown in table A.4.5.3.1.1-1 below. 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 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.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.4.5.3.3 SCell Activation and deactivation of unknown SCell in FR1

A.4.5.3.3.1 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 unknown by the UE at the time of activation.

The supported test configurations are 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.4.5.3.3.1-1 will replace the values of corresponding parameters in Tables A.4.5.3.1.1-2. 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. Cell 1 and Cell 2 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRAN 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. During T1 the SCell is powered off and UE is not aware of SCell.

A MAC message for activation of SCell is sent by the test equipment 100ms after the RRC message, in a slot # denoted m. The point in time at which the MAC message for activation of SCell is received at the UE antenna connector defines the start of time period T2. The UE shall be able to report valid CSI for the activated SCell at latest in slot as defined in clause 8.3 provided the SCell can be successfully detected on the first attempt. The UE shall start reporting CSI 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 the 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 at latest in 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 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 SCell1 deactivation command is sent until CSI reporting for SCell1 is discontinued.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.4.5.3.4 SCell Activation and deactivation of multiple unknown SCells in FR1 with single activation/deactivation command

A.4.5.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the multiple SCell activation and deactivation times are within the requirements stated in clause 8.3.7 and 8.3.8, when the two configured deactivated SCells in FR1 are unknown by the UE at the time of activation.

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 Table A.4.5.3.4.1-1 will replace the values of corresponding parameters in Table A.4.5.3.1.1-2. The cell specific test parameter values in Table A.4.5.3.4.1-2 will replace the values of corresponding parameters in Table A.4.5.3.1.1-3.

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are four carriers, E-UTRA has one cell, NR has three cells. Cell 1 and Cell 2 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRAN and Cell 2 (PSCell) on NR, but is not aware of Cell 3 (SCell) and Cell 4(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 SCells (Cell 3 and Cell 4) become configured on NR. During T1 the SCells (Cell 3 and Cell 4) are powered off and UE is not aware of SCells.

A MAC message for activation of SCells(Cell 3 and Cell 4) is sent by the test equipment 100ms after the RRC message, in a slot # denoted m. The point in time at which the MAC message for activation of SCells is received at the UE antenna connector defines the start of time period T2. Immediately at beginning of T2 the transmission power of cell 3 and cell 4 are increased to same level as for cell 2. The UE shall be able to report valid CSI for the activated SCells (Cell3 and Cell 4) at latest in slot respectively as defined in clause 8.3.7 provided the SCells can be successfully detected on the first attempt. The UE shall start reporting CSI for cell 3 and cell 4 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 for cell 3 and cell 4 has been completed, respectively. Any PSCell interruption due to activation of SCells 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 SCells shall occur in the subframe to subframe, where and are the index of the first and last subframe of E-UTRA PCell which overlaps with slot m, and is the interruption length given in TS 36.133 [14] clause 7.32.

Time period T3 starts when a MAC message for deactivation of the SCells (Cell 3 and Cell 4), 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 SCells at latest in 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 the activation time for Cell 3 by counting the slots from the time when the SCell activation command is sent until CSI report of acticated Cell 3 with other than CQI index 0 is received.

The test equipment verifies the activation time for Cell 4 by counting the slots from the time when the SCell activation command is sent until CSI report of acticated Cell 4 with other than CQI index 0 is received.

The test equipment verifies the deactivation time for Cell 3 by counting the slots from the time when the SCell deactivation command is sent until CSI reporting for Cell 3 is discontinued.

The test equipment verifies the deactivation time for Cell 4by counting the slots from the time when the SCell deactivation command is sent until CSI reporting for Cell 4 is discontinued.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.4.5.6.1.1 E-UTRAN – NR PSCell FR1 DL active BWP switch in non-DRX in synchronous EN-DC

A.4.5.6.1.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement defined in TS38.133 clause 8.6, and interruption requirement for E-UTRA victim cell defined in TS36.133 clause 7.32.2.7. Supported test configurations are shown in Table A.4.5.6.1.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), and one NR PSCell (Cell 2) as given in Table A.4.5.6.1.1.1-2. 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.4.5.6.1.1.1-3 below.

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

PDCCHs indicating new transmissions shall be sent continuously on PSCell (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.

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

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

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

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

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

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

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

During T3,

The time period T3 starts from the slot #*j*, where j is the beginning slot of the DL subframe immediately after the *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 at the beginning of the DL slot right after PSCell’s DL slot (*j+TBWPswitchDelay*) as defined in clause 8.6 and starts to report valid ACK/NACK for the PSCell at latest at the beginning of the DL slot right after DL slot (*j+TBWPswitchDelay+k1*). The UE shall be continuously scheduled on PSCell’s BWP-1 starting from the beginning of the DL slot right after DL slot (*j+TBWPswitchDelay*).

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

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

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

Table A.4.5.6.1.1.1-1: DL BWP switch supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations.  Note 2: A UE which fulfils the requirements in test case A.4.5.6.1.2 can skip the test cases in A.4.5.6.1.1. | |

Table A.4.5.6.1.1.1-2: 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 | 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 |
| *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. |
| Cell2 timing offset to cell1 | μs | 3 | Synchronous EN-DC |
| T1 | s | [0.2] |  |
| T2 | s | [0.2] |  |
| T3 | s | [0.2] |  |

**Table A.4.5.6.1.1.1-3.: NR Cell specific test parameters 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 1,4 |  | 10 MHz: NRB,c = 52 |
|  | Config 2,5 |  | 10 MHz: NRB,c = 52 |
|  | Config 3,6 |  | 40 MHz: NRB,c = 106 |
| Active BWP ID | |  | 1, 2 |
| Initial DL BWP | Config 1,4 |  | DLBWP.0.2 Note 4 |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active DL BWP-1 | Config 1,4 |  | DLBWP.1.1 Note 4 |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active DL BWP-2 | Config 1,4 |  | DLBWP.1.3 Note 4 |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Initial UL BWP | Config 1,4 |  | ULBWP.0.2 Note 4 |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active UL BWP-1 | Config 1,4 |  | ULBWP.1.1 Note 4 |
| Configuration | Config 2,5 |  |  |
|  | Config 3,6 |  |  |
| Active UL BWP-2 | Config 1,4 |  | N/A |
| Configuration | Config 2,5 |  | ULBWP.1.3 Note 4 |
|  | Config 3,6 |  | ULBWP.1.3 Note 4 |
| PDSCH Reference | Config 1,4 |  | SR.1.1 FDD |
| measurement channel | Config 2,5 |  | SR.1.1 TDD |
|  | Config 3,6 |  | SR.2.1 TDD |
| RMSI CORESET | Config 1,4 |  | CR.1.1 FDD |
| parameters | Config 2,5 |  | CR.1.1 TDD |
|  | Config 3,6 |  | CR.2.1 TDD |
| Dedicated CORESET | Config 1,4 |  | CCR.1.2 FDD |
| parameters | Config 2,5 |  | CCR.1.2 TDD |
|  | Config 3,6 |  | CCR.2.4 TDD |
| OCNG Patterns | |  | OP.1 |
| SSB Configuration | Config 1,2,4,5 |  | SSB.1 FR1 |
|  | Config 3,6 |  | SSB.2 FR1 |
| SMTC Configuration |  |  | SMTC.1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |
| TRS Configuration | Config 1,4 |  | TRS.1.1 FDD |
|  | Config 2,5 |  | TRS.1.1 TDD |
|  | Config 3,6 |  | TRS.1.2 TDD |
| EPRE ratio of PSS to SSS | |  |  |
| EPRE ratio of PBCH DMRS to SSS | |  |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |
| EPRE ratio of PDSCH to PDSCH | |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |
| NocNote 2 | Config 1,2,4,5 | dBm/SCS | [-104] |
|  | Config 3,6 |  | [-101] |
| NocNote 2 | | dBm/15kHz | -104 |
| SS-RSRP Note 3 | Config 1,2,4,5 | dBm/SCS | [-87] |
|  | Config 3,6 |  | [-90] |
| Ês/Iot | | dB | 17 |
| Ês/Noc | | dB | 17 |
| IoNote3 | Config 1,2,4,5 | dBm/9.36MHz | [-59] |
|  | Config 3,6 | dBm/38.16MHz | [-61.9] |
| 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.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | |

A.4.5.6.1.1.2 Test Requirements

During T1, the UE shall start to send the ACK for 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 for 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 PSCell 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 time of PCell interruption during PSCell active BWP switch shall not happen outside the BWP switch delay.

During T3, the start time of PCell interruption of during PSCell 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 TS36.133 Clause 7.32.2.7.

All of the above test requirements shall be fulfilled in order for the observed PCell 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 in the DL slot right after DL slot (*i+TBWPswitchDelay*+*k1*), (*j+TBWPswitchDelay*+*k1*), then the UE shall use the next available uplink resource for reporting the corresponding ACK.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.4.6.4.5 SSB based L1-RSRP measurement when DRX is used for UE configured with *highSpeedMeasFlag-r16*

##### A.4.6.4.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when UE is configured with *highSpeedMeasFlag-r16*. This test will partly verify the L1-RSRP measurement requirements for UE configured with *highSpeedMeasFlag-r16* in clause 9.5.4.1, with the testing configurations for NR cells in Table A.4.6.4.5.1-1.

Table A.4.6.4.5.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

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

##### A.4.6.4.5.2 Test parameters

There are two cells in the test, E-UTRAN PCell (Cell 1) and FR1 PSCell (Cell 2). The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 2 are given in Table A.4.6.4.5.2-1 and Table A.4.6.4.5.2-2 below.

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

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

Table A.4.6.4.5.2-1: General test parameters for UE configured with *highSpeedMeasFlag-r16*

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~6 |  | freq1 |
| Duplex mode | 1,4 |  | FDD |
|  | 2,5 |  | TDD |
|  | 3,6 |  | TDD |
| TDD Configuration | 1,4 |  | N/A |
|  | 2,5 |  | TDDConf.1.1 |
|  | 3,6 |  | TDDConf.2.1 |
| BWchannel | 1,4 | MHz | 10: NRB,c = 52 |
|  | 2,5 |  | 10: NRB,c = 52 |
|  | 3,6 |  | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1,4 |  | SR.1.1 FDD |
|  | 2,5 |  | SR.1.1 TDD |
|  | 3,6 |  | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1,4 |  | CR.1.1 FDD |
|  | 2,5 |  | CR.1.1 TDD |
|  | 3,6 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1,4 |  | CCR.1.1 FDD |
|  | 2,5 |  | CCR.1.1 TDD |
|  | 3,6 |  | CCR.2.1 TDD |
| SSB configuration | 1,4 |  | SSB.3 FR1 |
|  | 2,5 |  | SSB.3 FR1 |
|  | 3,6 |  | SSB.4 FR1 |
| OCNG Patterns | 1~6 |  | OP.1 |
| Initial BWP Configuration | 1~6 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~6 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~6 |  | SMTC.1 |
| TRS Configuration | 1,4 |  | TRS.1.1 FDD |
| 2,5 |  | TRS.1.1 TDD |
| 3,6 |  | TRS.1.2 TDD |
| DRX configuration | 1~6 |  | DRX.3 |
| reportConfigType | 1~6 |  | periodic |
| reportQuantity | 1~6 |  | ssb-Index-RSRP |
| Number of reported RS | 1~6 |  | 2 |
| L1-RSRP reporting period | 1~6 | slot | 80 |
| T1 | 1~6 | s | 5 |
| T2 | 1~6 | s | 2 |
| EPRE ratio of PSS to SSS | 1~6 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |
| Propagation condition | 1,2,4,5 |  | AWGN 1944 Hz |
|  | 3,6 |  | AWGN 3334 Hz |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | |

Table A.4.6.4.5.2-2: SSB specific test parameters for UE configured with *highSpeedMeasFlag-r16*

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

##### A.4.6.4.5.3 Test Requirements

The UE shall send L1-RSRP report every 80 slots. No later than 620ms plus 80 slots from the beginning of time period T2, UE shall send L1-RSRP report including results of both SSB0 and SSB1 while meeting absolute accuracy requirement in clause 10.1.19.1.1 and relative accuracy requirement in clause 10.1.19.1.2. The rate of correct events observed during repeated tests shall be at least 90%.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.5.5.1.5 EN-DC Radio Link Monitoring Out-of-sync Test for FR2 PSCell configured with CSI-RS-based RLM in non-DRX mode

A.5.5.1.5.1 Test Purpose and Environment

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

The test parameters are given in Tables A.5.5.1.5.1-1, A.5.5.1.5.1-2, A.5.5.1.5.1-3 and A.5.5.1.5.1-3A below. There are two cells, cell 1 is the E-UTRAN PCell, and cell 2 is the PSCell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.5.5.1.5.1-1 shows the variation of the downlink SNR in the E-UTRAN PCell and the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40ms). In the test, SSB0 and SSB1 are configured as BFD-RS.

Table A.5.5.1.5.1-1: Supported test configurations for FR2 PSCell

|  |  |
| --- | --- |
| Configuration | 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 pass in one of the supported test configurations in FR2 | |

Table A.5.5.1.5.1-2: General test parameters for FR2 PSCell for CSI-RS out-of-sync testing in non-DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** |
| **Test 1** |
| Active E-UTRA PCell | |  | Cell 1 |
| E-UTRA RF Channel Number | |  | 1 |
| Active PSCell | |  | Cell 2 |
| RF Channel Number | |  | 2 |
| Duplex Mode | |  | TDD |
| BWchannel | Config 1, 2 |  | 100: NRB,c = 66 |
| Data RBs allocated | Config 1, 2 |  | 24 |
| BWoccupied | Config 1, 2 |  | 24 |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |
| Config 2 | TDDConf.3.1 |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.4 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.4 |
| RMSI CORESET Reference Channel | Config 1 |  | CR.3.1 TDD |
|  | Config 2 |  | CR.3.1 TDD |
| Dedicated CORESET Reference Channel | Config 1 |  | CCR.3.4 TDD  CCR.3.6 TDD |
| Config 2 | CCR.3.4 TDD  CCR.3.6 TDD |
| SSB Configuration | Config 1 |  | SSB.1 FR2 |
| Config 2 | SSB.1 FR2 |
| SMTC Configuration | Config 1 |  | SMTC.1 |
| Config 2 | SMTC.1 |
| PDSCH/PDCCH  subcarrier spacing | Config 1 |  | 120 KHz |
| Config 2 | 120 KHz |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.2.1 TDD  Resource #4 in TRS.2.2 TDD |
| TRS configuration | |  | TRS.2.1 TDD  TRS.2.2 TDD |
| TCI configuration for PDCCH#1/PDSCH | |  | TCI.State.2 |
| TCI configuration for PDCCH#2 | |  | TCI.State.3 |
| OCNG parameters | |  | OP.5 |
| CP length | |  | Normal |
| Out of sync transmission parameters | DCI format |  | 1-0 |
| Number of Control OFDM symbols |  | 2 |
| Aggregation level | CCE | 8 |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
| DMRS precoder granularity |  | REG bundle size |
| REG bundle size |  | 6 |
| DRX | |  | *OFF* |
| Gap pattern ID | |  | *gp0* |
| Layer 3 filtering | |  | *Enabled* |
| T310 timer | | ms | *0* |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD |
| Config 2 | CSI-RS.3.1 TDD |
| reportConfigType | |  | periodic |
| reportQuantity | |  | cri-RI-PMI-CQI |
| CSI reporting periodicity | | slot | 40 |
| CSI reporting offset | | slot | 4 |
| T1 | | s | 0.2 |
| T2 | | s | 0.35 |
| T3 | | s | 0.35 |
| D1 | | s | 0.31 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts.  Note 2: E-UTRAN is in non-DRX mode under test. | | | |

Table A.5.5.1.5.1-3: Cell specific test parameters for FR2 for CSI-RS out-of-sync radio link monitoring in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test 1** | | | | | |
|  | |  | **T1** | **T2** | **T3** | **T1** | **T2** | **T3** |
| AoA setup | |  | Setup 3 defined in A.3.15 | | | | | |
|  | |  | AoA1 | | | AoA2 | | |
| Assumption for UE beamsNote 10 | |  | Rough | | | Rough | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |  | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | |  | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |  | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | Not sent | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |  | | |
| SNR on RLM-RS1 | Config 1, 2 | dB | 2Note 11 | -6Note 11 | -15 |  | | |
| SNR on RLM-RS2 | Config 1, 2 |  | Not sent | | | 2Note 11 | -14 | -15 |
|  | Config 1, 2 | dBm/ 15kHz | -92.1 | | | -92.1 | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | | | TDL-A 30ns 75Hz | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.5.5.1.5.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6.  Note 10: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 11: This value allows up to 1dB degradation from applied SNR to UE baseband | | | | | | | | |

Table A.5.5.1.5.1-3A: Measurement gap configuration for FR2 CSI-RS out-of-sync radio link monitoring in non-DRX mode

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

Table A.5.5.1.5.1-4: Void

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自動的に生成された説明**

Figure A.5.5.1.5.1-1: SNR variation for CSI-RS out-of-sync testing

A.5.5.1.5.2 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 2 (PSCell) at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 2.

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

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

#### A.5.5.1.6 EN-DC Radio Link Monitoring In-sync Test for FR2 PSCell configured with CSI-RS-based RLM in non-DRX mode

A.5.5.1.6.1 Test Purpose and Environment

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

The test parameters are given in Tables A.5.5.1.6.1-1, A.5.5.1.6.1-2, and A.5.5.1.6.1-3 below. There are two cells, cell 1which is the E-UTRAN PCell, and cell 2 is the PSCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.5.5.1.6.1-1 shows the variation of the downlink SNR in the PSCell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1 and cell 2. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5ms. In the test, DRX configuration is not enabled. In the test, SSB0 and SSB1 are configured as BFD-RS.

Table A.5.5.1.6.1-1: Supported test configurations for FR2 PSCell

|  |  |
| --- | --- |
| Configuration | 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 pass in one of the supported test configurations in FR2 | |

Table A.5.5.1.6.1-2: General test parameters for FR2 PSCell for CSI-RS in-sync testing in non-DRX mode

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** |
| **Test 1** |
| Active E-UTRA PCell | |  | Cell 1 |
| E-UTRA RF Channel Number | |  | 1 |
| Active PSCell | |  | Cell 2 |
| RF Channel Number | |  | 2 |
| Duplex Mode | |  | TDD |
| BWchannel | Config 1, 2 |  | 100: NRB,c = 66 |
| Data RBs allocated | Config 1, 2 |  | 24 |
| BWoccupied | Config 1, 2 |  | 24 |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |
| Config 2 | TDDConf.3.1 |
| DL initial BWP configuration | Config 1, 2 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | Config 1, 2 |  | DLBWP.1.4 |
| UL initial BWP configuration | Config 1, 2 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | Config 1, 2 |  | ULBWP.1.4 |
| RMSI CORESET Reference  Channel | Config 1 |  | CR.3.1 TDD |
|  | Config 2 |  | CR.3.1 TDD |
| Dedicated CORESET Reference Channel | Config 1 |  | CCR.3.1 TDD  CCR.3.3 TDD |
| Config 2 | CCR.3.1 TDD  CCR.3.3 TDD |
| SSB  Configuration | Config 1 |  | SSB.1 FR2 |
| Config 2 | SSB.1 FR2 |
| SMTC  Configuration | Config 1 |  | SMTC.1 |
| Config 2 | SMTC.1 |
| PDSCH/PDCCH  subcarrier spacing | Config 1 |  | 120 KHz |
| Config 2 | 120 KHz |
| CSI-RS for RLM | Config 1, 2 |  | Resource #4 in TRS.2.1 TDD  Resource #4 in TRS.2.2 TDD |
| OCNG parameters | |  | OP.5 |
| TRS configuration | |  | TRS.2.1 TDD  TRS.2.2 TDD |
| TCI configuration for PDCCH#1/PDSCH | |  | TCI.State.2 |
| TCI configuration for PDCCH#2 | |  | TCI.State.3 |
| CP length | |  | Normal |
| Out of sync transmission parameters | DCI format |  | 1-0 |
| Number of Control OFDM symbols |  | 2 |
| Aggregation level | CCE | 8 |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 4 |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 4 |
| DMRS precoder granularity |  | REG bundle size |
| REG bundle size |  | 6 |
| In sync transmission parameters | DCI format |  | 1-0 |
| Number of Control OFDM symbols |  | 2 |
| Aggregation level | CCE | 4 |
| Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | dB | 0 |
| Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | dB | 0 |
| DMRS precoder granularity |  | REG bundle size |
| REG bundle size |  | 6 |
| DRX | |  | *OFF* |
| Gap pattern ID | |  | N.A. |
| Layer 3 filtering | |  | *Enabled* |
| T310 timer | | ms | 1000 |
| T311 timer | | ms | 1000 |
| N310 | |  | 1 |
| N311 | |  | 1 |
| CSI-RS for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD |
| Config 2 | CSI-RS.3.1 TDD |
| reportConfigType | |  | periodic |
| reportQuantity | |  | cri-RI-PMI-CQI |
| CSI reporting periodicity | | slot | 40 |
| CSI reporting offset | | slot | 4 |
| T1 | | s | 0.2 |
| T2 | | s | 0.2 |
| T3 | | s | 0.24 |
| T4 | | s | 0.2 |
| T5 | | s | 0.88 |
| D1 | | s | 0.84 |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts.  Note 2: E-UTRAN is in non-DRX mode under test. | | | |

Table A.5.5.1.6.1-3: Cell specific test parameters for FR2 for CSI-RS in-sync radio link monitoring in non-DRX mode

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Test 1** | | | | | | | | | |
|  | |  | **T1** | **T2** | **T3** | **T4** | **T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| AoA setup | |  | Setup 3 defined in A.3.15 | | | | | | | | | |
|  | |  | AoA1 | | | | | AoA2 | | | | |
| Assumption for UE beamsNote 10 | |  | Rough | | | | | Rough | | | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |  | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB |  | | | | |  | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB |  | | | | |  | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |  | | | | |
| EPRE ratio of PSS to SSS | | dB | 0 | | | | | Not sent | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |  | | | | |
| SNR on RLM-RS1 | Config 1, 2 | dB | 2Note 11 | -6Note 11 | -15 | -4.5 | 2Note 11 |  | | | | |
| SNR on RLM-RS2 | Config 1, 2 |  | Not sent | | | | | 2Note 11 | -14 | -15 | -15 | -14 |
|  | Config 1, 2 | dBm/ 15KHz | -92.1 | | | | | -92.1 | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | | | | | TDL-A 30ns 75Hz | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 2 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The uplink resources for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 3: NZP CSI-RS resource set configuration for CSI reporting are assigned to the UE prior to the start of time period T1.  Note 4: Measurement gap configuration is assigned to the UE prior to the start of time period T1.  Note 5: The timers and layer 3 filtering related parameters are configured prior to the start of time period T1.  Note 6: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 7: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in figure A.5.5.1.6.1-1.  Note 9: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6.  Note 10: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation.  Note 11: This value allows up to 1dB degradation from applied SNR to UE baseband | | | | | | | | | | | | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.5.7.1.2 EN-DC inter-frequency case measurement accuracy with FR2 serving cell and FR2 target cell

##### A.5.7.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Clauses 10.1.5.1.1 and 10.1.5.1.2 for inter-frequency measurements with the testing configurations for NR cells in Table A.5.7.1.2.1-1.

Table A.5.7.1.2.1-1: Applicable NR configurations for FR2 inter-frequency SS-RSRP accuracy test

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD LTE PCell, cells 2&3 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | TDD LTE PCell, cells 2&3 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 3 | FDD LTE PCell, cells 2&3 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 4 | TDD LTE PCell, cells 2&3 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

##### A.5.7.1.2.2 Test parameters

In this set of test cases, there are three cells in the test, E-UTRAN PCell (Cell 1), FR2 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on a different frequency than 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.5.7.1.2.2-1 and Table A.5.7.1.2.2-2 below. Both absolute and relative accuracy of RSRP intrer-frequency measurements are tested by using the parameters in Table A.5.7.1.2.2-1 and Table A.5.7.1.2.2-2. The inter-frequency measurements are supported by a measurement gap.

Table A.5.7.1.2.2-1: SS-RSRP inter-frequency test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| SSB ARFCN | 1~4 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1~4 |  | 100:  NRB,c = 66 | | 100:  NRB,c = 66 | |
| Data RBs allocated | 1,2 |  | 24 | | 24 | |
| 3,4 | 48 | | 48 | |
| Duplex mode | 1~4 |  | TDD | | TDD | |
| TDD configuration | 1~4 |  | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH Reference measurement channel | 1,2 |  | SR.3. 2 TDD | - | SR.3. 2 TDD | - |
| 3,4 | SR.3.3 TDD | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1,2 |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| 3,4 | CR.3.2 TDD | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1,2 |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| 3,4 | CCR.3.7 TDD | CCR.3.7 TDD |
| SSB configuration | 1,2 |  | SSB.3 FR2 | | SSB.3 FR2 | |
|  | 3,4 |  | SSB.4 FR2 | | SSB.4 FR2 | |
| PDSCH/PDCCH subcarrier spacing | 1~4 | kHz | 120 | | 120 | |
| OCNG Patterns | 1~4 |  | OP.3 | | OP.3 | |
| Initial BWP Configuration | 1~4 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~4 |  | DLBWP.1.3  ULBWP.1.3 | | DLBWP.1.3  ULBWP.1.3 | |
| TRS Configuration | 1~4 |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDCCH/PDSCH TCI Configuration | 1~4 |  | TCI.State.2 | | TCI.State.2 | |
| SMTC configuration | 1~4 |  | SMTC.1 | | SMTC.1 | |
| Time offset between Cell 2 and Cell 3 | 1~4 | μs | 3 | | 3 | |
| EPRE ratio of PSS to SSS | 1~4 | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |  |
| Propagation condition | 1~4 | - | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration | 1~4 | - | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Void | | | | | | |

Table A.5.7.1.2.2-2: SS-RSRP inter frequency OTA related test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| Angle of arrival configuration | 1~4 |  | Setup 4b according to clause A.3.15.4.2 | | Setup 4b according to clause A.3.15.4.2 | |
|  |  |  | AoA1  Spherical coverage | AoA2  Rx Beam Peak | AoA1  Spherical coverage | AoA2  Rx Beam Peak |
| Assumption for UE beamsNote 7 | 1~4 |  | Rough | | Rough | |
| Note1 | 1, 2 | dBm/15kHzNote4 | -90.6 | -90.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +1.97dB) | (Table B.2.3-2 Rx Beam PeakNote 8 -3.03dB) |
|  | 3, 4 |  | -93.7 | -93.7 |
| Note1 | 1, 2 | dBm/SCSNote4 | -81.6 | -81.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +11.0dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +6.0dB) |
|  | 3, 4 |  | -81.7 | -81.7 | (Table B.2.3-2 Rx Beam PeakNote 8 +14.0dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +9.0dB) |
|  | 1~4 | dB | 6.0 | 6.0 | 17.0 | -1.0 |
| SSB\_RPNote2 | 1, 2 | dBm/SCS | -75.6 | -75.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +28.0dB) | (Table B.2. 3-2 Rx Beam PeakNote 8 +5.0dB) |
|  | 3, 4 |  | -75.7 | -75.7 | (Table B.2.3-2 Rx Beam PeakNote 8 +31.0dB) | (Table B.2. 3-2 Rx Beam PeakNote 8 +8.0dB) |
| (SSB\_RPCell 2 – SSB\_RPCell 3) | 1~4 | dB | 0 | | 23.00 | |
| BBNote6 | 1, 2 | dB | 5.26 | 5.96 | 9.53 | -3.46 |
| 3, 4 | 4. 61 | 5.91 |
| IoNote2 | 1, 2 | dBm/95.04 MHz Note4 | -50.00 | -50.00 | (Table B.2.3-2 Rx Beam PeakNote 8 +52.68dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +33.13dB) |
|  | 3, 4 |  | -50.09 | -50.09 | (Table B.2.3-2 Rx Beam PeakNote 8 +55.69dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +36.14dB) |
| (Iofreq 1 – Io freq 2) | 1~4 | dB | 0 | | 19.55 | |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SSB\_RP, Es/Iot, Io, (SSB\_RPCell 3 – SSB\_RPCell 2) and (Iofreq 2 – Io freq 1) 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: Void  Note 6: 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 or ΔMBS from TS 38.101-2 [19] Table 6.2.1.3-4.  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 8: The value in Table B.2.3-2 is the Minimum SSB\_RP for SCSSSB = 120 kHz, selected according to the operating band of Cell 3 and UE power class, without ∆MBP,n adjustment. | | | | | | |

##### 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 = [5.5dB]. D is the margin due to mis-alignment between fine beam and rough beam.  Note 6: Ginter = [3dB]. Ginter is the margin due to different antenna gain caused by frequency separation. | |

#### A.5.7.1.3 EN-DC inter-frequency measurement accuracy with FR1 serving cell and FR2 target cell

##### A.5.7.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in Clauses 10.1.5.1.1 for inter-frequency measurements with the testing configurations in Table A.5.7.1.3.1-1.

Table A.5.7.1.3.1-1: Applicable NR configurations for FR2 inter-frequency SS-RSRP accuracy test

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | LTE TDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | | |

##### A.5.7.1.3.2 Test parameters

In this set of test cases there are three cells in the test, E-UTRAN PCell (Cell 1), FR1 PSCell (Cell 2) and a FR2 neighbour cell (Cell 3) on a different frequency than 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.5.7.1.3.2-1 and Table A.5.7.1.3.2-2 below. Absolute accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.5.7.1.3.2-1 and Table A.5.7.1.3.2-2. The inter-frequency measurements are supported by a measurement gap.

Table A.5.7.1.3.2-1: SS-RSRP inter-frequency test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
| Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| SSB ARFCN | 1~6 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1,4 | MHz | 10:  NRB,c = 52 | 100:  NRB,c = 66 | 10:  NRB,c = 52 | 100:  NRB,c = 66 |
| 2,5 | 10:  NRB,c = 52 | 10:  NRB,c = 52 |
| 3,6 | 40:  NRB,c = 106 | 40:  NRB,c = 106 |
| Data RBs allocated | 1,2,4,5 |  | 52 | 24 | 52 | 66 |
| 3,6 | 106 | 106 |
| Gap pattern ID |  |  | 0 | | 0 | |
| Duplex mode | 1,4 |  | FDD | TDD | FDD | TDD |
| 2,5 | TDD | TDD |
| 3,6 | TDD | TDD |
| TDD configuration | 1,4 |  | N/A | TDDConf.3.1 | N/A | TDDConf.3.1 |
| 2,5 | TDDConf.1.1 | TDDConf.1.1 |
| 3,6 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH Reference measurement channel | 1,4 |  | SR.1.1 FDD | - | SR.1.1 FDD | - |
| 2,5 | SR.1.1 TDD | SR.1.1 TDD |
| 3,6 | SR.2.1 FDD | SR.2.1 FDD |
| RMSI CORESET Reference Channel | 1,4 |  | CR.1.1 FDD | - | CR.1.1 FDD | - |
| 2,5 | CR.1.1 TDD | - | CR.1.1 TDD | - |
| 3,6 | CR.2.1 FDD | - | CR.2.1 FDD | - |
| Dedicated CORESET Reference Channel | 1,4 |  | CCR.1.1 FDD | - | CCR.1.1 FDD | - |
| 2,5 |  | CCR.1.1 TDD | - | CCR.1.1 TDD | - |
| 3,6 |  | CCR.2.1 TDD | - | CCR.2.1 TDD | - |
| SSB configuration | 1,4 |  | SSB.1 FR1 | SSB.3 FR2 | SSB.1 FR1 | SSB.3 FR2 |
| 2,5 | SSB.1 FR1 | SSB.1 FR1 |
| 3,6 | SSB.2 FR1 | SSB.2 FR1 |
| OCNG Patterns | 1~6 |  | OP.1 | OP.3 | OP.1 | OP.1 |
| Initial BWP Configuration | 1~6 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~6 |  | DLBWP.1.3  ULBWP.1.3 | | DLBWP.1.3  ULBWP.1.3 | |
| TRS Configuration | 1~6 |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDCCH/PDSCH TCI Configuration | 1~6 |  | TCI.State.2 | | TCI.State.2 | |
| SMTC configuration | 1~6 |  | SMTC.1 | | SMTC.1 | |
| Time offset between Cell 2 and Cell 3 | 1~6 | μs | 3 | | 3 | |
| EPRE ratio of PSS to SSS | 1~6 | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Propagation condition | 1~6 | - | NA  Link only, see clause A.3.7A | AWGN | NA  Link only, see clause A.3.7A | AWGN |
| Antenna configuration | 1~6 | - | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Void | | | | | | |

Table A.5.7.1.3.2-2: SS-RSRP inter-frequency OTA related test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 NOTE 3 | |
| Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| Angle of arrival configuration according to clause A.3.15 |  |  | NA | Setup 2b | NA | Setup 2b |
| Assumption for UE beamsNote 4 |  |  | N/A | Rough | N/A | Rough |
|  | 1~6 | dBm/15kHz | NA  Link only, see clause A.3.7A | -90 | NA  Link only, see clause A.3.7A | NA |
|  | 1~6 | dBm/SSB SCS | -80.97 | NA |
|  |  |  |
|  | 1~6 | dB | 5 | NA |
| Es | 1~6 | dBm/SCS |  | (Table B.2.3-2 Spherical coverage +1dB) |
| SSB\_RPNote1 | 1~6 | dBm/SCS | -76.0 | (Table B.2.3-2 Spherical coverage +1dB) |
|  |  |  |
| BBNote6 | 1~6 | dB | 4.35 | -3.81 |
| IoNote1 | 1~6 | dBm/  95.04MHz | -50.18 | SSB\_RP+28.98 |
| Note 1: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 2: Void  Note 3: No additional noise is added by the test system in Test 2.  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: Where used, 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 6: 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 ΔMBS from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

##### A.5.7.1.3.3 Test Requirements

The SS-RSRP measurement accuracy for Cell 3 shall fulfil the Absolute requirement in clause 10.1.5.1.1.

Test 1:

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.5.7.1.3.3.

Test 2:

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.5.7.1.3.3.

Table A.5.7.1.3.3: SS-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4 |
| Cell 3 | SSB\_RP2 -δ +Gmin +X ≤ 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. | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.6.1.1.7 Cell reselection to FR1 intra-frequency NR case for UE configured with *highSpeedMeasFlag-r16*

##### A.6.1.1.7.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements for UE configured with *highSpeedMeasFlag-r16* specified in clause 4.2.2.3.

##### A.6.1.1.7.2 Test Parameters

The test scenario comprises of 1 NR carrier and 2 cells as given in tables A.6.1.1.1.x-1, A.6.1.1.1.x-2 and A.6.1.1.1.x-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. *highSpeedMeasFlag-r16* is broadcasted to UE.

Table A.6.1.1.7.2-1: Supported test configurations

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

Table A.6.1.1.7.2-2: General test parameters for intra frequency NR cell re-selection test case for UE c*onfigured with highSpeedMeasFlag-r16*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial | Active cell |  | 1, 2, 3 | Cell1 |  |
| condition | Neighbour cells |  | 1, 2, 3 | Cell2 |  |
| T2 end condition | Active cell |  | 1, 2, 3 | Cell2 |  |
| Neighbour cells |  | 1, 2, 3 | Cell1 |  |
| Final condition | Active cell |  | 1, 2, 3 | Cell1 |  |
| Neighbour cells | 1, 2, 3 | Cell2 |
| RF Channel Number | |  | 1, 2, 3 | 1 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
|  | |  | 2 | 3 μs | Synchronous cells |
|  | |  | 3 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1, 2, 3 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1 | SSB.1 FR1 |  |
|  | |  | 2 | SSB.1 FR1 |  |
|  | |  | 3 | SSB.2 FR1 |  |
| SMTC configuration | |  | 1 | SMTC pattern 2 | Configured in SIB2 of Cell 1 |
|  | |  |  | SMTC pattern 6 | Configured in SIB2 of Cell 2 |
|  | |  | 2 | SMTC pattern 1 |  |
|  | |  | 3 | SMTC pattern 1 |  |
| DRX cycle length | | s | 1, 2, 3 | 0.32 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1, 2, 3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1, 2, 3 | Not configured |  |
| T1 | | s | 1, 2, 3 | >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, 3 | 4 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 1, 2, 3 | 3 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.6.1.1.7.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case for UE c*onfigured with highSpeedMeasFlag-r16*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | Cell 2 | | |
|  |  |  | T1 | T2 | T3 | | T1 | T2 | T3 |
| TDD configuration |  | 1 | N/A | | | | N/A | | |
|  |  | 2 | TDDConf.1.1 | | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.2.1 | | | | TDDConf.2.1 | | |
| PDSCH RMC |  | 1 | SR.1.1 FDD | | | | SR.1.1 FDD | | |
| configuration |  | 2 | SR.1.1 TDD | | | | SR.1.1 TDD | | |
|  |  | 3 | SR.2.1 TDD | | | | SR.2.1 TDD | | |
| RMSI CORESET |  | 1 | CR.1.1 FDD | | | | CR.1.1 FDD | | |
| RMC configuration |  | 2 | CR.1.1 TDD | | | | CR.1.1 TDD | | |
|  |  | 3 | CR.2.1 TDD | | | | CR.2.1 TDD | | |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | | | | CCR.1.1 FDD | | |
| RMC configuration |  | 2 | CCR.1.1 TDD | | | | CCR.1.1 TDD | | |
|  |  | 3 | CCR.2.1 TDD | | | | CCR.2.1 TDD | | |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2, 3 | SSB | | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | | | | -140 | | |
|  |  | 3 | -137 | | | | -137 | | |
| Pcompensation | dB | 1, 2, 3 | 0 | | | | 0 | | |
| Qhysts | dB | 1, 2, 3 | 0 | | | | 0 | | |
| Qoffsets, n | dB | 1, 2, 3 | 0 | | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | | | | SS-RSRP | | |
|  | dB | 1 | 16 | -3.11 | 2.79 | | -infinity | 2.79 | -3.11 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| Note2 | dBm/SCS | 1 | -98 | | | | | | |
|  |  | 2 | -98 | | | | | | |
|  |  | 3 | -95 | | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | | |
|  |  | 2 |  | | | | | | |
|  |  | 3 |  | | | | | | |
|  | dB | 1 | 16 | 13 | 16 | | -infinity | 16 | 13 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -82 | -85 | -82 | | -infinity | -82 | -85 |
|  |  | 2 | -82 | -85 | -82 | | -infinity | -82 | -85 |
|  |  | 3 | -79 | -82 | -79 | | -infinity | -79 | -82 |
| Io | dBm/9.36 MHz | 1 | -53.94 | -52.21 | -52.21 | | Same as parameters specified in Cell 1 columns- | | |
|  | dBm/9.36 MHz | 2 | -53.94 | -52.21 | -52.21 | |  | | |
|  | dBm/38.16 MHz | 3 | -47.85 | -46.12 | -46.12 | |  | | |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | | 0 | 0 | 0 |
| SintrasearchP | dB | 1, 2, 3 | 60 | | | | 60 | | |
| Propagation Condition |  | 1, 2 | AWGN | | | AWGN 1944Hz Note4 | | | |
| Propagation Condition |  | 3 | AWGN | | | AWGN 3334Hz Note5 | | | |
| 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: The AWGN 1944 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 1944 Hz.  Note 5: The AWGN 3334 Hz condition is a non fading propagation channel with one tap. Doppler shift is a constant 3334 Hz. | | | | | | | | | |

##### A.6.1.1.7.3 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 Tracking Area Update procedure on Cell 2.

The cell re-selection delay to a newly detectable cell shall be less than 4 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 Tracking Area Update procedure on cell 1.

The cell re-selection delay to an already detected cell shall be less than 3 s.

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

NOTE: The cell re-selection delay to a 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 4.2.2.3-2 in clause 4.2.2.3

Tevaluate, NR\_ intra See Table 4.2.2.3-2 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; 1280ms is assumed in this test case.

This gives a total of 3.84s, allow 4s for the cell re-selection delay to a newly detectable cell and 2.24 s for the cell re-selection delay to an already detected cell in the test case, which we allow 3 s.

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<<Start of change>>

### A.6.5.1 Radio link Monitoring

In the following clause, any uplink signal transmitted by the UE is used for detecting the In-/Out-of-Sync state of the UE. In terms of measurement, the uplink signal is verified on the basis of the UE output power:

For intra-band contiguous carrier aggregation, transmit OFF power is measured as the mean power per component carrier.

For UE with multiple transmit antennas, transmit OFF power is measured as the mean power at each transmit connector.

- UE output power higher than Transmit OFF power -50 dBm (as defined in TS 38.101-1 [18]) means uplink signal

- UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 38.101-1 [18]) means no uplink signal.

#### A.6.5.1.1 Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode

##### A.6.5.1.1.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.6.5.1.1.1-1. The test parameters are given in Tables A.6.5.1.1.1-2, A.6.5.1.1.1-3, and A.6.5.1.1.1-4 below. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.6.5.1.1.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40ms) in test 1.

Table A.6.5.1.1.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 3 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.6.5.1.1.1-2: General test parameters for FR1 out-of-sync testing in non-DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| Duplex mode | | Config 1 |  | FDD |
|  | | Config 2, 3 |  | TDD |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 |
|  | | Config 2 |  | 10: NRB,c = 52 |
|  | | Config 3 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1, 2, 3 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2, 3 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3 |  | ULBWP.1.1 |
| TDD Configuration | | Config 1 |  | Not Applicable |
|  | | Config 2 |  | TDDConf.1.1 |
|  | | Config 3 |  | TDDConf.2.1 |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 FDD |
|  | | Config 2 |  | CR.1.1 TDD |
|  | | Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | Config 1 |  | CCR.1.3 FDD |
|  | | Config 2 |  | CCR.1.3 TDD |
|  | | Config 3 |  | CCR.2.2 TDD |
| SSB Configuration | | Config 1 |  | SSB.1 FR1 |
|  | | Config 2 |  | SSB.1 FR1 |
|  | | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | | Config 1, 2 |  | SMTC.1 |
|  | | Config 3 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 15 kHz |
|  | | Config 3 |  | 30 kHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.2.1-1 |
|  | | Config 3 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
|  | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX | | |  | *OFF* |
| Gap pattern ID | | |  | *gp0* |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 |  | CSI-RS.1.1 FDD |
|  | | Config 2 |  | CSI-RS.1.1 TDD |
|  | | Config 3 |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1 |  | TRS.1.1 FDD |
|  | | Config 2 |  | TRS.1.1 TDD |
|  | | Config 3 |  | TRS.1.2 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.48 |
| T3 | | | s | 0.48 |
| D1 | | | s | 0.44 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.6.5.1.1.1-3: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 |
|  | Config 2 |  | 1 | -7 | -15 |
|  | Config 3 |  | 1 | -7 | -15 |
|  | Config 1 | dBm/15kHz | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -98 | | |
|  | Config 1 | dBm/SCS | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -95 | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1.1.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6. | | | | | |

Table A.6.5.1.1.1-4: Measurement gap configuration for out-of-sync tests in non-DRX mode

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

****

**Figure A.6.5.1.1.1-1: SNR variation for out-of-sync testing**

##### A.6.5.1.1.2 Test Requirements

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

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

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

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

#### A.6.5.1.2 Radio Link Monitoring In-sync Test for FR1 PCell configured with SSB-based RLM RS in non-DRX mode

##### A.6.5.1.2.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.6.5.1.2.1-1. The test parameters are given in Tables A.6.5.1.2.1-2, and A.6.5.1.2.1-3 below. There is one cell (Cell 1), which is the active cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.1.2.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms.

Table A.6.5.1.2.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 3 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.6.5.1.2.1-2: General test parameters for FR1 in-sync testing in non-DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active PCell | | | |  | Cell 1 |
| RF Channel Number | | | |  | 1 |
| Duplex mode | | | Config 1 |  | FDD |
|  | | | Config 2, 3 |  | TDD |
| BWchannel | | | Config 1 | MHz | 10: NRB,c = 52 |
|  | | | Config 2 |  | 10: NRB,c = 52 |
|  | | | Config 3 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1, 2, 3 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2, 3 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2, 3 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2, 3 |  | ULBWP.1.1 |
| TDD Configuration | | | Config 1 |  | Not Applicable |
|  | | | Config 2 |  | TDDConf.1.1 |
|  | | | Config 3 |  | TDDConf.2.1 |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 FDD |
|  | | | Config 2 |  | CR.1.1 TDD |
|  | | | Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 FDD |
|  | | | Config 2 |  | CCR.1.1 TDD |
|  | | | Config 3 |  | CCR.2.1 TDD |
| SSB Configuration | | | Config 1 |  | SSB.1 FR1 |
|  | | | Config 2 |  | SSB.1 FR1 |
|  | | | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | | | Config 1, 2 |  | SMTC.1 |
|  | | | Config 3 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2 |  | 15 kHz |
|  | | | Config 3 |  | 30 kHz |
| PRACH Configuration | | | Config 1, 2 |  | Table A.3.8.2.1-1 |
|  | | | Config 3 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX | | | |  | *OFF* |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 1000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 | |  | CSI-RS.1.1 FDD |
|  | | Config 2 | |  | CSI-RS.1.1 TDD |
|  | | Config 3 | |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1, 4 | |  | TRS.1.1 FDD |
|  | | Config 2, 5 | |  | TRS.1.1 TDD |
|  | | Config 3, 6 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.24 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.6.5.1.2.1-3: Cell specific test parameters for FR1 (Cell 1) for in-sync radio link monitoring tests in non-DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
|  | |  | T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 2 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 3 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1 | dBm/15 kHz | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 3 |  | -98 | | | | |
|  | Config 1 | dBm/SCS | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 3 |  | -95 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.6.5.1.2.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

**Table A.6.5.1.2.1-4: Void**

****

**Figure A.6.5.1.2.1-1: SNR variation for in-sync testing**

##### A.6.5.1.2.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

#### A.6.5.1.3 Radio Link Monitoring Out-of-sync Test for FR1 PCell configured with SSB-based RLM RS in DRX mode

##### A.6.5.1.3.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.6.5.1.3.1-1. The test parameters are given in Tables A.6.5.1.3.1-2, and A.6.5.1.3.1-3. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of three successive time periods, with time duration of T1, T2 and T3 respectively. Figure A.6.5.1.3.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.6.5.1.3.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 3 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.6.5.1.3.1-2: General test parameters for FR1 out-of-sync testing in DRX mode

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
|  | | |  | Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| Duplex mode | | Config 1 |  | FDD |
|  | | Config 2, 3 |  | TDD |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 |
|  | | Config 2 |  | 10: NRB,c = 52 |
|  | | Config 3 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1, 2, 3 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | Config 1, 2, 3 |  | DLBWP.1.1 |
| UL initial BWP configuration | | Config 1, 2, 3 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | Config 1, 2, 3 |  | ULBWP.1.1 |
| TDD Configuration | | Config 1 |  | Not Applicable |
|  | | Config 2 |  | TDDConf.1.1 |
|  | | Config 3 |  | TDDConf.2.1 |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 FDD |
|  | | Config 2 |  | CR.1.1 TDD |
|  | | Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | Config 1 |  | CCR.1.3 FDD |
|  | | Config 2 |  | CCR.1.3 TDD |
|  | | Config 3 |  | CCR.2.2 TDD |
| SSB Configuration | | Config 1 |  | SSB.1 FR1 |
|  | | Config 2 |  | SSB.1 FR1 |
|  | | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | | Config 1, 2 |  | SMTC.1 |
|  | | Config 3 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 |  | 15 kHz |
|  | | Config 3 |  | 30 kHz |
| PRACH Configuration | | Config 1, 2 |  | Table A.3.8.2.1-1 |
|  | | Config 3 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | |  | 0 |
| OCNG parameters | | |  | OP.1 |
| CP length | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |
| Out of sync transmission parameters | DCI format | |  | 1-0 |
|  | Number of Control OFDM symbols | |  | 2 |
|  | Aggregation level | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | dB | 4 |
|  | DMRS precoder granularity | |  | REG bundle size |
|  | REG bundle size | |  | 6 |
| DRX Configuration | | |  | DRX.3 |
| Gap pattern ID | | |  | N.A. |
| Layer 3 filtering | | |  | *Enabled* |
| T310 timer | | | ms | *0* |
| T311 timer | | | ms | 1000 |
| N310 | | |  | 1 |
| N311 | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 |  | CSI-RS.1.1 FDD |
|  | | Config 2 |  | CSI-RS.1.1 TDD |
|  | | Config 3 |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1 |  | TRS.1.1 FDD |
|  | | Config 2 |  | TRS.1.1 TDD |
|  | | Config 3 |  | TRS.1.2 TDD |
| T1 | | | s | 0.2 |
| T2 | | | s | 0.68 |
| T3 | | | s | 0.68 |
| D1 | | | s | 0.64 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

Table A.6.5.1.3.1-3: Cell specific test parameters for FR1 (Cell 1) for out-of-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | |
|  | |  | T1 | T2 | T3 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 4 | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | |
| EPRE ratio of PSS to SSS | | dB |  | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 |
|  | Config 2 |  | 1 | -7 | -15 |
|  | Config 3 |  | 1 | -7 | -15 |
|  | Config 1 | dBm/15kHz | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -98 | | |
|  | Config 1 | dBm/SCS | -98 | | |
|  | Config 2 |  | -98 | | |
|  | Config 3 |  | -95 | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3 respectively in Figure A.6.5.1.3.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 is A.3.6. | | | | | |

Table A.6.5.1.3.1-4: Void

Table A.6.5.1.3.1-5: Void

Table A.6.5.1.3.1-6: Void

****

**Figure A.6.5.1.3.1-1: SNR variation for out-of-sync testing**

##### A.6.5.1.3.2 Test Requirements

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

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

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

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

#### A.6.5.1.4 Radio Link Monitoring In-sync Test for FR1 PCell configured with SSB-based RLM RS in DRX mode

##### A.6.5.1.4.1 Test Purpose and Environment

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

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.6.5.1.4.1-1. The test parameters are given in Tables A.6.5.1.4.1-2, and A.6.5.1.4.1-3. There is one cell (Cell 1), which is the active NR cell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.1.4.1-1 shows the variation of the downlink SNR in the active cell to emulate out-of-sync and in-sync states. Prior to the start of the time duration T1, the UE shall be fully synchronized to Cell 1. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. In the test, DRX configuration is enabled and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CSI during the period when On-duration timer is running. Time alignment timers shall be set to “infinity” so that UL timing alignment is maintained during the test.

Table A.6.5.1.4.1-1: Supported test configurations for FR1 PCell

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 2 | TDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz |
| 3 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| Note: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.6.5.1.4.1-2: General test parameters for FR1 in-sync testing in DRX mode

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
|  | | | |  | Test 1 |
| Active PCell | | | |  | Cell 1 |
| RF Channel Number | | | |  | 1 |
| Duplex mode | | | Config 1 |  | FDD |
|  | | | Config 2, 3 |  | TDD |
| BWchannel | | | Config 1 | MHz | 10: NRB,c = 52 |
|  | | | Config 2 |  | 10: NRB,c = 52 |
|  | | | Config 3 |  | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1, 2, 3 |  | DLBWP.0.1 |
| DL dedicated BWP configuration | | | Config 1, 2, 3 |  | DLBWP.1.1 |
| UL initial BWP configuration | | | Config 1, 2, 3 |  | ULBWP.0.1 |
| UL dedicated BWP configuration | | | Config 1, 2, 3 |  | ULBWP.1.1 |
| TDD Configuration | | | Config 1 |  | Not Applicable |
|  | | | Config 2 |  | TDDConf.1.1 |
|  | | | Config 3 |  | TDDConf.2.1 |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 FDD |
|  | | | Config 2 |  | CR.1.1 TDD |
|  | | | Config 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 FDD |
|  | | | Config 2 |  | CCR.1.1 TDD |
|  | | | Config 3 |  | CCR.2.1 TDD |
| SSB Configuration | | | Config 1 |  | SSB.1 FR1 |
|  | | | Config 2 |  | SSB.1 FR1 |
|  | | | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | | | Config 1, 2 |  | SMTC.1 |
|  | | | Config 3 |  | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2 |  | 15 kHz |
|  | | | Config 3 |  | 30 kHz |
| PRACH Configuration | | | Config 1, 2 |  | Table A.3.8.2.1-1 |
|  | | | Config 3 |  | Table A.3.8.2.1-1 |
| SSB index assigned as RLM RS | | | |  | 0 |
| OCNG parameters | | | |  | OP.1 |
| CP length | | | |  | Normal |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |
| In sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 4 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 0 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| Out of sync transmission parameters | DCI format | | |  | 1-0 |
|  | Number of Control OFDM symbols | | |  | 2 |
|  | Aggregation level | | | CCE | 8 |
|  | Ratio of hypothetical PDCCH RE energy to average SSS RE energy | | | dB | 4 |
|  | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 4 |
|  | DMRS precoder granularity | | |  | REG bundle size |
|  | REG bundle size | | |  | 6 |
| DRX Configuration | | | |  | DRX.3 |
| Gap pattern ID | | | |  | N.A. |
| Layer 3 filtering | | | |  | *Enabled* |
| T310 timer | | | | ms | 2000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 | |  | CSI-RS.1.1 FDD |
|  | | Config 2 | |  | CSI-RS.1.1 TDD |
|  | | Config 3 | |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1 | |  | TRS.1.1 FDD |
|  | | Config 2 | |  | TRS.1.1 TDD |
|  | | Config 3 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.64 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 0.88 |
| D1 | | | | s | 0.84 |
| Note 1: All configurations are assigned to the UE prior to the start of time period T1.  Note 2: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

Table A.6.5.1.4.1-3: Cell specific test parameters for FR1 (Cell 1) for in-sync radio link monitoring tests in DRX mode

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test 1 | | | | |
| T1 | T2 | T3 | T4 | T5 |
| EPRE ratio of PDCCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | dB | 0 | | | | |
| EPRE ratio of PBCH to PBCH DMRS | | dB |  | | | | |
| EPRE ratio of PSS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH DMRS to SSS | | dB |  | | | | |
| EPRE ratio of PDSCH to PDSCH DMRS | | dB |  | | | | |
| EPRE ratio of OCNG DMRS to SSS | | dB |  | | | | |
| EPRE ratio of OCNG to OCNG DMRS | | dB |  | | | | |
| SNR on RLM-RS | Config 1 | dB | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 2 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 3 |  | 1 | -7 | -15 | -4.5 | 1 |
|  | Config 1 | dBm/15 kHz | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 3 |  | -98 | | | | |
|  | Config 1 | dBm/SCS | -98 | | | | |
|  | Config 2 |  | -98 | | | | |
|  | Config 3 |  | -95 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | | | | |
| Note 1: OCNG shall be used such that the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The signal contains PDCCH for UEs other than the device under test as part of OCNG.  Note 3: SNR levels correspond to the signal to noise ratio over the SSS REs.  Note 4: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2, SNR3, SNR4 and SNR5 respectively in Figure A.6.5.1.4.1-1.  Note 5: The SNR values are specified for testing a UE which supports 2RX on at least one band. For testing of a UE which supports 4RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6. | | | | | | | |

Table A.6.5.1.4.1-4: Void

Table A.6.5.1.4.1-5: Void

****

Figure A.6.5.1.4.1-1: SNR variation for in-sync testing.

##### A.6.5.1.4.2 Test Requirements

The UE behaviour in each test during time durations T1, T2, T3, T4 and T5 shall be as follows:

During the period from time point A to time point F (D1 second after the start of time duration T5) the UE shall transmit uplink signal at least in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting.

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

<<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 are shown in table A.6.5.3.1.1-1 below. 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 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.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

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.6.5.3.3 SCell Activation and deactivation of unknown SCell in FR1 in non-DRX

A.6.5.3.3.1 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 unknown by the UE at the time of activation.

The supported test configurations are the same as defined in clause A.6.5.3.1.1. The test parameters are the same except those described in the following clause. The listed parameter values in Tables A.6.5.3.3.1-1 will replace the values of corresponding parameters in Tables A.6.5.3.1.1-1. 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.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

##### A.6.5.6.1.2 NR FR1 DL active BWP switch with non-DRX in SA

A.6.5.6.1.2.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch delay requirement defined in clause 8.6.

The supported test configurations are shown in Table A.6.5.6.1.2.1-1. The test scenario comprises of one cell (Cell 1) as given in Table A.6.5.6.1.2.1-2. Cell-specific parameters of the cell are specified in Table A.6.5.6.1.2.1-3 below.

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

Before the test starts,

- UE is connected to Cell 1 on radio channel 1.

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

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

- UE is configured with a *bwp-InactivityTimer* timer value for Cell1.

The cell has constant signal levels throughout the test.

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

During T1,

Time period T1 starts when a DCI format 1\_1 command for DL BWP switch, sent from the test equipment to the UE, is received at the UE side in Cell1’s slot # denoted *i*. The UE shall switch its bandwidth part from BWP-1 to BWP-2.

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of Cell1’s DL slot (*i+TBWPswitchDelay*) as defined in clause 8.6 and starts to report valid ACK/NACK for the Cell1 no later than the first UL slot that occurs after the beginning of slot (*i+TBWPswitchDelay+k1*). The UE shall be continuously scheduled on Cell1’s BWP-2 starting from the first DL slot that occurs after the beginning of slot (*i+TBWPswitchDelay*).

During T2, the test equipment won’t transmit DCI format for PDSCH reception on Cell1.

During T3,

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

The UE shall be able to receive PDSCH on the first DL slot that occurs after the beginning of Cell1’s slot (*j+TBWPswitchDelay*) as defined in clause 8.6 and starts to report valid ACK/NACK for the Cell1 at latest on the first UL slot that occurs after the beginning of slot (*j+TBWPswitchDelay+k1*). The UE shall be continuously scheduled on Cell1’s BWP-1 starting from the first DL slot that occurs after the beginning of slot (*j+TBWPswitchDelay*).

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

Table A.6.5.6.1.2.1-1: DL BWP switch supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 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.6.5.6.1.1 can skip the test cases in A.6.5.6.1.2. | |

Table A.6.5.6.1.2.1-2: General test parameters for DL BWP switch in SA

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | One NR radio channel is used for this test |
| Active Cell |  | Cell 1 | Cell1 on RF channel number 1. |
| CP length |  | Normal |  |
| DRX |  | OFF |  |
| *bwp-InactivityTimer* | ms | 200 |  |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |
| T3 | s | 0.2 |  |

Table A.6.5.6.1.2.1-3: NR Cell specific test parameters for DL BWP switch in SA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Cell 1 |
| Frequency Range | | | |  | FR1 |
| Duplex mode | | | Config 1 |  | FDD |
|  | | | Config 2,3 |  | TDD |
| TDD configuration | | | Config 1 |  | Not Applicable |
|  | | | Config 2 |  | TDDConf.1.1 |
|  | | | Config 3 |  | TDDConf.2.1 |
| BWchannel | | | Config 1 |  | 10 MHz: NRB,c = 52 |
|  | | | Config 2 |  | 10 MHz: NRB,c = 52 |
|  | | | Config 3 |  | 40 MHz: NRB,c = 106 |
| Active BWP ID | | | |  | 1, 2 |
| Initial DL BWP Configuration | | | Config 1,2,3 |  | DLBWP.0.2 Note 4 |
| Active DL BWP-1 Configuration | | | Config 1,2,3 |  | DLBWP.1.1 Note 4 |
| Active DL BWP-2 Configuration | | | Config 1,2,3 |  | DLBWP.1.3 Note 4 |
| Initial UL BWP Configuration | | | Config 1,2,3 |  | ULBWP.0.2 Note 4 |
| Active UL BWP-1 Configuration | | | Config 1,2,3 |  | ULBWP.1.1 Note 4 |
| Active UL BWP-2 Configuration | | | Config 1 |  | N/A |
|  | | | Config 2,3 |  | ULBWP.1.3 Note 4 |
| PDSCH Reference measurement channel | | | Config 1 |  | SR.1.1 FDD |
|  | | | Config 2 | SR.1.1 TDD |
|  | | | Config 3 | SR.2.1 TDD |
| RMSI CORESET parameters | | | Config 1 |  | CR.1.1 FDD |
|  | | | Config 2 | CR.1.1 TDD |
|  | | | Config 3 | CR.2.1 TDD |
| Dedicated CORESET parameters | | | Config 1 |  | CCR.1.2 FDD |
|  | | | Config 2 | CCR.1.2 TDD |
|  | | | Config 3 | CCR.2.4 TDD |
| OCNG Patterns | | | |  | OP.1 |
| SSB Configuration | | | Config 1,2 |  | SSB.1 FR1 |
|  | | | Config 3 |  | SSB.2 FR1 |
| SMTC Configuration | | |  |  | SMTC.1 |
| Correlation Matrix and Antenna Configuration | | | |  | 1x2 Low |
| TRS Configuration | | Config 1,4 | |  | TRS.1.1 FDD |
|  | | Config 2,5 | |  | TRS.1.1 TDD |
|  | | Config 3,6 | |  | TRS.1.2 TDD |
| EPRE ratio of PSS to SSS | | | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |
| 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 the resources in Cell 1 are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | | | |

A.6.5.6.1.2.2 Test Requirements

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

During T3, the UE shall start to send the ACK/NACK for PCell from the first UL slot that occurs after the beginning of DL slot (*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 Cell1 active BWP switch delay 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 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.6.6.4.5 SSB based L1-RSRP measurement when DRX is used for UE configured with *highSpeedMeasFlag-r16*

##### A.6.6.4.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-RSRP measurement when UE is configured with *highSpeedMeasFlag-r16*. This test will partly verify the L1-RSRP measurement requirements for UE configured with *highSpeedMeasFlag-r16* in clause 9.5.4.1, with the testing configurations for NR cells in Table A.6.6.4.5.1-1.

Table A.6.6.4.5.1-1: Applicable NR configurations for FR1 SSB based L1-RSRP test

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

##### A.6.6.4.5.2 Test parameters

There is one cells in the test, the FR1 PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.6.6.4.5.2-1 and Table A.6.6.4.5.2-2 below.

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

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

Table A.6.6.4.5.2-1: General test parameters for UE configured with *highSpeedMeasFlag-r16*

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
|  | 2 |  | TDD |
|  | 3 |  | TDD |
| TDD Configuration | 1 |  | N/A |
|  | 2 |  | TDDConf.1.1 |
|  | 3 |  | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
|  | 2 |  | 10: NRB,c = 52 |
|  | 3 |  | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
|  | 2 |  | SR.1.1 TDD |
|  | 3 |  | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
|  | 2 |  | CR.1.1 TDD |
|  | 3 |  | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
|  | 2 |  | CCR.1.1 TDD |
|  | 3 |  | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
|  | 2 |  | SSB.3 FR1 |
|  | 3 |  | SSB.4 FR1 |
| OCNG Patterns | 1~3 |  | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
|  | 2 |  | TRS.1.1 TDD |
|  | 3 |  | TRS.1.2 TDD |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | periodic |
| reportQuantity | 1~3 |  | ssb-Index-RSRP |
| Number of reported RS | 1~3 |  | 2 |
| L1-RSRP reporting period | 1~3 | slot | 80 |
| T1 | 1~3 | s | 5 |
| T2 | 1~3 | s | 2 |
| EPRE ratio of PSS to SSS | 1~3 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |
| Propagation condition | 1~2 |  | AWGN 1944 Hz |
|  | 3 |  | AWGN 3334 Hz |
| 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.6.6.4.5.2-2: SSB specific test parameters for UE configured with *highSpeedMeasFlag-r16*

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

##### A.6.6.4.5.3 Test Requirements

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.6.6.12.1 NR RSTD measurement reporting delay test case for single positioning frequency layer in FR1 SA

##### A.6.6.12.1.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 9.9.2 in an environment with AWGN propagation conditions in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations are specified in Table A.6.6.12.1.1-1.

Table A.6.6.12.1.1-1: Supported test configurations

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

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All 3 cells are on the same RF channel in FR1.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall not have any timing information of Cell 2 and Cell 3. All three cells transmit PRS during T2.

Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The *NR-DL-TDOA-ProvideAssistanceData* and *nr-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE during T1. The last TTI containing the two messages shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the *DL-TDOA assistance* data and location information request.

The beginning of the time interval T2 shall be aligned with the beginning of the first MG instance containing the PRS resources.

The UE is configured with measurement gap pattern ID # 24 or #0 before T2.

The general test parameters are listed in Table A.6.6.12.1.1-2, and cell specific test parameters are listed in Table A.6.6.12.1.1-3.

Table A.6.6.12.1.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| SSB configuration | Config 1 |  | SSB.1 FR1 |  |
| Config 2 |  | SSB.1 FR1 |
| Config 3 |  | SSB.2 FR1 |
| SMTC configuration | Config 1 |  | SMTC.2 |  |
| Config 2 |  | SMTC.1 |
| Config 3 |  | SMTC.1 |
| PDSCH RMC configuration | Config 1 |  | SR.1.1 FDD |  |
| Config 2 |  | SR.1.1 TDD |  |
| Config 3 |  | SR.2.1 TDD |  |
| RMSI CORESET RMC configuration | Config 1 |  | CR.1.1 FDD | As specified in clause A.3.1.2.1 |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Dedicated CORESET RMC configuration | Config 1 |  | CR.1.1 FDD |  |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.2.1 TDD |  |
| Initial BWP configuration | Config 1,2,3 |  | DLBWP.0.1  ULBWP.0.1 |  |
| Active DL BWP configuration | Config 1,2,3 |  | DLBWP.1.1 |  |
| Active UL BWP configuration | Config 1,2,3 |  | ULBWP.1.1 |  |
| PRS Configuration | Config 1 |  | PRS.1.1 FR1 | As specified in clause A.3.31 |
| Config 2 |  | PRS.1.2 FR1 |
| Config 3 |  | PRS.2.1 FR1 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2)mod6=0  and  (PCI of Cell 1 – PCI of Cell 3)mod6=0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| DRX | |  | OFF |  |
| Measurement gap | |  | GP#24 or GP#0 | GP#24 is configured if UE supports MG#24, otherwise GP#0 is configured |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance ta specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 16 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to prs-MutingInfo defined in TS 37.355 [34] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | [1.28] | The length of the time interval that follows immediately after time interval T1 |

Table A.6.6.12.1.1-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Positiong frequency layer | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | N/A | N/A |
| Note 3 | Config 1 | dBm/SCS | -98 | | |
| Config 2 | dBm/SCS | -98 | | |
| Config 3 | dBm/SCS | -95 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| SSB | | dB | 10 | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/  9.36MHz | -68.63 | -70.05 | -70.05 |
| Config 2 | dBm/  9.36MHz | -68.63 | -70.05 | -70.05 |
| Config 3 | dBm/  38.16MHz | -63.20 | -63.96 | -63.96 |
| SSB RP Note4 | Config 1 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 2 | dBm/SCS | -88 | -Infinity | -Infinity |
| Config 3 | dBm/SCS | -88 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | |

Table A.6.6.12.1.1-4: Cell-specific test parameters for RSTD measurement reporting delay during T2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| T2 | T2 | T2 |
| NR RF Channel Number | |  | 1 | 1 | 1 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | OP.1 |
| PRACH configuration | |  | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 | FR1 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -98 | -98 | -98 |
| Config 2 | dBm/SCS | -98 | -98 | -98 |
| Config 3 | dBm/SCS | -95 | -95 | -95 |
| PRS | Config 1 | dB | -5.45 | -11.67 | -11.67 |
| Config 2 | dB | -5.45 | -11.67 | -11.67 |
| Config 3 | dB | -5.45 | -11.67 | -11.67 |
| Io Note 4 | Config 1 | dBm/  9.36MHz | -69.59 | -69.93 | -69.93 |
| Config 2 | dBm/  96.48MHz | -69.59 | -69.93 | -69.93 |
| Config 3 | dBm/  38.16MHz | -63.72 | -63.89 | -63.89 |
| PRS | | dB | -6 | -13 | -13 |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.  Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled. | | | | | |

##### A.6.6.12.1.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 9.9.2.5.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the DL-TDOA assistance data, Cell 1, within the time duration specified in section 9.9.1.5 starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 10.1.23.3, i.e., between RSTD\_0000000 and RSTD1970049

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.6.7.13.2 RSTD measurement accuracy test case for dual positioning frequency layer

##### A.6.7.13.2.1 Test purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the accuracy requirements specified in clause 10.1.23.2 in an environment with AWGN propagation conditions.

The supported test configurations are specified in Table A.6.7.13.2.1-1.

Table A.6.7.13.2.1-1: Supported test configurations

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

In the test there are two synchronous cells: Cell 1 and Cell 2. Cell 1 is the reference as well as the PCell on NR RF channel #1 in FR1. Cell 2 is a neighbour cell on a different NR RF channel #2 in FR1. GP#24 is configured if UE supports MG#24, otherwise GP#0 is configured. The *NR-TDOA-ProvideAssistanceData* and *NR-TDOA-RequestLocationInformation* message as defined in TS 37.355 shall be provided to the UE before the start of the test. The test duration should be larger than the UE measurement period as defined in clause 9.9.2.

Table A.6.7.13.2.1-2: RSTD accuracy test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
| Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| PRS ARFCN | 1~3 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| 2 | 10: NRB,c = 52 | | 10: NRB,c = 52 | |
| 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Duplex mode | 1 |  | FDD | | FDD | |
| 2 | TDD | | TDD | |
| 3 | TDD | | TDD | |
| TDD configuration | 1 |  | N/A | | N/A | |
| 2 | TDDConf.1.1 | | TDDConf.1.1 | |
| 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD | - | SR.1.1 FDD | - |
| 2 | SR.1.1 TDD |  | SR.1.1 TDD |  |
| 3 | SR.2.1 FDD |  | SR.2.1 FDD |  |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD | - | CR.1.1 FDD | - |
| 2 | CR.1.1 TDD | - | CR.1.1 TDD | - |
| 3 | CR.2.1 FDD | - | CR.2.1 FDD | - |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD | - | CCR.1.1 FDD | - |
| 2 | CCR.1.1 TDD | - | CCR.1.1 TDD | - |
| 3 | CCR.2.1 TDD | - | CCR.2.1 TDD | - |
| SSB configuration | 1 |  | SSB.1 FR1 | | SSB.1 FR1 | |
| 2 | SSB.1 FR1 | | SSB.1 FR1 | |
| 3 | SSB.2 FR1 | | SSB.2 FR1 | |
| OCNG Patterns | 1~3 |  | OP.1 | | OP.1 | |
| TRS configuration | 1 |  | TRS.1.1 FDD | - | TRS.1.1 FDD |  |
| 2 | TRS.1.1 TDD |  | TRS.1.1 TDD |  |
| 3 | TRS.1.2 TDD |  | TRS.1.2 TDD |  |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 | | DLBWP.1.1  ULBWP.1.1 | |
| Time offset with Cell 1 | 1 | μs | - | 3 | - | 3 |
| 2,3 | - | 3 | - | 3 |
| SMTC configuration | 1 |  | SMTC.2 | | SMTC.2 | |
| 2,3 | SMTC.1 | | SMTC.1 | |
| PRS configuration | 1 |  | PRS.1.1 FR1 | | PRS.1.2 FR1 | |
| 2 | PRS.1.1 FR1 | | PRS.1.2 FR1 | |
| 3 | PRS.2.1 FR1 | | PRS.2.2 FR1 | |
| PRS Resource slot offset | 1, 2, 3 | slot | 0 | 4 | 0 | 4 |
| Expected RSTD | 1, 2, 3 | μs | N/A | 3 | N/A | 3 |
| Expected RSTD uncertainty | 1, 2, 3 | μs | N/A | 5 | N/A | 5 |
| EPRE ratio of PSS to SSS | 1~3 | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Note2 | 1,2 | dBm/ SCS | -98 | | -98 | |
| 3 | -95 | | -95 | |
|  | 1~3 | dB | -6 | -13 | -6 | -13 |
| PRS-RSRPNote3 | 1,2 | dBm/SCS | -104 | -111 | -104 | -111 |
| 3 | -101 | -108 | -101 | -108 |
| IoNote3 | 1,2 | dBm/  9.36MHz | -69.07 | -69.83 | -69.07 | -69.83 |
| 3 | dBm/  38.16MHz | -62.98 | -63.74 | -62.98 | -63.74 |
|  | 1~3 | dB | -6 | -13 | -6 | -13 |
| Propagation condition | 1~3 | - | AWGN | | AWGN | |
| Antenna configuration | 1~3 |  | 1x2 | | 1x2 | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | |

##### A.6.7.13.2.2 Test Requirements

The RSTD measurement accuracy for Cell 2 shall fulfil the absolute requirement in clause 10.1.23.2.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.6.7.14 PRS-RSRP measurements

#### A.6.7.14.1 SA: measurement accuracy with PRS in FR1

##### A.6.7.14.1.1 Test Purpose and Environment

The purpose of this test is to verify that the PRS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.24.2.1 and 10.1.24.2.2.

##### A.6.7.14.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Supported test configurations are shown in table A.6.7.14.1.2-1. Both absolute and relative accuracy of PRS-RSRP measurements are tested by using the parameters in A.6.7.14.1.2-2. In all test cases, Cell 1 is the PCell.

Table A.6.7.14.1.2-1: PRS-RSRP supported test configurations

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

Table A.6.7.14.1.2-2: PRS-RSRP test parameters

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | Test 2 | | |
|  | | |  | Cell 1 | | Cell 2 | Cell 1 | Cell 2 | |
| Cell ID | | |  | 489 | | 0 | 489 | 0 | |
| SSB ARFCN | | |  | freq1 | | | freq1 | | |
| Duplex mode | | Config 1 |  | FDD | | | | | |
|  | | Config 2,3 |  | TDD | | | | | |
| TDD configuration | | Config 1 |  | Not Applicable | | | | | |
|  | | Config 2 |  | TDDConf.1.1 | | | | | |
|  | | Config 3 |  | TDDConf.2.1 | | | | | |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | | |
| BWP BW | | Config 1 |  | 10: NRB,c = 52 | | | | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | | | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | | |
| Downlink initial BWP configuration | | |  | DLBWP.0.1 | | | | | |
| Downlink dedicated BWP configuration | | |  | DLBWP.1.1 | | | | | |
| Uplink initial BWP configuration | | |  | ULBWP.0.1 | | | | | |
| Uplink dedicated BWP configuration | | |  | ULBWP.1.1 | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.1 FDD | | NA | TRS.1.1 FDD | NA | |
|  | | Config 2 |  | TRS.1.1 TDD | | NA | TRS.1.1 TDD | NA | |
|  | | Config 3 |  | TRS.1.2 TDD | | NA | TRS.1.2 TDD | NA | |
| DRX Cycle | | | ms | Not Applicable | | | | | |
| Measurement gap | | |  | GP#24 or GP#0 Note 7 | | | | | |
| PDSCH Reference measurement channel | | Config 1 |  | SR.1.1 FDD | | - | SR.1.1 FDD | - | |
|  | | Config 2 |  | SR.1.1 TDD | |  | SR.1.1 TDD |  | |
|  | | Config 3 |  | SR2.1 TDD | |  | SR2.1 TDD |  | |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 FDD | | - | CR.1.1 FDD | - | |
|  | | Config 2 |  | CR.1.1 TDD | |  | CR.1.1 TDD |  | |
|  | | Config 3 |  | CR2.1 TDD | |  | CR2.1 TDD |  | |
| Control channel RMC | | Config 1 |  | CCR.1.1 FDD | | - | CCR.1.1 FDD | - | |
|  | | Config 2 |  | CCR.1.1 TDD | |  | CCR.1.1 TDD |  | |
|  | | Config 3 |  | CCR2.1 TDD | |  | CCR2.1 TDD |  | |
| PRS configuration | | Config 1 |  | PRS.1.3 FR1 | | PRS.1.3 FR1 | PRS.1.4 FR1 | PRS.1.4 FR1 | |
|  | | Config 2 |  | PRS.1.3 FR1 | | PRS.1.3 FR1 | PRS.1.4 FR1 | PRS.1.4 FR1 | |
|  | | Config 3 |  | PRS.2.3 FR1 | | PRS.2.3 FR1 | PRS.2.4 FR1 | PRS.2.4 FR1 | |
| PRS Resource slot offset (slot) | | Config 1,2,3 | slot | 0 | | 4 | 0 | 4 | |
| SSB configuration | | Config 1 |  | SSB.1 FR1 | | SSB.1 FR1 | SSB.1 FR1 | SSB.1 FR1 | |
|  | | Config 2 |  | SSB.1 FR1 | | SSB.1 FR1 | SSB.1 FR1 | SSB.1 FR1 | |
|  | | Config 3 |  | SSB.2 FR1 | | SSB.2 FR1 | SSB.2 FR1 | SSB.2 FR1 | |
| Time offset with Cell 1 | | Config 1 | ms | - | | 3 | - | 3 | |
|  | | Config 2,3 | μs | - | | 3 | - | 3 | |
| SMTC configuration | | Config 1 |  | SMTC.2 | | | | | |
| Config 2,3 |  | SMTC.1 | | | | | |
| OCNG Patterns | | |  | OCNG pattern 1 | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | | | | |
| Config 3 | 30 kHz | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | 0 | 0 | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |  | |  |  |  | |
| EPRE ratio of PBCH to PBCH DMRS | | |  |  | |  |  |  | |
| EPRE ratio of PDCCH DMRS to SSS | | |  |  | |  |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |  | |  |  |  | |
| EPRE ratio of PDSCH DMRS to SSS | | |  |  | |  |  |  | |
| EPRE ratio of PDSCH to PDSCH | | |  |  | |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |  | |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |  | |  |  |  | |
| Note2 | Config 1,2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | dBm/15KhZ | -106 | | | -88 | | |
| Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | Not applicableNote 5 | | | -94 | | |
| Note2 | Config 1,2 | | dBm/SCS | -106 | | | -88 | | |
| Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | Not applicableNote 5 | | | -91 | | |
|  | | | dB | 2.46 | -5.97 | | 2.46 | | -5.97 |
|  | | | dB | 6 | 1 | | 6 | | 1 |
| PRS-RSRP Note3 | Config 1, 2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | dBm/SCS | -100 | | -105 | -82 | | -87 |
|  | Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H |  | Not applicable Note 5 | | Not applicable Note 5 | -85 | | -90 |
| IoNote3 | Config 1,2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | dBm/9.36MHz | -70.09 | | | -52.09 | | |
| Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6, NR\_SDL\_FR1\_A,  NR\_FDD\_FR1\_B,  NR\_TDD\_FR1\_C,  NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D,  NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E,  NR\_FDD\_FR1\_F,  NR\_FDD\_FR1\_G,  NR\_FDD\_FR1\_H | dBm/38.16MHz | Not applicable Note 5 | | | -51.99 | | |
| Propagation condition | | |  | AWGN | | | | | |
| Antenna configuration | | |  | 1x2 | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: PRS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: Subtest 1 is not used when testing with 30kHz SSB SCS.  Note 6: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification  Note 7: GP#24 is configured if UE supports MG#24, otherwise GP#0 is configured. | | | | | | | | | |

##### A.6.7.14.1.3 Test Requirements

In each test, the absolute PRS-RSRP measurement for each cell shall fulfil the absolute accuracy requirement in clause 10.1.24.2.1. The relative PRS-RSRP measurement between the two PRS resources within the same cell shall fulfil the relative accuracy requirement in clause 10.1.24.2.2.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.6.7.15 UE Rx-Tx time difference measurements

#### A.6.7.15.1 UE Rx-Tx time difference measurement accuracy for single positioning frequency layer in FR1 SA

##### A.6.7.15.1.1 Test purpose and environment

The purpose of the test is to verify that the UE Rx-Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.25.2. The test is conducted in AWGN propagation condition in FR1 in standalone scenario when single positioning frequency layer is configured.

The supported test configurations in listed in Table A.6.7.15.1.1-1.

Table A.6.7.15.1.1-1: Supported test configurations

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

There are two cells in the test: PCell (Cell 1) and a neighbour cell (Cell 2). All cells are on the same RF channel in FR1.

The *NR-Multi-RTT-ProvideAssistanceData* and *nr-Multi-RTT-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE before the start of the test.

The UE is configured with measurement gap pattern ID #0 or ID #24 before the test.

The UE is configured to transmit SRS on Cell 1 during the test.

The test equipment measures the transmit timing of the UE using the transmitted SRS and measures the receive timing using the PRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE for each cell.

##### A.6.7.15.1.2 Test parameters

The UE Rx-Tx time difference accuracy test parameters are given in Table A.6.7.15.1.2-1.

Table A.6.7.15.1.2-2: UE Rx-Tx time difference measurement accuracy test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| RF Channel Number |  | 1,2,3 | 1 | 1 | 1 | 1 |
| Measurement gap |  | 1,2,3 | GP#24 or GP#0 Note 4 | | GP#24 or GP#0 Note 4 | |
| DRX |  | 1,2,3 | OFF | | OFF | |
| Time offset with Cell 1 | μs | 1, 2, 3 | N/A | 3 | N/A | 3 |
| TDD configuration |  | 1 | N/A | N/A | N/A | N/A |
|  | 2 | TDDConf.1.1 | TDDConf.1.1 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | N/A | SR.1.1 FDD | N/A |
|  | 2 | SR.1.1 TDD |  | SR.1.1 TDD |
|  | 3 | SR.2.1 TDD |  | SR.2.1 TDD |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | N/A | CR.1.1 FDD | N/A |
|  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | N/A | CCR.1.1 FDD | N/A |
|  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | OP.1 | OP.1 | OP.1 |
| TRS Configuration |  | 1 | TRS.1.1 FDD | N/A | TRS.1.1 FDD | N/A |
|  | 2 | TRS.1.1 TDD | TRS.1.1 TDD |
|  | 3 | TRS.1.2 TDD | TRS.1.2 TDD |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | N/A | DLBWP.0.1 ULBWP.0.1 | N/A |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.1 | N/A | DLBWP.1.1 | N/A |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.1 | N/A | ULBWP.1.1 | N/A |
| PRS configuration |  | 1 | PRS.1.1 FR1 | PRS.1.1 FR1 | PRS.1.2 FR1 | PRS.1.2 FR1 |
|  | 2 | PRS.1.1 FR1 | PRS.1.1 FR1 | PRS.1.2 FR1 | PRS.1.2 FR1 |
|  | 3 | PRS.2.1 FR1 | PRS.2.1 FR1 | PRS.2.2 FR1 | PRS.2.2 FR1 |
| PRS Resource slot offset | slot | 1, 2, 3 | 0 | 4 | 0 | 4 |
| SRS configuration |  | 1 | POS-SRS.1 | N/A | POS-SRS.1 | N/A |
|  |  | 2 | POS-SRS.1 | N/A | POS-SRS.1 | N/A |
|  |  | 3 | POS-SRS.2 | N/A | POS-SRS.2 | N/A |
| Note 2 | dBm/SCS | 1 | -98 | | -98 | |
|  | 2 | -98 | | -98 | |
|  | 3 | -95 | | -95 | |
| Note 2 | dBm/15 kHz | 1 | -98 | | -98 | |
|  | 2 |  | |
|  | 3 |  | |
| PRS | dB | 1 | -2.41 | -12.12 | -2.41 | -12.12 |
|  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| PRS | dB | 1 | -2 | -10 | -2 | -10 |
|  | 2 |  |  |  |
|  |  | 3 |  |  |  |  |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1 | -100 | -108 | -100 | -108 |
|  | 2 | -100 | -108 | -100 | -108 |
|  | 3 | -97 | -105 | -97 | -105 |
| Io | dBm/9.36 MHz | 1 | -67.67 | -67.67 | -67.67 | -67.67 |
| dBm/9.36 MHz | 2 | -67.67 | -67.67 | -67.67 | -67.67 |
| dBm/38.16 MHz | 3 | -61.57 | -61.57 | -61.57 | -61.57 |
| Propagation Condition |  | 1, 2, 3 | AWGN | | AWGN | |
| Note 1: Void.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: PRS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: GP#24 is configured if UE supports MG#24, otherwise GP#0 is configured. | | | | | | |

Table A.6.7.15.1.2-2: Void

##### A.6.7.15.1.3 Test requirements

The UE Rx-Tx time difference measurement time fulfils the UE Rx-Tx measurement accuracy requirements specified in clause 10.1.25.2 for both Cell 1 and Cell 2.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.7.1.1.5 Cell reselection to FR2 inter-frequency NR case for UE fulfilling low mobility relaxed measurement criterion

##### A.7.1.1.5.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for UE fulfilling low mobility criterion specified in clause 4.2.2.10.2.

##### A.7.1.1.5.2 Test Parameters

The test scenario comprises of 2 cells (Cell 1 and Cell 2) on 2 different NR carriers respectively as given in tables A.7.1.1.5.2-1, A.7.1.1.5.2-2 and A.7.1.1.5.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2. Cell 2 is of higher priority than Cell 1. The UE is configured with l*owMobilityEvalutation* criterion [2].

Table A.7.1.1.5.2-1: 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.7.1.1.5.2-2: General test parameters for FR2 inter frequency NR cell re-selection test case for UE fulfilling low mobility criterion

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell2 | The UE camps on cell2 and fulfils low mobility (*lowMobilityEvalutation* [2]) criterion. |
|  | Neighbour cell |  | 1, 2 | Cell1 |
| T1 final condition | Active cell |  | 1, 2 | Cell1 | The UE reselects to low priority cell1 during T1 |
|  | Neighbour cell |  | 1, 2 | Cell2 |
| T2 final condition | Active cell |  | 1, 2 | Cell2 | The UE reselects to high priority cell2 during T2 |
|  | Neighbour cell |  |  | 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 pattern 1 |  |
| DRX cycle length | | s | 1, 2 | 0.64 | 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 | 85 | T1 needs to be long enough to allow cell re-selection to already known cell1 |
| T2 | | s | 1, 2 | 85 | T2 needs to be long enough to allow cell re-selection to already known cell2 |

Table A.7.1.1.5.2-3: Cell specific test parameters for FR2 inter frequency NR cell re-selection test case in AWGN for UE fulfilling low mobility criterion

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| 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 | |
|  | dB | 1, 2 | 10.5 | 8 | -10.5 | -8.5 |
| Note2 | dBm/SCS | 1 | -93 | | -93 | |
| 2 | -90 | | -90 | |
| Note2 | dBm/15 kHz | 1, 2 | -102 | | -102 | |
|  | dB | 1, 2 | 10.5 | 8 | -10.5 | 8.5 |
| SS-RSRP Note3 | dBm/SCS | 1 | -82.5 | -85 | -103.5 | -84.5 |
|  |  | 2 | -79.5 | -82 | -100.5 | -81.5 |
| Io | dBm/95.04 MHz | 1 | -53.14 | -55.37 | -63.64 | -54.94 |
|  |  | 2 | -58.10 | -60.189 | -66.79 | -59.79 |
| TreselectionNR | s | 1, 2 | 0 | | 0 | |
| SnonintrasearchP | dB | 1, 2 | 50 | | Not sent | |
| SSearchDeltaP | dB | 1, 2 | 6 | | 6 | |
| TSearchDeltaP | s | 1, 2 | 5 | | 5 | |
| 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 | | | | | | |

##### A.7.1.1.5.3 Test Requirements

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

The cell re-selection delay to an already detected low priority cell, Cell 1, shall be less than 79 s.

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

The cell re-selection delay to an already detected high priority cell, Cell 2, shall be less than 79 s.

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

NOTE 1: The cell re-selection delay to an already detected low priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR

NOTE 2: The cell re-selection delay to an already detected higher priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR

Where:

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

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

This gives a total of 78.08 s, allow 79 s for the cell re-selection delay to an already detected low priority cell for UE fulfilling low mobility criterion in the test case.

This gives a total of 78.08 s, allow 79 s for the cell re-selection delay to an already detected high priority cell for UE fulfilling low mobility criterion in the test case.

#### A.7.1.1.6 Cell reselection to FR2 inter-frequency NR case for UE fulfilling not-at-cell edge relaxed measurement criterion

##### A.7.1.1.6.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements for UE fulfilling not-at-cell edge criterion specified in clause 4.2.2.10.3.

##### A.7.1.1.6.2 Test Parameters

The test scenario comprises of 2 cells (Cell 1 and Cell 2) on 2 different NR carriers respectively as given in tables A.7.1.1.6.2-1, A.7.1.1.6.2-2 and A.7.1.1.6.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and Cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing Cell 2. Cell 2 is of higher priority than Cell 1. The UE is configured with *cellEdgeEvaluation* criterion [2].

Table A.7.1.1.6.2-1: 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.7.1.1.6.2-2: General test parameters for FR2 inter frequency NR cell re-selection test case for UE fulfilling not-at-cell edge criterion

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell2 | The UE camps on cell2 and fulfils not-at-cell edge (*cellEdgeEvaluation* [2]) criterion. |
|  | Neighbour cell |  | 1, 2 | Cell1 |  |
| T1 final condition | Active cell |  | 1, 2 | Cell1 | The UE reselects to low priority cell1 during T1 |
| Neighbour cell |  | 1, 2 | Cell2 |  |
| T2 final condition | Active cell |  | 1, 2 | Cell2 | The UE reselects to high priority cell2 during T2 |
| 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 pattern 1 |  |
| DRX cycle length | | s | 1, 2 | 0.64 | 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 | 85 | T1 needs to be long enough to allow cell re-selection to already known cell. |
| T2 | | s | 1, 2 | 85 | T2 needs to be long enough to allow cell re-selection to already known cell. |

Table A.7.1.1.6.2-3: Cell specific test parameters for FR2 inter frequency NR cell re-selection test case in AWGN for UE fulfilling not-at-cell edge criterion

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| 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 | |
|  | dB | 1, 2 | 10.5 | 8 | -10.5 | 8.5 |
| Note2 | dBm/SCS | 1 | -93 | | -93 | |
| 2 | -90 | | -90 | |
| Note2 | dBm/15 kHz | 1, 2 | -102 | | -102 | |
|  | dB | 1, 2 | 10.5 | 8 | -10.5 | 8.5 |
| SS-RSRP Note3 | dBm/SCS | 1 | -82.5 | -85 | -103.5 | -84.5 |
|  |  | 2 | -79.5 | -82 | -100.5 | -81.5 |
| Io | dBm/95.04 MHz | 1 | -53.14 | -55.37 | -63.64 | -54.94 |
|  |  | 2 | -58.10 | -60.189 | -66.79 | -559.79 |
| SSearchThresholdP |  | 1, 2 | 35 | 35 | 29 | 29 |
| TreselectionNR | s | 1, 2 | 0 | | 0 | |
| SnonintrasearchP | dB | 1, 2 | 50 | | Not sent | |
| 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 | | | | | | |

##### A.7.1.1.6.3 Test Requirements

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

The cell re-selection delay to an already detected low priority cell, Cell 1, shall be less than 79 s.

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

The cell re-selection delay to an already detected high priority cell, Cell 2, shall be less than 79 s.

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

NOTE 1: The cell re-selection delay to an already detected low priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR

NOTE 2: The cell re-selection delay to an already detected higher priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR

Where:

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

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

This gives a total of 78.8 s, allow 79 s for the cell re-selection delay to an already detected low priority cell for UE fulfilling not-at-cell edge criterion in the test case.

This gives a total of 78.08 s, allow 79 s for the cell re-selection delay to an already detected high priority cell for UE fulfilling not-at-cell edge criterion in the test case.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.7.5.3.2.2 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 (m+k). UE is allowed to postpone CSI report to next available UL resource if an available uplink resource is subject to interruption. Whether CSI report in a slot was interrupted is checked by monitoring ACK/NACK sent in PCell in the slot.

During T2 the UE shall start sending valid L1-RSRP report for the SCell in the configured slots for CSI reporting after slot (m+TL1-RSRP), where TL1-RSRP is no larger than

3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report

as defined in clause 8.3.2. For this test case, TFirstSSB\_MAX=TSMTC\_MAX=Trs=20ms; TL1-RSRP, measure=160ms and TL1-RSRP, report=5ms, which allows TL1-RSRP 680 ms.

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

- THARQ is defined in Table A.5.5.3.1.1-2

- Tactivation\_time = 3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)}, which allows 710 ms

- TCSI\_Reporting = 10ms

- NR slot length is 0.125ms for this test case.

During T3 the UE shall stop sending CSI reports for both SCells no later than slot , as defined in clause 8.3.

During T2 interruption of PCell during SCell activation shall not happen outside the slot to , as defined in clause 8.3, where TX =20ms.

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 of PCell due to activation of SCell shall not be more than the values specified for SA in Clause 8.2.2.2.7.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.7.5.3.3.2 Test Requirements

During T2 the UE shall start sending CSI report for the SCell in the configured slots for CSI reporting after at least one CSI-RS transmission occasion for channel measurement and reporting after slot (m+k). UE shall send the first CSI report for SCell after receiving at least one CSI-RS transmission occasion for channel measurement and reporting after slot (m+k), or in the next available uplink resource for CSI reporting if the slot was subject to interruption. Whether CSI report in a slot was interrupted is checked by monitoring ACK/NACK sent in PCell in the slot.

During T2, the UE shall start sending valid L1-RSRP report for the SCell in the configured slots for CSI reporting after slot (m+TL1-RSRP), where TL1-RSRP is no larger than 3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report as defined in clause 8.3.2. For this test case, TFirstSSB\_MAX=TSMTC\_MAX=Trs=20ms; TL1-RSRP, measure=480ms and TL1-RSRP, report=5ms, which allows TL1-RSRP =1000ms.

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

- THARQ is defined in Table A.7.5.3.3.1-2

- Tactivation\_time = 3ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)}, which allows 1030ms

- TCSI\_Reporting = 10ms

- NR slot length is 0.125ms for this test case.

During T2, the interruption of PCell during SCell activation shall not happen outside the slot to , where TX =20ms.

During T3, the UE shall stop sending CSI reports for SCell no later than slot , 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.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.7.6.9.2 NR RSTD measurement reporting delay test case for dual positioning frequency layers in FR2 SA

##### A.7.6.9.2.1 Test Purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the requirements specified in Clause 9.9.2 in an environment with AWGN propagation conditions in FR2 in standalone scenario when dual positioning frequency layer is configured.

Supported test configurations are shown in table A.7.6.9.2.1-1. The test parameters are as given in Table 7.6.7.2.1-2, Table A.7.6.9.2.1-3 and , Table A.7.6.9.2.1-4.

Table A.7.6.9.2.1-1: Supported test configurations for NR RSTD

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

In the test there are three synchronous cells: Cell 1, Cell 2 and Cell 3. Cell 1 is the reference as well as the PCell. Cell 2 and Cell 3 are the neighbour cells. All cells are on the 2 RF channels distributed in dual positioning frequency layers.

The test consists of two consecutive time intervals, with duration of T1 and T2. During time duration T1, the UE shall not have any timing information of Cell 2 and Cell 3. All three cells transmit PRS during T2.Note: The information on when PRS is muted is conveyed to the UE using PRS muting information.

The *NR-DL-TDOA-ProvideAssistanceData* and *nr-DL-TDOA-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE during T1. The last TTI containing the two messages shall be provided to the UE ΔT ms before the start of T2, where ΔT = 50 ms is the maximum processing time of the *DL-TDOA assistance* data and location information request.

The beginning of the time interval T2 shall be aligned with the beginning of the first MG instance containing the PRS resources.

The UE is configured with measurement gap pattern ID # 24 or #13 before T2.

Table A.7.6.9.2.1-2: General test parameters for RSTD measurement reporting delay

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Reference cell | |  | Cell 1 | Reference cell is the cell in the DL-TDOA assistance data with respect to which the RSTD measurement is defined, as specified in TS 38.215 [4] and TS 37.355 [34]. The reference cell is the PCell in this test case. |
| Neighbor cells | |  | Cell 2 and Cell 3 | Cell 2 and Cell 3 appear at the first and second places in the neighbour cell list in the DL-TDOA assistance data. |
| SSB configuration | Config 1 |  | SSB.2 FR2 |  |
| SMTC configuration | Config 1 |  | SMTC.1 |  |
| PDSCH RMC configuration | Config 1 |  | SR.1.1 FDD |  |
| RMSI CORESET RMC configuration | Config 1 |  | CR.3.1 TDD | As specified in clause A.3.1.2.1 |
| Dedicated CORESET RMC configuration | Config 1 |  | CR.1.1 FDD |  |
| PRS Configuration | Config 1 |  | PRS.1.1. FR2 | As specified in clause A.3.31 |
| Physical cell ID PCI | |  | (PCI of Cell 1 – PCI of Cell 2)mod6=0  and  (PCI of Cell 1 – PCI of Cell 3)mod6=0 | The cell PCIs are selected such that the relative shifts of PRS patterns among cells are as given by the test parameters |
| CP length | |  | Normal |  |
| DRX | |  | OFF |  |
| Measurement gap | |  | GP#24 or GP#13 | GP#24 is configured if UE supports MG#24, otherwise GP#13 is configured |
| Radio frame receive time offset between the cells at the UE antenna connector | | μs | Cell 2 to Cell 1: 0  Cell 3 to Cell 1: 3 | PRS are transmitted from synchronous cells |
| Expected RSTD | | μs | Cell 2: 3  Cell 3: 3  Other neighbour cells: randomly between -3 and 3 | The expected RSTD is what is expected at the receiver. The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD indicator |
| Expected RSTD uncertainty for all neighbour cells | | μs | 5 | The corresponding parameter in the DL-TDOA assistance data specified in TS 37.355 [34] is the expectedRSTD-Uncertainty index |
| Number of cells provided in DL-TDOA assistance data | |  | 16 | Including the reference cell |
| PRS muting info | |  | Cell 1: ‘10’  Cell 2: ‘01’  Cell 3: ‘10’ | Correponds to prs-MutingInfo defined in TS 37.355 [24] |
| PRS resource RE offset | |  | Cell 1: 0  Cell 2: 0  Cell 3: 1 | Cell 1 and Cell 3 are configured with different resource offsets |
| T1 | | s | 3 | The length of the time interval from the beginning of each test |
| T2 | | s | 1.28 | The length of the time interval that follows immediately after time interval T1 |
| AoA setup | |  | Setup 1 | As defined in A.3.15.1 |
| Beam assumption | |  | Rough | Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation |

Table A.7.6.9.2.1-3: Cell-specific test parameters for RSTD measurement reporting delay during T1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| NR RF Channel Number | |  | 1 | 1 | 2 |
| Positiong frequency layer | |  | 1 | 1 | 2 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | N/A | N/A |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | |
| EPRE ratio of PDCCH DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH DMRS | |
| EPRE ratio of PDSCH DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |
| Note 3 | Config 1 | dBm/SCS | -89 | | |
| PRS | | dB | -Infinity | -Infinity | -Infinity |
| Io Note 4 | Config 1 | dBm/95.04MHz | -58.86 | -60.01 | -60.01 |
| SSB RP Note4 | Config 1 | dBm/SCS | -89 | -Infinity | -Infinity |
|  |  | dB | 0 | -Infinity | -Infinity |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cell (Cell 1) is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 4: SSB RP and Io levels have been derived from other parameters and are given for information purpose. These are not settable test parameters. | | | | | |

Table A.7.6.9.2.1-4: Cell-specific test parameters for RSTD measurement reporting delay during T2 and T3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 1 | Cell 2 | Cell 3 |
| T2 | T2 | T2 |
| RF Channel Number | |  | 1 | 1 | 2 |
| Positiong frequency layer | |  | 1 | 1 | 2 |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low | 1x2 Low | 1x2 Low |
| OCNG patterns defined in A.3.2.1 | |  | OP.1 | OP.1 | N/A |
| PRACH configuration | |  | FR2 PRACH configuration 1 | FR2 PRACH configuration 1 | FR2 PRACH configuration 1 |
| Note 3 | Config 1 | dBm/SCS | -89 | -89 | -89 |
| PRS | Config 1 | dB | -5.44 | -11.67 | -11.67 |
| Io | Config 1 | dBm/  9.36MHz | -59.65 | -59.92 | -59.92 |
| PRS | | dB | -6 | -13 | -13 |
| Propagation Condition | |  | AWGN | | |
| Note 1: OCNG shall be used such that active cells (all, except Cell 3 in T3) are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols other than those in the subframes with transmitted PRS.  Note 2: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  Note 3: Interference from other cells and noise sources not specified in the test are assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled. | | | | | |

**Table A.7.6.9.2.1-5: Void**

##### A.7.6.9.2.2 Test Requirements

The RSTD measurement time fulfils the requirements specified in Clause 9.9.2.5.

The UE shall perform and report the RSTD measurements for Cell 2 and Cell 3 with respect to the reference cell in the DL-TDOA assistance data, Cell 1, within the time duration specified in section 9.9.1.5 starting from the beginning of time interval T2.

The rate of the correct events for each neighbour cell observed during repeated tests shall be at least 90%, where the reported RSTD measurement for each correct event shall be within the RSTD reporting range specified in Clause 10.1.23.3, i.e., between RSTD\_0000000 and RSTD\_1970049.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

#### A.7.7.1.2 SA inter-frequency case measurement accuracy with FR2 serving cell and FR2 target cell

##### A.7.7.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.5.1.1 and 10.1.5.1.2 for intrer-frequency measurements with the testing configurations for NR cells in Table A.7.7.1.2.1-1.

Table A.7.7.1.2.1-1: Applicable NR configurations for FR2 inter-frequency SS-RSRP accuracy test

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |

##### A.7.7.1.2.2 Test parameters

In this set of test cases there are two cells in the test, PCell (Cell 1) and a FR2 neighbour cell (Cell 2) on a different frequency than the PCell. The test parameters and applicability for Cell 1 are defined in A.3.7.2. The test parameters for the Cell 1 and Cell 2 are given in Table A.7.7.1.2.2-1 and Table A.7.7.1.2.2-2 below. Both absolute and relative accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.7.7.1.2.2-1 and Table A.7.7.1.2.2-1. The inter-frequency measurements are supported by a measurement gap.

Table A.7.7.1.2.2-1: SS-RSRP inter-frequency test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| SSB ARFCN | 1~2 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1~2 |  | 100:  NRB,c = 66 | | 100:  NRB,c = 66 | |
| Data RBs allocated | 1 |  | 24 | | 24 | |
| 2 | 48 | | 48 | |
| Gap pattern ID |  |  | 0 | | 0 | |
| Duplex mode | 1~2 |  | TDD | | TDD | |
| TDD configuration | 1~2 |  | TDDConf.3.1 | | TDDConf.3.1 | |
| PDSCH Reference measurement channel | 1 |  | SR.3. 2 TDD | - | SR.3. 2 TDD | - |
| 2 | SR.3.3 TDD | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| 2 | CR.3.2 TDD | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| 2 | CCR.3.7 TDD | CCR.3.7 TDD |
| SSB configuration | 1 |  | SSB.3 FR2 | | SSB.3 FR2 | |
|  | 2 |  | SSB.4 FR2 | | SSB.4 FR2 | |
| PDSCH/PDCCH subcarrier spacing | 1~2 | kHz | 120 | | 120 | |
| OCNG Patterns | 1~2 |  | OP.3 | | OP.3 | |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.3  ULBWP.1.3 | | DLBWP.1.3  ULBWP.1.3 | |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 | | TCI.State.2 | |
| SMTC configuration | 1~2 |  | SMTC.1 | | SMTC.1 | |
| Time offset between Cell 2 and Cell 1 | 1~2 | μs | 3 | | 3 | |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |  |
| Propagation condition | 1~2 | - | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration | 1~2 | - | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Void. | | | | | | |

Table A.7.7.1.2.2-2: SS-RSRP inter frequency OTA related test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
|  |  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration | 1~2 |  | Setup 4b according to clause A.3.15.4.2 | | Setup 4b according to clause A.3.15.4.2 | |
|  |  |  | AoA1  Spherical coverage | AoA2  Rx Beam Peak | AoA1  Spherical coverage | AoA2  Rx Beam Peak |
| Assumption for UE beamsNote 7 | 1~2 |  | Rough | | Rough | |
| Note1 | 1 | dBm/15kHzNote4 | -90.6 | -90.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +1.97dB) | (Table B.2.3-2 Rx Beam PeakNote 8 -3.03dB) |
|  | 2 |  | -93.7 | -93.7 |
| Note1 | 1 | dBm/SCSNote4 | -81.6 | -81.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +11.0dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +6.0dB) |
|  | 2 |  | -81.7 | -81.7 | (Table B.2.3-2 Rx Beam PeakNote 8 +14.0dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +9.0dB) |
|  | 1~2 | dB | 6.0 | 6.0 | 17.0 | -1.0 |
| SSB\_RPNote2 | 1 | dBm/SCS | -75.6 | -75.6 | (Table B.2.3-2 Rx Beam PeakNote 8 +28.0dB) | (Table B.2. 3-2 Rx Beam PeakNote 8 +5.0dB) |
|  | 2 |  | -75.7 | -75.7 | (Table B.2.3-2 Rx Beam PeakNote 8 +31.0dB) | (Table B.2. 3-2 Rx Beam PeakNote 8 +8.0dB) |
| (SSB\_RPCell 1 – SSB\_RPCell 2) | 1~2 | dB | 0 | | 23.00 | |
| BBNote6 | 1 | dB | 5.26 | 5.96 | 9.53 | -3.46 |
|  | 2 |  | 4. 61 | 5.91 |  |  |
| IoNote2 | 1 | dBm/95.04 MHz Note4 | -50.00 | -50.00 | (Table B.2.3-2 Rx Beam PeakNote 8 +52.68dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +33.13dB) |
|  | 2 |  | -50.09 | -50.09 | (Table B.2.3-2 Rx Beam PeakNote 8 +55.69dB) | (Table B.2.3-2 Rx Beam PeakNote 8 +36.14dB) |
| (Iofreq 1 – Io freq 2) | 1~2 | dB | 0 | | 19.55 | |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SSB\_RP, Es/Iot, Io, (SSB\_RPCell 2 – SSB\_RPCell 1) and (Iofreq 2 – Io freq 1) 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: Void  Note 6: 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 or ΔMBS from TS 38.101-2 [19] Table 6.2.1.3-4.  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 8: The value in Table B.2.3-2 is the Minimum SSB\_RP for SCSSSB = 120 kHz, selected according to the operating band of Cell 2 and UE power class, without ∆MBP,n adjustment. | | | | | | |

##### 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 = [5.5dB]. D is the margin due to mis-alignment between fine beam and rough beam.  Note 6: Ginter = [3dB]. Ginter is the margin due to different antenna gain caused by frequency separation. | |

#### A.7.7.1.3 SA inter-frequency measurement accuracy with FR1 serving cell and FR2 target cell

##### A.7.7.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.5.1.1 for inter-frequency measurements with the testing configurations in Table A.7.7.1.3.1-1.

Table A.7.7.1.3.1-1: Applicable NR configurations for FR2 inter-frequency SS-RSRP accuracy test

|  |  |  |
| --- | --- | --- |
| **Config** | **Description of serving cell** | **Description of target cell** |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 120 kHz SSB SCS, 100 MHz bandwidth, TDD 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 |

##### A.7.7.1.3.2 Test parameters

In this set of test cases there are two cells in the test, PCell (Cell 1) in FR1 and Cell 2 in FR2 . The test parameters for the Cell 1 and Cell 2 are given in Table A.7.7.1.3.2-1 and Table A.7.7.1.3.2-2 below. Absolute accuracy of RSRP inter-frequency measurements are tested by using the parameters in Table A.7.7.1.3.2-1 and Table A.7.7.1.3.2-2. The inter-frequency measurements are supported by a measurement gap.

Table A.7.7.1.3.2-1: SS-RSRP inter-frequency test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Config | Unit | Test 1 | | Test 2 | |
| Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| SSB ARFCN | 1~3 |  | freq1 | freq2 | freq1 | freq2 |
| BWchannel | 1 | MHz | 10:  NRB,c = 52 | 100:  NRB,c = 66 | 10:  NRB,c = 52 | 100:  NRB,c = 66 |
| 2 | 10:  NRB,c = 52 | 10:  NRB,c = 52 |
| 3 | 40:  NRB,c = 106 | 40:  NRB,c = 106 |
| Data RBs allocated | 1,2 |  | 52 | 24 | 52 | 66 |
| 3 | 106 | 106 |
| Duplex mode | 1 |  | FDD | TDD | FDD | TDD |
| 2 | TDD | TDD |
| 3 | TDD | TDD |
| TDD configuration | 1 |  | N/A | TDDConf.3.1 | N/A | TDDConf.3.1 |
| 2 | TDDConf.1.1 | TDDConf.1.1 |
| 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD | - | SR.1.1 FDD | - |
| 2 | SR.1.1 TDD | SR.1.1 TDD |
| 3 | SR.2.1 FDD | SR.2.1 FDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD | - | CR.1.1 FDD | - |
| 2 | CR.1.1 TDD | - | CR.1.1 TDD | - |
| 3 | CR.2.1 FDD | - | CR.2.1 FDD | - |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD | - | CCR.1.1 FDD | - |
| 2 |  | CCR.1.1 TDD | - | CCR.1.1 TDD | - |
| 3 |  | CCR.2.1 TDD | - | CCR.2.1 TDD | - |
| SSB configuration | 1 |  | SSB.1 FR1 | SSB.3 FR2 | SSB.1 FR1 | SSB.3 FR2 |
| 2 | SSB.1 FR1 | SSB.1 FR1 |
| 3 | SSB.2 FR1 | SSB.2 FR1 |
| OCNG Patterns | 1~3 |  | OP.1 | OP.3 | OP.1 | OP.1 |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 | | DLBWP.0.1  ULBWP.0.1 | |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.3  ULBWP.1.3 | | DLBWP.1.3  ULBWP.1.3 | |
| TRS Configuration | 1~3 |  | TRS.2.1 TDD | | TRS.2.1 TDD | |
| PDCCH/PDSCH TCI Configuration | 1~3 |  | TCI.State.2 | | TCI.State.2 | |
| SMTC configuration | 1~3 |  | SMTC.1 | | SMTC.1 | |
| Time offset between Cell 2 and Cell 1 | 1~3 | μs | 3 | | 3 | |
| EPRE ratio of PSS to SSS | 1~3 | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Propagation condition | 1~3 | - | NA  Link only, see clause A.3.7A | AWGN | NA  Link only, see clause A.3.7A | AWGN |
| Antenna configuration | 1~3 | - | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Void | | | | | | |

Table A.7.7.1.3.2-2: SS-RSRP inter-frequency OTA related test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Test 1** | | **Test 2** NOTE 3 | |
| **Cell 1** | **Cell 2** | **Cell 1** | **Cell 2** |
| Angle of arrival configuration according to clause A.3.15 |  |  | NA | Setup 2b | NA | Setup 2b |
| Assumption for UE beamsNote 4 |  |  | N/A | Rough | N/A | Rough |
|  | 1~3 | dBm/15kHz | NA  Link only, see clause A.3.7A | -90 | NA  Link only, see clause A.3.7A | NA |
|  | 1~3 | dBm/SSB SCS | -80.97 | NA |
|  | 1~3 | dB | 5 | NA |
| Es | 1~3 | dBm/SCS |  | (Table B.2.3-2 Spherical coverage +1dB) |
| SSB\_RPNote1 | 1~3 | dBm/SCS | -76.0 | Table B.2.3-2 Spherical coverage +1dB) |
| BBNote6 | 1~3 | dB | 4.35 | -3.81 |
| IoNote1 | 1~3 | dBm/  95.04MHz | -50.18 | SSB\_RP+28.98 |
| Note 1: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 2: Void  Note 3: No additional noise is added by the test system in Test 2.  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: Where used, 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 6: 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 ΔMBS from TS 38.101-2 [19] Table 6.2.1.3-4. | | | | | | |

##### A.7.7.1.3.3 Test Requirements

The SS-RSRP measurement accuracy for Cell 2 shall fulfil the Absolute requirement in clause 10.1.5.1.1.

Test 1:

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.7.7.1.3.3.

Test 2:

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.7.7.1.3.3.

Table A.7.7.1.3.3: SS-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3,4 |
| Cell 2 | SSB\_RP1 -δ +Gmin +X ≤ Reported RSRP(dBm) ≤ SSB\_RP1 +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. | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.7.7.10 RSTD measurements

#### A.7.7.10.1 RSTD measurement accuracy test case for single positioning frequency layer

##### A.7.7.10.1.1 Test purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the accuracy requirements specified in clause 10.1.23.2 in an environment with AWGN propagation conditions.

The supported test configurations are specified in Table A.7.7.10.1.1-1.

Table A.7.7.10.1.1-1: Supported test configurations

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

In the test there are two synchronous cells: Cell 1 and Cell 2. Cell 1 is the reference as well as the PCell. Cell 2 is a neighbour cells. Both cells are on the same NR RF channel in FR2. GP#24 is configured if UE supports GP#24, otherwise, GP#13 is configured for the test. The *NR-TDOA-ProvideAssistanceData* and *NR-TDOA-RequestLocationInformation* message as defined in TS 37.355 shall be provided to the UE before the start of the test. The test duration should be larger than the UE measurement period as defined in clause 9.9.2.

Table A.7.7.10.1.1-2: RSTD accuracy test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| PRS ARFCN |  | freq1 | | freq1 | |
| Duplex mode |  | TDD | | TDD | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Downlink initial BWP configuration |  | DLBWP.0.1 | - | DLBWP.0.1 | - |
| Downlink dedicated BWP configuration |  | DLBWP.1.1 | - | DLBWP.1.1 | - |
| Uplink initial BWP configuration |  | ULBWP.0.1 | - | ULBWP.0.1 | - |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | - | ULBWP.1.1 | - |
| DRX cycle configuration |  | Not applicable | - | Not applicable | - |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| TCI state |  | TCI.State.0 | - | TCI.State.0 | - |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET Reference Channel |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.3 | OP.3 | OP.3 | OP.3 |
| SSB configuration |  | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 |
| SMTC configuration |  | SMTC.1 | SMTC.1 | SMTC.1 | SMTC.1 |
| PRS configuration |  | PRS.1.1 FR2 | PRS.1.1 FR2 | PRS.1.2 FR2 | PRS.1.2 FR2 |
|  |  |  |  |  |  |
| PRS Resource slot offset | slot | 0 | 4 | 0 | 4 |
| Expected RSTD | μs | N/A | 3 | N/A | 3 |
| Expected RSTD uncertainty | μs | N/A | 5 | N/A | 5 |
| Time offset with Cell 1 | μs | - | 3 | - | 3 |
| PDSCH/PDCCH subcarrier spacing | kHz | 120 | 120 | 120 | 120 |
| EPRE ratio of PSS to SSS | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |
| Propagation conditions |  | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | | | |

Table A.7.7.10.1.1-3: RSTD accuracy OTA related test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | | | |
| Assumption for UE beamsNote 5 |  | Rough | | Rough | |
| Note1 | dBm/SCSNote3 | -98 | | -98 | |
|  | dB | -6 | -13 | -6 | -13 |
| PRS-RSRPNote2 | dBm/SCS | -104 | -111 | -104 | -111 |
| BB Note4 | dB | -6 | -13 | -6 | -13 |
| IoNote2 | dBm/95.04 MHz Note3 | -68.04 | -68.80 | -68.04 | -68.80 |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SSB\_RP, Es/Iot and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 4: 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 36.101-2 [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.  Note 5: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | |

##### A.7.7.10.1.2 Test Requirements

The RSTD measurement accuracy for Cell 2 shall fulfil the absolute requirement in clause 10.1.23.2.

#### A.7.7.10.2 RSTD measurement accuracy test case for dual positioning frequency layer

##### A.7.7.10.2.1 Test purpose and Environment

The purpose of the test is to verify that the RSTD measurement meets the accuracy requirements specified in clause 10.1.23.2 in an environment with AWGN propagation conditions. The *NR-TDOA-ProvideAssistanceData* and *NR-TDOA-RequestLocationInformation* message as defined in TS 37.355 shall be provided to the UE before the start of the test. The test duration should be larger than the UE measurement period as defined in clause 9.9.2.

The supported test configurations are specified in Table A.7.7.10.2.1-1.

Table A.7.7.10.2.1-1: Supported test configurations

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

In the test there are two synchronous cells: Cell 1 and Cell 2. Cell 1 is the reference as well as the PCell on NR RF channel #1 in FR2. Cell 2 is a neighbour cell on a different NR RF channel #2 in FR2. GP#24 is configured if UE supports GP#24, otherwise, GP#13 is configured for the test.

Table A.7.7.10.2.1-2: RSTD accuracy test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| PRS ARFCN |  | freq1 | | freq1 | |
| PRS ARFCN |  | freq1 | freq2 | freq1 | freq2 |
| Duplex mode |  | TDD | | TDD | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 100: NRB,c = 66 | | 100: NRB,c = 66 | |
| Downlink initial BWP configuration |  | DLBWP.0.1 | - | DLBWP.0.1 | - |
| Downlink dedicated BWP configuration |  | DLBWP.1.1 | - | DLBWP.1.1 | - |
| Uplink initial BWP configuration |  | ULBWP.0.1 | - | ULBWP.0.1 | - |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | - | ULBWP.1.1 | - |
| DRX cycle configuration |  | Not applicable | - | Not applicable | - |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| TCI state |  | TCI.State.0 | - | TCI.State.0 | - |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET Reference Channel |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.3 | OP.3 | OP.3 | OP.3 |
| SSB configuration |  | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 |
| SMTC configuration |  | SMTC.1 | SMTC.1 | SMTC.1 | SMTC.1 |
| PRS configuration |  | PRS.1.1 FR2 | PRS.1.1 FR2 | PRS.1.2 FR2 | PRS.1.2 FR2 |
| PRS Resource slot offset | slot | 0 | 4 | 0 | 4 |
| Expected RSTD | μs | N/A | 3 | N/A | 3 |
| Expected RSTD uncertainty | μs | N/A | 5 | N/A | 5 |
| Time offset with Cell 1 | μs | - | 3 | - | 3 |
| PDSCH/PDCCH subcarrier spacing | kHz | 120 | 120 | 120 | 120 |
| EPRE ratio of PSS to SSS | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |
| Propagation conditions |  | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | | | |

Table A.7.7.10.2.1-3: RSTD accuracy OTA related test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | | | |
| Assumption for UE beamsNote 5 |  | Rough | | Rough | |
| Note1 | dBm/SCSNote3 | -98 | | -98 | |
|  | dB | -6 | -13 | -6 | -13 |
| PRS-RSRPNote2 | dBm/SCS | -104 | -111 | -104 | -111 |
| BB Note4 | dB | -6 | -13 | -6 | -13 |
| IoNote2 | dBm/95.04 MHz Note3 | -68.04 | -68.80 | -68.04 | -68.80 |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SSB\_RP, Es/Iot and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 4: 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 36.101-2 [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.  Note 5: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | |

##### A.7.7.10.2.2 Test Requirements

The RSTD measurement accuracy for Cell 2 shall fulfil the absolute requirement in clause 10.1.23.2.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.7.7.11 PRS-RSRP measurements

#### A.7.7.11.1 SA measurement accuracy with PRS in FR2

##### A.7.7.11.1.1 Test Purpose and Environment

The purpose of this test is to verify that the PRS-RSRP measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.24.2.1 and 10.1.24.2.2.

##### A.7.7.11.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency. Supported test configurations are shown in Table A.7.7.11.1.2-1. Both absolute and relative accuracy of PRS-RSRP measurements are tested by using the parameters in Table A.7.7.11.1.2-2 and A.7.7.11.1.2-3. In all test cases, Cell 1 is the PCell. The TCI status for Cell 1 is defined in Table A.3.16.2-1 and TRS configuration for Cell 1 is defined in Table A.3.17.2.1-1.

Table A.7.7.11.1.2-1: PRS-RSRP supported test configurations

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

Table A.7.7.11.1.2-2: PRS-RSRP general test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Cell ID |  | 489 | 0 | 489 | 0 |
| SSB ARFCN |  | freq1 | | freq1 | |
| Duplex mode |  | TDD | | TDD | |
| TDD configuration |  | TDDConf.3.1 | | TDDConf.3.1 | |
| BWchannel | MHz | 100: NRB,c = 24 | | 100: NRB,c = 24 | |
| Downlink initial BWP configuration |  | DLBWP.0.1 | - | DLBWP.0.1 | - |
| Downlink dedicated BWP configuration |  | DLBWP.1.1 | - | DLBWP.1.1 | - |
| Uplink initial BWP configuration |  | ULBWP.0.1 | - | ULBWP.0.1 | - |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | - | ULBWP.1.1 | - |
| DRX cycle configuration |  | Not applicable | - | Not applicable | - |
| Measurement gap |  | GP#13 or GP#24 Note2 | | | |
| TRS configuration |  | TRS.2.1 TDD | - | TRS.2.1 TDD | - |
| TCI state |  | TCI.State.0 | - | TCI.State.0 | - |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | - | SR.3.1 TDD | - |
| RMSI CORESET Reference Channel |  | CR.3.1 TDD | - | CR.3.1 TDD | - |
| Control channel RMC |  | CCR.3.1 TDD | - | CCR.3.1 TDD | - |
| OCNG Patterns |  | OP.3 | OP.3 | OP.3 | OP.3 |
| SSB configuration |  | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 | SSB.3 FR2 |
| SMTC configuration |  | SMTC.1 | SMTC.1 | SMTC.1 | SMTC.1 |
| Time offset with Cell 1 | μs | - | 3 | - | 3 |
| PRS configuration |  | PRS.1.3 FR2 | PRS.1.3 FR2 | PRS.1.4 FR2 | PRS.1.4 FR2 |
| PRS Resource slot offset | slot | 0 | 4 | 0 | 4 |
| PDSCH/PDCCH subcarrier spacing | kHz | 120 | 120 | 120 | 120 |
| EPRE ratio of PSS to SSS | dB | 0 | 0 | 0 | 0 |
| EPRE ratio of PBCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS |  |  |  |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS |  |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS |  |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |  |  |
| Propagation conditions |  | AWGN | AWGN | AWGN | AWGN |
| Antenna configuration |  | 1x2 | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: GP#24 is configured if UE supports MG#24, otherwise GP#13 is configured. | | | | | |

Table A.7.7.11.1.2-3: PRS-RSRP OTA related test parameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test 1 | | Test 2 | |
|  |  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | | | |
| Assumption for UE beamsNote 7 |  | Rough | | Rough | |
| Note1 | dBm/15kHzNote4 | -91.6 | | -91.6 | |
| Note1 | dBm/SCSNote4 | -82.6 | | -82.6 | |
|  | dB | 6.0 | 1.0 | 6.0 | 1.0 |
| Es | dBm/SCSNote4 | - | - | - | - |
| PRS\_RPNote2 | dBm/SCS | -76.6 | -81.6 | -76.6 | -81.6 |
| BB Note6 | dB | 2.44 | -5.98 | 2.44 | -5.98 |
| IoNote2 | dBm/95.04 MHz Note4 | -50.05 | | -50.05 | |
| Note 1: Where used, interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: PRS\_RP, Es/Iot 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: Void  Note 6: 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 36.101-2 [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.  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | | | |

##### A.7.7.11.1.3 Test Requirements

In each test, the absolute PRS-RSRP measurement for each cell shall fulfil the absolute accuracy requirement in clause 10.1.24.2.1 if the reported PRS-RSRP is in the range shown in table A.7.7.11.1.3-1. The relative PRS-RSRP measurement between the two PRS resources within the same cell shall fulfil the relative accuracy requirement in clause 10.1.24.2.2.

Table A.7.7.11.1.3-1: PRS-RSRP absolute accuracy test requirement

|  |  |
| --- | --- |
|  | Test requirement Notes1,2,3 |
| Cell 1 | PRS\_RP1 -δ +Gmin ≤ Reported RSRP(dBm) ≤ PRS\_RP1 +δ +Gmax |
| Cell 2 | PRS\_RP2 -δ +Gmin ≤ Reported RSRP(dBm) ≤ PRS\_RP2 +δ +Gmax |
| Note 1: PRS\_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 10.1.24.2.1-2, 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.2.1.6.1-1, selected according to the UE power class | |

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

### A.7.7.12 UE Rx-Tx time difference measurements

#### A.7.7.12.1 UE Rx-Tx time difference measurement period for single positioning frequency layer in FR2 SA

##### A.7.7.12.1.1 Test purpose and environment

The purpose of the test is to verify that the UE Rx-Tx time difference measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.25.2. The test is conducted in AWGN propagation condition in FR2 in standalone scenario when single positioning frequency layer is configured.

The supported test configuration is listed in Table A.7.7.12.1.1-1.

Table A.7.7.12.1.1-1: Supported test configurations

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

There are two cells in the test: PCell (Cell 1) and a neighbour cell (Cell 2). All cells are on the same RF channel in FR2.

The *NR-Multi-RTT-ProvideAssistanceData* and *nr-Multi-RTT-RequestLocationInformation* as defined in TS 37.355 [34, clause 6.5.12.1], shall be provided to the UE before the start of the test.

The UE is configured with measurement gap pattern ID #13 or ID #24 before the test.

The UE is configured to transmit SRS on Cell 1 during the test.

The test equipment measures the transmit timing of the UE using the transmitted SRS and measures the receive timing using the PRS. The test equipment then compares the difference of these two timings to the UE Rx-Tx measurement reported by the UE for each cell.

##### A.7.7.12.1.2 Test parameters

The UE Rx-Tx time difference accuracy test parameters are given in Table A.7.7.12.1.2-1.

Table A.7.7.12.1.2-1: UE Rx-Tx time difference measurement accuracy test parameters

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Test 1 | | Test 2 | |
|  | Cell 1 | Cell 2 | Cell 1 | Cell 2 |
| AoA setup |  | 1 | Setup 1 as specified in clause A.3.15 | | Setup 1 as specified in clause A.3.15 | |
| Beam AssumptionNote 7 |  | 1 | Rough | Rough | Rough | Rough |
| Measurement gap |  | 1 | GP#24 or GP#13 Note 8 | | GP#24 or GP#13 Note 8 | |
| DRX |  | 1 | OFF | | OFF | |
| Time offset with Cell 1 | μs | 1 | N/A | 3 | N/A | 3 |
| TDD configuration |  | 1 | TDDConf.3.1 | TDDConf.3.1 | TDDConf.3.1 | TDDConf.3.1 |
| PDSCH RMC configuration |  | 1 | SR.3.1 TDD | N/A | SR.3.1 TDD | N/A |
| RMSI CORESET RMC configuration |  | 1 | CR.3.1 TDD | N/A | CR.3.1 TDD | N/A |
| Dedicated CORESET RMC configuration |  | 1 | CCR.3.1 TDD | N/A | CCR.3.1 TDD | N/A |
| OCNG Patterns |  | 1 | OP.1 | OP.1 | OP.1 | OP.1 |
| TRS Configuration |  | 1 | TRS.2.1 TDD | N/A | TRS.2.1 TDD | N/A |
| Initial BWP configuration |  | 1 | DLBWP.0.1 ULBWP.0.1 | N/A | DLBWP.0.1 ULBWP.0.1 | N/A |
| Active DL BWP configuration |  | 1 | DLBWP.1.1 | N/A | DLBWP.1.1 | N/A |
| Active UL BWP configuration |  | 1 | ULBWP.1.1 | N/A | ULBWP.1.1 | N/A |
| PRS configuration |  | 1 | PRS.1.1 FR2 | PRS.1.1 FR2 | PRS.1.2 FR2 | PRS.1.2 FR2 |
| PRS Resource slot offset | slot | 1 | 0 | 4 | 0 | 4 |
| SRS configuration |  | 1 | POS-SRS.3 | N/A | POS-SRS.3 | N/A |
| Note 2 | dBm/SCS | 1 | -89 | | -89 | |
| Note 2 | dBm/15 kHz | 1 | -98 | | -98 | |
| PRS | dB | 1 | -2.41 | -12.12 | -2.41 | -12.12 |
| PRS | dB | 1 | -2 | -10 | -2 | -10 |
| PRS-RSRP Note 3 | dBm/SCS kHz | 1 | -91 | -99 | -91 | -99 |
| Io | dBm/95.04 MHz | 1 | -57.63 | -57.63 | -57.63 | -57.63 |
| Propagation Condition |  | 1 | AWGN | | AWGN | |
| Note 1: Void.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: PRS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: PRS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 6: As observed with 0 dBi gain antenna at the centre of the quiet zone  Note 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation  Note 8: GP#24 is configured if UE supports MG#24, otherwise GP#13 is configured. | | | | | | |

Table A.7.7.12.1.2-2: Void

##### A.7.7.12.1.3 Test requirements

The UE Rx-Tx time difference measurement time fulfils the UE Rx-Tx measurement accuracy requirements specified in clause 10.1.25.2 for both Cell 1 and Cell 2.

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.10.3.3.1 SCell Activation and Deactivation of known NR SCell with NR PSCell and NR SCell under CCA, 160 ms SCell measurement cycle

A.10.3.3.1.1 Test Purpose and Environment

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

The supported test configurations are shown in Table A.10.3.3.1.1-1.

The test parameters are given in Table A.10.3.3.1.1-2 and cell-specific parameters for NR cells are provided in Table A.10.3.3.1.1-3 below. Cell-specific parameters for EUTRA PCell are provided in clause A.3.7.2.1.

The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are three carriers, each with one cell: Cell 1 (PCell) on radio channel 1 (PCC) in E-UTRA, Cell 2 (PSCell) on radio channel 2 (PSCC) in NR, and Cell3 (SCell) on radio channel 3 (SCC) in NR. Before the test starts the UE is connected to Cell 1 and Cell 2, but is not aware of Cell 3, as the UE is only monitoring PCC and PSCC. 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 radio channel 2. The UE now starts monitoring the SCC. At the end of T1, the test equipment sends a MAC message for activation of the SCell.

The point in time at which the MAC message is received at the UE antenna connector, in a slot # denoted *m*, defines the start of time period T2. The UE shall be able to report a valid CSI in PSCell for the activated SCell at latest in slot *m* + (THARQ+ Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, as defined in clause 8.3A.2. The UE shall start reporting CSI in PSCell in first available uplink resource for CSI reporting after at least one CSI-RS transmission occasion for channel measurement and reporting following slot *m+* and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PSCell interruption shall fall within the time window specified in clause 8.3A.2.

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

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in 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, while taking into account CCA failures on SCC.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.10.3.3.1.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+ Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB + L1\*Trs + 5ms, as specified in clause 8.3A.2.

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

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

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

The interruption on PSCell shall not be more than specified for EN-DC in clause 8.2.1.2.4.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.10.3.3.2.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+ Tactivation\_time\_withCCA + TCSI\_reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + L2,1\*TSMTC\_MAX + (1 +L2,2)\*Trs + 5ms, as specified in clause 8.3A.2.

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

During T2, interruption on PSCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB\_MAX + L2,1\* TSMTC\_MAX.

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

The interruption on PSCell shall not be more than specified for EN-DC in clause 8.2.1.2.4.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.10.3.3.3.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+ Tactivation\_time\_withCCA + TCSI\_reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + (1 + L3,1)\*TSMTC\_MAX + (2 + L3,2)\*Trs + 5ms, as specified in clause 8.3A.2.

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

During T2, interruption on PSCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB\_MAX + L3,1\* TSMTC\_MAX.

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

The interruption on PSCell shall not be more than specified for EN-DC in clause 8.2.1.2.4.

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.11.4.3.1.1 Test Purpose and Environment

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

The supported test configurations are shown in Table A.11.4.3.1.1-1.

The test parameters are given in Table A.11.4.3.1.1-2 and cell-specific parameters in Table A.11.4.3.1.1-3 below. The test consists of three successive time periods, with duration of T1, T2 and T3, respectively. There are two carriers, each with one cell: Cell 1 (PCell) on radio channel 1 (PCC) in NR with CCA, and Cell2 (SCell) on radio channel 2 (SCC) in NR with CCA. Before the test starts the UE is connected to Cell 1, but is not aware of Cell 2, as the UE is only monitoring the PCC. The UE shall be continuously scheduled in the PCell throughout the whole test.

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

The point in time at which the MAC message is received at the UE antenna connector, in a slot # denoted *m*, defines the start of time period T2. The UE shall be able to report a valid CSI in PCell for the activated SCell at latest in slot *m* + (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, as defined in clause 8.3A.2. The UE shall start reporting CSI in PCell in first available uplink resource for CSI reporting after at least one CSI-RS transmission occasion for channel measurement and reporting following slot *m+* and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption shall fall within the time window specified in clause 8.3.2.

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.11.4.3.1.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB + L1\*Trs + 5ms, as specified in clause 8.3A.2.

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

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.11.4.3.2.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + L2,1\*TSMTC\_MAX + (1 +L2,2)\*Trs + 5ms, as specified in clause 8.3A.2.

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

During T2, interruption on PCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB\_MAX + L2,1\* TSMTC\_MAX.

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.11.4.3.3.2 Test Requirements

During T2, starting after at least one CSI-RS transmission occasion for channel measurement and reporting from the slot specified in clause 4.3 of TS 38.213 [3] 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.

During T2, the UE shall send the first valid CSI report (non-zero CQI) for the SCell in first available uplink resource for CSI reporting no later than slot *m +* (THARQ+Tactivation\_time\_withCCA + TCSI\_Reporting\_withCCA)/NR\_slot\_length, where Tactivation\_time\_withCCA = TFirstSSB\_MAX + (1 + L3,1)\*TSMTC\_MAX + (2 + L3,2)\*Trs + 5ms, as specified in clause 8.3A.2.

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

During T2, interruption on PCell shall not occur outside slot *m* +1+ to slot *m* +1+ with TX = TFirstSSB\_MAX + L3,1\* TSMTC\_MAX.

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.13.2.2.1.1 Test Purpose and Environment

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

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

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

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

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

Any PCell interruption shall fall within the time window specified in clause 8.3A.2. At the end of T2 the test equipment sends a MAC message for deactivation of the SCell.

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.13.2.2.1.2 Test Requirements

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

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

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

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.13.2.2.2.2 Test Requirements

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

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

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

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

A.13.2.2.3.2 Test Requirements

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

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

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

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

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

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

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

<<End of change>>

<<Unchanged sections skipped>>

<<Start of change>>

## B.2.14 Conditions for NR PRS-based measurements

This clause defines the following conditions for NR PRS-based measurements and corresponding procedures performed based on PRS: PRP and PRS Ês/Iot, applicable for a corresponding operating band.

The conditions are defined in Table B.2.14-1 for FR1 NR cells.

The conditions are defined in Table B.2.14-2 for FR2 NR cells.

Table B.2.14-1: Conditions for NR PRS-based measurements in FR1

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | NR operating band groups Note1 | Minimum PRP1,2 | | | PRS Ês/Iot |
| dBm / SCSPRS | | | dB |
| SCSPRS = 15 kHz | SCSPRS = 30 kHz | SCSPRS = 60 kHz |
| Conditions | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A, NR\_SDL\_FR1\_A | -127 | -124 | -121 | ≥ -6 Note2  ≥ -13 Note3  ≥ -3 Note4 |
| NR\_FDD\_FR1\_B | -126.5 | -123.5 | -120.5 |
| NR\_TDD\_FR1\_C | -126 | -123 | -120 |
| NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D | -125.5 | -122.5 | -119.5 |
| NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E | -125 | -122 | -119 |
| NR\_FDD\_FR1\_F | -124.5 | -121.5 | -118.5 |
| NR\_FDD\_FR1\_G | -124 | -121 | -118 |
| NR\_FDD\_FR1\_H | -123.5 | -120.5 | -117.5 |
| NOTE 1: NR operating band groups are defined in clause 3.5.2.  NOTE 2: PRS Ês/Iot for RSTD measurement reference cell PRS resource.  NOTE 3: PRS Ês/Iot for RSTD measurement neighbor cell PRS resource, PRS-RSRP measurement and UE Rx-Tx time difference measurement.  NOTE 4: PRS Ês/Iot for PRS-RSRP measurement and UE Rx-Tx time difference measurement. | | | | | |

Table B.2.14-2: Conditions for NR PRS-based measurements in FR2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Angle of arrival | NR operating bands | Minimum PRP1,2 Note 2, Note 3 | | | | | PRS Ês/Iot |
| dBm / SCSPRS | | | | | dB |
| SCSPRS = 120 kHz | | | | SCSPRS = 60 kHz |
| UE power class | | | | UE power class |
| 1 | 2 | 3 | 4 | 1, 2, 3, 4 |
| **Conditions** | Rx Beam Peak | n257 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 | (Value for SCSPRS = 120 kHz) - 3dB | ≥ -6 Note4  ≥ -13 Note5  ≥ -3 Note6 |
| n258 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| n259 |  |  | -108.5 | -124.7+Y4 |
| n260 | -125.3+Y1 |  | -109.5 | -125.8+Y4 |
| n261 | -128.3+Y1 | -113.8 | -112.1 | -127.8+Y4 |
| Spherical coverage Note 1 | n257 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 | (Value for SCSPRS = 120 kHz) - 3dB | ≥ -6 Note4  ≥ -13 Note5  ≥ -3 Note6 |
| n258 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| n259 |  |  | -95.7 | -115.7+Z4 |
| n260 | -117.3+Z1 |  | -96.9 | -113.8+Z4 |
| n261 | -120.3+Z1 | -102.8 | -101.2 | -118.8+Z4 |
| NOTE 1: Values based on EIS spherical coverage as defined in clause 7.3.4 of TS 38.101-2 [19]. Side condition applies for directions in which EIS spherical coverage requirement is met.  NOTE 2: Values specified at the Reference point to give minimum PRS Ês/Iot, with no applied noise.  NOTE 3: For UEs that support multiple FR2 bands, Rx Beam Peak values are increased by ∆MBP,n and spherical coverage values are increased by ∆MBS,n, the UE multi-band relaxation factor in dB specified in clause 6.2.1 of TS 38.101-2 [19].  NOTE 4: PRS Ês/Iot for RSTD measurement reference cell PRS resource.  NOTE 5: PRS Ês/Iot for RSTD measurement neighbor cell PRS resource, PRS-RSRP measurement and UE Rx-Tx time difference measurement.  NOTE 6: PRS Ês/Iot for PRS-RSRP measurement and UE Rx-Tx time difference measurement. | | | | | | | | |

*Editor’s notes for Table B.2.14-2:*

*- The value of Y for power classes 1 and 4 is FFS, where Y1 and Y4 are the rough/fine beam gain differences in Rx beam peak direction for power classes 1 and 4 respectively*

*- The value of Z for power classes 1 and 4 is FFS, where Z1 and Z4 are the rough/fine beam gain differences in spherical coverage directions for power classes 1 and 4 respectively*

<<End of change>>