**3GPP TSG-RAN4 Meeting #102-e *R4-2207139***

**Electronic Meeting, February 21-March 03, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.133** | **CR** |  | **rev** | **-** | **Current version:** | **16.10.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Big CR to TS 38.133: Rel-16 WIs RRM maintenance Part 1 (Rel-16) | | | | | | | | | |
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| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic, NR\_eMIMO | | | | |  | ***Date:*** | | | 2022-03-07 |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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:*** | | Endorsed draft CRs for NR unlicensed operation and eMIMO are to be incorporated.  NR-unlic related draft CRs:  R4-2203522 Correction of NR-U inter-frequency cell identification and measurements requirements  Error on definition of Lmax for inter-frequency measurement RRM requirements.  R4-2203524 Correction of inter-frequency measurement procedures TCs under CCA  Inter-frequency measurements test cases for NR-U are updated according to latest agreements.  R4-2203526 Removal of TCI state switching TC for unlicensed bands  Removal of TCI state switching titles, since this TC was agreed not to be included in the last RAN4 meeting.  R4-2204857 Draft CR on maintenance of measurement requirements for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115276 missing from BIG CR# 2209  1.The SSB symbols in scheduling restrictions shall considered the merged set configured by different MOs. The defination has been corrected in the requirements in other parts, which should be also fixed in NR-U section.  2. According to the defination of rmtc-SubframeOffset, when it is not configured for inter-frequency measurements, UE shall choose a random value to determine the RMTC window. According to RAN1 LS to RAN2 [R1-2106264], the generation method for the random offset value is up to UE’s implementation. Thus, for inter-frequency RSSI/CO measurement, the randomly generated window may not be covered by the measurement gap.  ***rmtc-SubframeOffset***  Indicates the RSSI measurement timing configuration (RMTC) subframe offset for this frequency (see TS 38.215 [9], clause 5.1.21). For inter-frequency measurements, this field is optional present and if it is not configured, the UE chooses a random value as *rmtc-SubframeOffset* for *measDurationSymbols* which shall be selected to be between 0 and the configured *rmtc-Periodicity* with equal probability.  R4-2204859 Draft CR on TC of BFD and CBD for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115279 missing from BIG CR# 2211  1.The test2 in A.10.3.4.1, A.10.3.4.2, A.11.4.4.1 and A.11.4.4.1 requres UE to detect beam failure at high SNR condition which is not aligned with the requirements of BFD.  2.The note in A.11.4.4.1 and A.11.4.4.1 is misleading that only one configuration is defined.  3.Typos needs to be fixed  R4-2204861 Draft CR on TC of inter-RAT measurement procedure for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115280 missing from BIG CR# 2211  1.The measurement quantity for event B2 reporting is RSRP/RSRQ/SINR. b2-Threshold1 and b2-Threshold2 is still TBD in the inter-RAT measurement test cases.The entering condition for event B2 is as follows:  Mp+Hys<Thresh1, and  Mn+Ofn-Hys>Thresh2  When the measurement quantity is RSRQ. For E-UTRA PCell, the RSRQ is calculated as -10.89 dB, considering the measurement accuracy and necessary margin. Thresh 1 is assumed to be -5 dB. Then b2-Threshold1 is 77 dB ((IE value – 87) / 2 dB). Similarly, b2-Threshold2 is calculated as 55 dB  When the measurement quantity is SINR. For E-UTRA PCell, the SINR is calculated as 17 dB, considering the measurement accuracy and necessary margin. Thresh 1 is assumed to be 22 dB. Then b2-Threshold1 is 90 ((IE value – 46) / 2 dB). b2-Threshold2 is defined as 50.  2.In the test cases in DRX mode, DRX.10 is configured. In the event triggered reporting, UE shall be provided TA command MAC CE to keep uplink time alignment. In DRX.10, DRX cycle is 640ms which is longer than TimeAlignmentTimer of 500 ms. Istead, DRX.12 should be used here.  3.Typos need to be fixed.  R4-2204863 Draft CR on TC of inter-RAT SFTD measurement procedure for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115282 missing from BIG CR# 2211  1.The CCA probabilty configuration is not aligned with the agreed value.  2.Io is not correct in A.12.4.1.1.1-3  3.Note 7 in A.12.4.1.1.1-3 states that UE supporting FBE and LBE must be tested under both configurations. However, according to the agreed applicability rule in R4-2103518, Inter-RAT SFTD is not required to be tested in both case.  R4-2204865 Draft CR on TC of intra-frequency measurement accuracy for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115283 missing from BIG CR# 2211  1. SMTC configuration, CCA model configuration and CCA probability in A.10.5.1.1.2-2 are missing  2. In test 2 in A.10.5.1, Io is larger than -70 dBm  3. CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io are missing in A.11.6.1.1.2-2. And the band group is not correct.  4. CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io are missing in A.11.6.1.2.2-2. And the band group is not correct.  5. Note should be added to state that UE is only required to be tested in one of the supported test configurations in A.13.4.1.1. And CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io are missing.  R4-2204867 Draft CR on TC of RLM for NR-U R16  Note: Resubmission of previously endorsed Draft CR R4-2115278 missing from BIG CR# 2211  1.The test2 in A.10.3.1.2 and A.11.4.1.2 should be removed which required UE to detec OOS at high SNR.  2.TDD configuration, CORESET Reference Channel, SSB configuration, DBT window configurationPRACH Configuration, CCA probability configuration in A.10.3.1.2, A.10.3.1.3, A.11.4.1.2 and A.11.4.1.3 are not defined.  3.T1-T3, D1, T310, T311, N310 and N310 configuration are not defined in A.10.3.1.2 and A.11.4.1.2.  4.T1-T5, D1, T310, T311, N310 and N310 configuration are not defined in A.10.3.1.3 and A.11.4.1.3.  R4-2205076 Draft CR: Clarification of availability of SSB monitoring occasions for RLM and BM  It is not clear the determination of the availability of SSB occasions for RLM, CBD, and L1-RSRP evaluation period.  R4-2205078 Draft CR: Addition of SS-SINR/SS-RSRQ measurement accuracy tests for NR-U  No test cases for SS-RSRQ/SS-SINR measurement accuracy for NR-U  R16 eMIMO related draft CRs:  R4-2204694 Draft CR to TS38.133 Corrections on L1-SINR requirement (Rel-16)  CR R4-2103590 are not consistently implemented in TS38.133. Rel-16 and Rel-17 spec are inconsistent.  R4-2205320 DraftCR on correction to L1-SINR and SCell BFR tests R16  Several mistakes are found in the SCell BFR test cases:   1. The Qin\_LR shall be configured by rsrp-ThresholdBFR for SCell BFR. 2. The parameter rsrp-ThresholdBFR could be only configured as integer. 3. The Noc is now dBm/15kHz in FR2, which causes misalignment among Noc, SNR and RSRP. 4. The antenna configuration is missing in FR2 test cases.   For CMR only L1-SINR test, the UE shall report L1-SINR on aperiodic CSI-RS resources. However, aperiodic CSI-RS resources are not configured as CMR for L1-SINR reporting.  R4-2207113 [dCR] Test cases for applicable timing for PL RS activated by MAC-CE  Add test cases for delay requirements for pathloss RS activation / update. | | | | | | | | |
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| ***Summary of change:*** | | R4-2203522  The variable name on the definition of Lmax was wrong for PSS/SSS detection.  R4-2203524  Introduction of new values for TBD test parameters.  Confirmation of values for test parameters defined in square brackets.  Correction to avoid text inconsistencies and typos.  Addition of L\_CCA and W\_CCA parameters.  R4-2203526  Converting TCI state switching titles to “void”.  R4-2204857  1.Align the defination of SSB symbols with the existing requirements.  2.Clarify that there is no requirements for inter-frequency RSSI/CO measurement when rmtc-SubframeOffset is not configured.  R4-2204859  1. Test 2 related configurations and descriptions are removed.  2. The note in A.11.4.4.1 and A.11.4.4.1 about UE is only required to be tested in one configuration is removed.  3. Typos are fixed.  R4-2204861  1. b2-Threshold1 and b2-Threshold2 for RSRQ/SINR test cases are defined.  2. DRX configuration is changed to DRX.12  3. Typos are fixed.  R4-2204863  1.Update the CCA probability configuration in table A.12.4.1.1.1-3  2.Correct the Io value in A.12.4.1.1.1-3  3.Correct the note 7 in A.12.4.1.1.1-3 that UE can be tested under dynamic channel access only  R4-2204865  1. Add SMTC configuration, CCA model configuration and CCA probability in A.10.5.1.1.2-2.  2. In test 2 in A.10.5.1, the SS-RSRP and Es/Iot are changed to gurantee that Io is under -70 dBm. The related parameters are changed accordingly..  3. Add CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io in A.11.6.1.1.2-2, and correct the band group in the table.  4. Add CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io in A.11.6.1.2.2-2, and correct the band group in the table.  5. Add a note in A.13.4.1.1 that UE is only required to be tested in one of the supported test configurations. Add CCA probability, Noc,ES/Iot, ES/Noc, SS-RSRP, Io in A.13.4.1.1.2-2, and correct the band groups in the table.  R4-2204867  1. Test 2 related configurations and descriptions are removed in A.10.3.1.2 and A.11.4.1.2.  2. Add TDD configuration, CORESET Reference Channel, SSB configuration, DBT window configurationPRACH Configuration, CCA probability configuration in A.10.3.1.2, A.10.3.1.3, A.11.4.1.2 and A.11.4.1.3  3. Add T1-T3, D1, T310, T311, N310 and N310 configuration in A.10.3.1.2 and A.11.4.1.2 using the evlaution period defined in Table 8.1A.2.2-1 based on the principle in R4-1910104.  4. Add T1-T5, D1, T310, T311, N310 and N310 configuration in A.10.3.1.3 and A.11.4.1.3 using the evlaution period defined in Table 8.1A.2.2-1 based on the principle in R4-1910104.  R4-2205076  Clarify how often UE is required to determine of the availability of SSB for RLM In-sync, CBD and L1-RSRP evaluation.  R4-2205078  Addittion of the SS-RSRQ/SS-SINR measurement accuracy test cases for NR-U.  R4-2204694  Modification on L1-SINR requirement in TS38.133, based on CR R4-2103590. The clause number is kept and no technical issue.  R4-2205320   1. Correcting the IE parameter to ‘rsrp-ThresholdBFR’ for both FR1 and FR2 SCell BFR test cases. 2. Correcting the value of rsrp-ThresholdBFR to integer in FR2 SCell BFR test cases 3. Correcting the Unit of Noc to dBm/120kHz in FR2 SCell BFR test cases. 4. Adding the antenna configuration in FR2 SCell BFR test cases 5. Correcting the CSI-RS configuration in CMR only L1-SINR measurement test case.   R4-2207113  Add test cases for delay requirements for pathloss RS activation / update for the known case corresponding to the core requirements. | | | | | | | | |
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| ***Consequences if not approved:*** | | R4-2203522  No definition of LPSS/SSS,gaps,max leading to incomplete requirements.  R4-2203524  Test cases will not include the latest agreements  R4-2203526  Clauses with non-void titles can give the impression that these test cases are to be further developed when analysed in other working groups like RAN5.  R4-2204857  The requirements are not correct.  R4-2204859  The test cases are wrong  R4-2204861  The test cases are wrong  R4-2204863  The test cases are wrong  R4-2204865  The test cases are wrong  R4-2204867  The test cases are wrong  R4-2205076  It is not clear how often UE is required to determine the availability of SSB.  R4-2205078  The SS-RSRQ/SS-SINR measurement accuracy requirements cannot be verified.  R4-2204694  The requirement of L1-SINR requirement in TS38.133 of Rel-16 and Rel-17 spec are inconsistent.  R4-2205320  The test case can’t verify the test purpose.  R4-2207113  The test cases for MAC-CE activated / updated PL-RS delay are missing from the specification. | | | | | | | | |
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| ***Clauses affected:*** | | R4-2203522  9.3A.4, 9.3A.5  R4-2203524  A.10.4.2, A.11.5.2, A.13.3.2  R4-2203526  A.10.3.7, A.11.4.6, A.13.2.3  R4-2204857  9.2A.5.3, 9.3A.8 and 9.3A.9  R4-2204859  A.10.3.4.1, A.10.3.4.2, A.11.4.4.1 and A.11.4.4.1  R4-2204861  A.10.4.4.1, A.10.4.4.2, A.10.4.4.3, A.10.4.4.4, A.12.4.2.1, A.12.4.2.2, A.12.4.2.3, A.12.4.2.4  R4-2204863  A.12.4.1  R4-2204865  A.10.5.1.1, A.11.6.1.1 , A.10.6.1.2 and A.13.4.1.1  R4-2204867  A.10.3.4.1, A.10.3.4.2, A.11.4.4.1 and A.11.4.4.1  R4-2205076  8.1A.2.2, 8.5A.5, 9.5A.4  R4-2205078  A.10.5.2 (New), A.10.5.3 (New), A.11.6.2 (New), A.11.6.3 (New), A.13.4.2 (New), A.13.4.3 (New).  R4-2204694  9.8.3  R4-2205320  A.4.5.5.5, A.4.5.5.6, A.5.5.5.6, A.5.5.5.7, A.6.5.5.5, A.6.5.5.6, A.6.6.8.1, A.7.5.5.6, A.7.5.5.7  R4-2207113  A.6.5.x (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

---Start of NR-U related changes---

<Start of change 1>

### 9.3A.4 Inter-frequency cell identification

When measurement gaps are provided, or the UE supports capability of conducting such measurements without gaps, the UE shall be able to identify a new detectable inter-frequency cell within Tidentify\_inter\_cca\_without\_index if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured). Otherwise UE shall be able to identify a new detectable inter-frequency cell, in carrier frequencies with CCA, within Tidentify\_inter\_cca\_with\_index. The UE shall be able to identify a new detectable inter-frequency SS block, in carrier frequencies with CCA, of an already detected cell within Tidentify\_inter\_cca\_without\_index.

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

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

Where:

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1. CSSFinter : it is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps.

Table 9.3A.4-1: Time period for PSS/SSS detection

|  |  |
| --- | --- |
| Condition NOTE1,2,3,4 | TPSS/SSS\_sync\_inter\_cca |
| No DRX | max(600ms, (8+LPSS/SSS,gaps) x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle ≤ 320ms | max(600ms, ceil((8+LPSS/SSS,gaps)x1.5) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter |
| DRX cycle > 320ms | (8+LPSS/SSS,gaps) x DRX cycle x CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.  NOTE 3: When DRX is not configured, LPSS/SSS,gaps is the number of SMTC occasions not available at the UE during TPSS/SSS\_sync\_inter\_cca, for PSS/SSS detection, where LPSS/SSS,gaps ≤ LPSS/SSS,gaps,max. When DRX is configured, LPSS/SSS,gaps is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TPSS/SSS\_sync\_inter\_cca, for PSS/SSS detection, where LPSS/SSS,gaps ≤ LPSS/SSS,gaps,max. When configured with DRX, the UE is not required to determine the availability of SMTC occasions more frequent than once per DRX cycle. When configured with measurement gaps, the UE is not required to determine the availability of SMTC occasions more frequent than once during MGRP. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFinter.  NOTE 4: LPSS/SSS,gaps,max = 12 for max(DRX cycle, SMTC period, MGRP) ≤ 40 ms LPSS/SSS,gaps,max = 8 for 40 ms < max(DRX cycle, SMTC period, MGRP) ≤ 320 ms, and LPSS/SSS,gaps,max = 5 for DRX cycle > 320 ms. | |

Upon exceeding LPSS/SSS,gaps,max, the UE is not required to meet the corresponding PSS/SSS detection requirement. The requirements apply provided that any two closest SMTC occasions available at the UE for the measurement shall be separated by no more than the maximum time requirement for the cell to remain known.

Table 9.3A.4-2: Time period for time index detection

|  |  |
| --- | --- |
| Condition NOTE1,2,3,4 | TSSB\_time\_index\_inter\_cca |
| No DRX | max(120ms, (3+ Lind,gaps) x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle ≤ 320ms | max(120ms, ceil((3+ Lind,gaps) x 1.5) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter |
| DRX cycle > 320ms | (3 + Lind,gaps) x DRX cycle x CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.  NOTE 3: When DRX is not configured, Lind,gaps is the number of SMTC occasions not available at the UE during TSSB\_time\_index\_inter\_cca for time index identification, where Lind,gaps ≤ Lind,gaps,max. When DRX is configured, Lind,gaps is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TSSB\_time\_index\_inter\_cca for time index identification, where Lind,gaps ≤ Lind,gaps,max. When configured with DRX, the UE is not required to determine the availability of SMTC occasions more frequent than once per DRX cycle. When configured with measurement gaps, the UE is not required to determine the availability of SMTC occasions more frequent than once during MGRP. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFinter.  NOTE 4: Lind,gaps,max = 5 for max(DRX cycle, SMTC period, MGRP) ≤ 40 ms, Lind,gaps,max = 3 for 40 ms < max(DRX cycle, SMTC period, MGRP) ≤ 320 ms, and Lind,gaps,max = 2 for DRX cycle > 320 ms. | |

The UE shall restart the time index detection upon exceeding Lind,gaps,max. The requirements apply provided that any two closest SMTC occasions available at the UE for the measurement shall be separated by no more than the maximum time requirement for the cell to remain known.

### 9.3A.5 Inter-frequency measurements

When measurement gaps are provided for inter-frequency measurements in carrier frequencies with CCA, or the UE supports capability of conducting such measurements without gaps, the UE physical layer shall be capable of reporting SS-RSRP, SS-RSRQ and SS-SINR measurements to higher layers with measurement accuracy as specified in clauses 10.1.28, 10.1.30, 10.1.32, respectively, as shown in table 9.3A.5-1:

Table 9.3A.5-1: Measurement period for inter-frequency measurements with gaps

|  |  |
| --- | --- |
| Condition NOTE1,2,3,4 | T SSB\_measurement\_period\_inter\_cca |
| No DRX | max(200ms, (8+ Lmeas) x max(MGRP, SMTC period)) x CSSFinter |
| DRX cycle ≤ 320ms | max(200ms, ceil((8+ Lmeas) x 1.5) x max(MGRP, SMTC period, DRX cycle)) x CSSFinter |
| DRX cycle > 320ms | (8+ Lmeas) x DRX cycle x CSSFinter |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: In EN-DC operation, the parameters, timers and scheduling requests referred to in clause 3.6.1 are for the secondary cell group. The DRX cycle is the DRX cycle of the secondary cell group.  NOTE 3: When DRX is not configured, Lmeas is the number of SMTC occasions not available at the UE during T SSB\_measurement\_period\_NR\_cca, for inter-frequency measurements with gaps, where Lmeas ≤ Lmeas,max. When DRX is configured, Lmeas is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during T SSB\_measurement\_period\_NR\_cca, for inter-frequency measurements with gaps, where Lmeas ≤ Lmeas,max. When configured with DRX, the UE is not required to determine the availability of SMTC occasions more frequent than once per DRX cycle. When configured with measurement gaps, the UE is not required to determine the availability of SMTC occasions more frequent than once during MGRP. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFinter.  NOTE 4: Lmeas,max = 12 for max(DRX cycle, SMTC period, MGRP) ≤ 40 ms, Lmeas,max = 8 for 40 ms < max(DRX cycle, SMTC period, MGRP) ≤ 320 ms, and Lmeas,max = 5 for DRX cycle > 320 ms. | |

The UE shall restart the measurement upon exceeding Lmeas,max. The requirements apply provided that any two closest SMTC occasions available at the UE for the measurement shall be separated by no more than the maximum time requirement for the cell to remain known.

The UE shall stop the measurement attempts on the SSB of a cell and perform the detection procedure again, like for any other SSB, when the following conditions are met:

* Lmeas > Lmeas,max, and
* The time period of unsuccessful measurement attempts exceeds the maximum time required for the cell to remain known as defined in clause 9.3A.6.3.

<End of change 1>

<Start of change 2>

#### A.10.4.2.3 EN-DC event triggered reporting tests for FR1 with CCA cell without SSB time index detection when DRX is not used

##### A.10.4.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.3.1-1, A.10.4.2.3.1-2, and A.10.4.2.3.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.3.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.2.3.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.3.1-1.

Table A.10.4.2.3.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE TDD  NR cell with CCA: 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 | |

Table A.10.4.2.3.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | Comment |
|  |  | configuration | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | Config 1,2 | 1 | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cell |  | Config 1,2 | LTE Cell 1 (PCell) and NR cell 2 with CCA (PScell) | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 with CCA is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell 3 | | NR cell 3 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2 | -6 | |  |
| Hysteresis | dB | Config 1,2 | 0 | |  |
| CP length |  | Config 1,2 | Normal | |  |
| TimeToTrigger | s | Config 1,2 | 0 | |  |
| Filter coefficient |  | Config 1,2 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2 | 3 s | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 s | | Synchronous cells. |
| T1 | s | Config 1,2 | 5 | |  |
| T2 | s | Config 1,2 | 1.7 | 1.7 |  |

Table A.10.4.2.3.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | Cell 3 | |
|  | |  | configuration | T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | 2 | |
| Duplex mode | |  | Config 1,2 | TDD | | | |
| BWchannel | | MHz | Config 1,2 | 40: NRB,c = 106 | | | |
| BWP BW | | MHz | Config 1,2 | 40: NRB,c = 106 | | | |
| TDD configuration | |  | Config 1,2 | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| Initial DL BWP | |  | Config 1,2 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | Config 1,2 | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | Config 1,2 | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | Config 1,2 | ULBWP.1.1 | | NA | |
| TRS configuration | |  | Config 1,2 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1,2 | SR.1.1 CCA | | - | |
| CORESET Reference Channel | |  | Config 1,2 | CR.1.1 CCA | | - | |
| SSB parameters | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | SSB.1 CCA | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | |  | Config 1,2 | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration | |  | Config 1,2 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH | | kHz | Config 1,2 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | |  | Config 1,2 | 12 | | 12 | |
| WCCA\_DL | | ms | Config 1,2 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| 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 | |  | Config 1,2 | 0 | | 0 | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |
| Note2 | | dBm/15kHz | Config 1,2 | -104 | | -104 | |
| Note2 | | dBm/SCS | Config 1,2 | -101 | | -101 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -91 | -91 | -Infinity | -88 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/38.16MHz | Config 1,2 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | |  | Config 1,2 | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | |

##### A.10.4.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.4 EN-DC event triggered reporting tests for FR1 cell with CCA without SSB time index detection when DRX is used

##### A.10.4.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.4.1-1, A.10.4.2.4.1-2, and A.10.4.2.4.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.4.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.10.4.2.4.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.4.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.10.4.2.4.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE TDD  NR cell with CCA: 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 | |

Table A.10.4.2.4.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | | | Comment |
|  |  | configuration | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number |  | Config 1,2 | 1 | | | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cell |  | Config 1,2 | LTE Cell 1 (PCell) and NR cell 2 with CCA (PScell) | | | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 with CCA is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2 | -6 | | | |  |
| Hysteresis | dB | Config 1,2 | 0 | | | |  |
| CP length |  | Config 1,2 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2 | 0 | | | |  |
| Filter coefficient |  | Config 1,2 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2 | 3 s | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 s | | | | Synchronous cells. |
| T1 | s | Config 1,2 | 5 | | | |  |
| T2 | s | Config 1,2 | 2.5 | 17 | 2.5 | 17 |  |

Table A.10.4.2.4.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | | | Cell 3 | | | |
|  | |  | configuration | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | | | 2 | | | |
| Duplex mode | |  | Config 1,2 | TDD | | | | | | | |
| BWchannel | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | | | | |
| BWP BW | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | | | | |
| TDD configuration | |  | Config 1,2 | TDDConf.1.1 CCA | | | | TDDConf.1.1 CCA | | | |
| Initial DL BWP | |  | Config 1,2 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | Config 1,2 | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | Config 1,2 | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | Config 1,2 | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | |  | Config 1,2 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference | |  | Config 1,2 | SR.1.1 CCA | | | | - | | | |
| CORESET Reference Channel | |  | Config 1,2 | CR.1.1 CCA | | | | - | | | |
| SSB parameters | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | | | SSB.1 CCA | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | SSB.2 CCA | | | | SSB.2 CCA | | | |
| DBT window configuration | |  | Config 1,2 | As defined in A.3.28.1 | | | | As defined in A.3.28.1 | | | |
| SMTC configuration | |  | Config 1,2 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH | | kHz | Config 1,2 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_DL=0.9375 | | | | PCCA\_DL=0.9375 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_UL=1 | | | | PCCA\_UL=1 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_UL=1 | | | | PCCA\_UL=1 | | | |
| EPRE ratio of PSS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  | | | |  | | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  | Config 1,2 | 0 | | | | 0 | | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | | |  | | | |
| Note2 | | dBm/15kHz | Config 1,2 | -104 | | | | -104 | | | |
| Note2 | | dBm/SCS | Config 1,2 | -101 | | | | -101 | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -91 | | -91 | | -Infinity | | -88 | |
|  | | dB | Config 1,2 | 4 | | 4 | | -Infinity | | 7 | |
|  | | dB | Config 1,2 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | dBm/38.16MHz | Config 1,2 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | |  | Config 1,2 | AWGN | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | |

Table A.10.4.2.4.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
|  | Value | Value |  |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |  |
| drx-RetransmissionTimerDL | sl1 | sl1 |  |
| drx-RetransmissionTimerUL | sl1 | sl1 |  |
| drx-LongCycleStartOffset | ms40 | Ms640 |  |
| shortDRX | disable | disable |  |

Table A.10.4.2.4.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.10.4.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.5 EN-DC event triggered reporting tests for FR1 cell with CCA with SSB time index detection when DRX is not used

##### A.10.4.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.5.1-1, A.10.4.2.5.1-2, and A.10.4.2.5.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.5.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.2.5.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.5.1-1.

Table A.10.4.2.5.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE TDD  NR cell with CCA: 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 | |

Table A.10.4.2.5.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | Comment |
|  |  | configuration | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | Config 1,2 | 1 | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cell |  | Config 1,2 | LTE Cell 1 (PCell) and NR cell 2 with CCA (PScell) | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 with CCA is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell 3 | | NR cell 3 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2 | -6 | |  |
| Hysteresis | dB | Config 1,2 | 0 | |  |
| CP length |  | Config 1,2 | Normal | |  |
| TimeToTrigger | s | Config 1,2 | 0 | |  |
| Filter coefficient |  | Config 1,2 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2 | OFF | | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2 | 3 s | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 s | | Synchronous cells. |
| T1 | s | Config 1,2 | 5 | |  |
| T2 | s | Config 1,2 | 2 | 2 |  |

Table A.10.4.2.5.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | Cell 3 | |
|  | |  | configuration | T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | 2 | |
| Duplex mode | |  | Config 1,2 | TDD | | | |
| BWchannel | | MHz | Config 1,2 | 40: NRB,c = 106 | | | |
| BWP BW | | MHz | Config 1,2 | 40: NRB,c = 106 | | | |
| TDD configuration | |  | Config 1,2 | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| Initial DL BWP | |  | Config 1,2 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | Config 1,2 | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | Config 1,2 | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | Config 1,2 | ULBWP.1.1 | | NA | |
| TRS configuration | |  | Config 1,2 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | OP.1 | |
| PDSCH Reference | |  | Config 1,2 | SR.1.1 CCA | | - | |
| CORESET Reference Channel | |  | Config 1,2 | CR.1.1 CCA | | - | |
| SSB parameters | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | SSB.1 CCA | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | |  | Config 1,2 | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration | |  | Config 1,2 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH | | kHz | Config 1,2 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | |  | Config 1,2 | 5 | | 5 | |
| WCCA\_DL | | ms | Config 1,2 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| 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 | |  | Config 1,2 | 0 | | 0 | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |
| Note2 | | dBm/15kHz | Config 1,2 | -104 | | -104 | |
| Note2 | | dBm/SCS | Config 1,2 | -101 | | -101 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -91 | -91 | -Infinity | -88 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/38.16MHz | Config 1,2 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | |  | Config 1,2 | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | |

##### A.10.4.2.5.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.6 EN-DC event triggered reporting tests for FR1 cell with CCA with SSB time index detection when DRX is used

##### A.10.4.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.6.1-1, A.10.4.2.6.1-2, and A.10.4.2.6.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.6.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.10.4.2.6.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.6.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.10.4.2.6.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE TDD  NR cell with CCA: 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 | |

Table A.10.4.2.6.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | | | Comment |
|  |  | configuration | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number |  | Config 1,2 | 1 | | | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cell |  | Config 1,2 | LTE Cell 1 (PCell) and NR cell 2 with CCA (PScell) | | | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 with CCA is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2 | -6 | | | |  |
| Hysteresis | dB | Config 1,2 | 0 | | | |  |
| CP length |  | Config 1,2 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2 | 0 | | | |  |
| Filter coefficient |  | Config 1,2 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2 | 3 s | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 s | | | | Synchronous cells. |
| T1 | s | Config 1,2 | 5 | | | |  |
| T2 | s | Config 1,2 | 3 | 20 | 3 | 20 |  |

Table A.10.4.2.6.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | | | Cell 3 | | | |
|  | |  | configuration | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | |  | Config 1,2 | 1 | | | | 2 | | | |
| Duplex mode | |  | Config 1,2 | TDD | | | | | | | |
| BWchannel | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | | | | |
| BWP BW | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | | | | |
| TDD configuration | |  | Config 1,2 | TDDConf.1.1 CCA | | | | TDDConf.1.1 CCA | | | |
| Initial DL BWP | |  | Config 1,2 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | Config 1,2 | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | Config 1,2 | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | Config 1,2 | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | |  | Config 1,2 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference | |  | Config 1,2 | SR.1.1 CCA | | | | - | | | |
| CORESET Reference Channel | |  | Config 1,2 | CR.1.1 CCA | | | | - | | | |
| SSB parameters | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | | | SSB.1 CCA | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | SSB.2 CCA | | | | SSB.2 CCA | | | |
| DBT window configuration | |  | Config 1,2 | As defined in A.3.28.1 | | | | As defined in A.3.28.1 | | | |
| SMTC configuration | |  | Config 1,2 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH | | kHz | Config 1,2 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_DL=0.9375 | | | | PCCA\_DL=0.9375 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2 | PCCA\_UL=1 | | | | PCCA\_UL=1 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2 | PCCA\_UL=1 | | | | PCCA\_UL=1 | | | |
| EPRE ratio of PSS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PBCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  |  | | | |  | | | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  | Config 1,2 | 0 | | | | 0 | | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | | |  | | | |
| Note2 | | dBm/15kHz | Config 1,2 | -104 | | | | -104 | | | |
| Note2 | | dBm/SCS | Config 1,2 | -101 | | | | -101 | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -91 | | -91 | | -Infinity | | -88 | |
|  | | dB | Config 1,2 | 4 | | 4 | | -Infinity | | 7 | |
|  | | dB | Config 1,2 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | dBm/38.16MHz | Config 1,2 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | |  | Config 1,2 | AWGN | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | |

Table A.10.4.2.6.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
|  | Value | Value |  |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |  |
| drx-RetransmissionTimerDL | sl1 | sl1 |  |
| drx-RetransmissionTimerUL | sl1 | sl1 |  |
| drx-LongCycleStartOffset | ms40 | Ms640 |  |
| shortDRX | disable | disable |  |

Table A.10.4.2.6.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.10.4.2.6.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.7 EN-DC event triggered reporting tests for FR1 cell without SSB time index detection when DRX is not used

##### A.10.4.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.7.1-1, A.10.4.2.7.1-2, and A.10.4.2.7.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.7.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.2.7.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.7.1-1.

Table A.10.4.2.7.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | E-UTRAN cell: LTE FDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 5 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode,  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 6 | E-UTRAN cell: LTE TDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 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 | |

Table A.10.4.2.7.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | Comment |
|  |  | configuration | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | | Two FR1 NR carrier frequencies are used. NR RF channel 1 is with CCA. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | | NR cell 3 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3,4,5,6 | -6 | |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 | |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 | |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | OFF | | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 s | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2,3,4,5,6 | 3 ms | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | Config 1,2,3,4,5,6 | 3 s | | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 | |  |
| T2 | s | Config 1,2,3,4,5,6 | 1.7 | 1.7 |  |

Table A.10.4.2.7.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | Cell 3 | |
|  | |  | configuration | T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3,4,5,6 | 1 | | 2 | |
| Duplex mode | |  | Config 1,4 | TDD | | FDD | |
|  | |  | Config 2,3,5,6 | TDD | | TDD | |
| BWchannel | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3,6 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3,6 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| TDD configuration | |  | Config 1,4 | TDDConf.1.1 CCA | | NA | |
|  | |  | Config 2,5 | TDDConf.1.1 CCA | | TDDConf.1.1 | |
|  | |  | Config 3,6 | TDDConf.1.1 CCA | | TDDConf.2.1 | |
| Initial DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | | NA | |
| TRS configuration | |  | Config 1,2,3,4,5,6 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3,4,5,6 | OP.1 | | OP.1 | |
| PDSCH Reference  measurement channel | |  | Config 1,4 | SR.1.1 CCA | | SR.1.1 FDD | |
| Config 2,5 | SR.1.1 CCA | | SR.1.1 TDD | |
| Config 3,6 | SR.1.1 CCA | | SR.2.1 TDD | |
| CORESET Reference Channel | |  | Config 1,4 | CR.1.1 CCA | | CR.1.1 FDD | |
| Config 2,5 | CR.1.1 CCA | | CR.1.1 TDD | |
| Config 3,6 | CR.1.1 CCA | | CR.2.1 TDD | |
| SSB | Semi-static channel access Note 5,7 |  | Config 1,4 | SSB.1 CCA | | SSB.1 FR1 | |
| parameters |  | Config 2,5 | SSB.1 CCA | | SSB.1 FR1 | |
|  |  | Config 3,6 | SSB.1 CCA | | SSB.2 FR1 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,4 | SSB.2 CCA | | SSB.1 FR1 | |
|  |  | Config 2,5 | SSB.2 CCA | | SSB.1 FR1 | |
|  |  | Config 3,6 | SSB.2 CCA | | SSB.2 FR1 | |
| DBT window configuration | |  | Config 1,2,3,4,5,6 | As defined in A.3.28.1 | | Not applicable | |
| SMTC configuration | |  | Config 1,4 | SMTC.2 | | SMTC.5 | |
| defined in A.3.11 | |  | Config 2,3,5,6 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH | | kHz | Config 1,2,4,5 | 30 | | 15 | |
| subcarrier spacing | |  | Config 3,6 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL=0.9375 | | Not applicable | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | Not applicable | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | Not applicable | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | Not applicable | |
| LCCA\_DL | |  | Config 1,2,3,4,5,6 | 12 | | 12 | |
| WCCA\_DL | | ms | Config 1,2,3,4,5,6 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| 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 | |  | Config 1,2,3,4,5,6 | 0 | | 0 | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |
| Note2 | | dBm/15kHz | Config 1,2,3,4,5,6 | -104 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2,4,5 | -101 | | -98 | |
|  | | Config 3,6 | -101 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2,4,5 | -94 | -94 | -Infinity | -91 |
|  | | Config 3,6 | -91 | -91 | -Infinity | -88 |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | NR Config 1,2,4,5 | -58.49 | -58.49 | -70.05 | -62.26 |
| dBm/38.16MHz | NR Config 3,6 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | |  | Config 1,2,3,4,5,6 | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | |

##### A.10.4.2.7.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.8 EN-DC event triggered reporting tests for FR1 cell without SSB time index detection when DRX is used

##### A.10.4.2.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.8.1-1, A.10.4.2.8.1-2, and A.10.4.2.8.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.8.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.10.4.2.8.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.8.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.10.4.2.8.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | E-UTRAN cell: LTE FDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 5 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode,  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mod |
| 6 | E-UTRAN cell: LTE TDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 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 | |

Table A.10.4.2.8.1-2: General test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | | | Comment |
|  |  | configuration | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | | | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. NR RF channel 1 is with CCA. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | | | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3,4,5,6 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 | | | |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 s | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2,3,4,5,6 | 3 ms | | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | Config 1,2,3,4,5,6 | 3 s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 | | | |  |
| T2 | s | Config 1,2,3,4,5,6 | 2.5 | 17 | 2.5 | 17 |  |

Table A.10.4.2.8.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | | | Cell 3 | | | |
|  | |  | configuration | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | |  | Config 1,2,3,4,5,6 | 1 | | | | 2 | | | |
| Duplex mode | |  | Config 1,4 | TDD | | | | FDD | | | |
|  | |  | Config 2,3,5,6 | TDD | | | | TDD | | | |
| BWchannel | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3,6 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP BW | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3,6 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| TDD configuration | |  | Config 1,4 | TDDConf.1.1 CCA | | | | NA | | | |
|  | |  | Config 2,5 | TDDConf.1.1 CCA | | | | TDDConf.1.1 | | | |
|  | |  | Config 3,6 | TDDConf.1.1 CCA | | | | TDDConf.2.1 | | | |
| Initial DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | |  | Config 1,2,3,4,5,6 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3,4,5,6 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference  measurement channel | |  | Config 1,4 | SR.1.1 CCA | | | | SR.1.1 FDD | | | |
| Config 2,5 | SR.1.1 CCA | | | | SR.1.1 TDD | | | |
| Config 3,6 | SR.1.1 CCA | | | | SR.2.1 TDD | | | |
| CORESET Reference  Channel | |  | Config 1,4 | CR.1.1 CCA | | | | CR.1.1 FDD | | | |
| Config 2,5 | CR.1.1 CCA | | | | CR.1.1 TDD | | | |
| Config 3,6 | CR.1.1 CCA | | | | CR.2.1 TDD | | | |
| SSB | Semi-static channel access Note 5,7  Semi-static channel access Note 5,7 |  | Config 1,4 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
| parameters |  | Config 2,5 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 3,6 | SSB.1 CCA | | | | SSB.2 FR1 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,4 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 2,5 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 3,6 | SSB.2 CCA | | | | SSB.2 FR1 | | | |
| DBT window configuration | |  | Config 1,2,3,4,5,6 | As defined in A.3.28.1 | | | | Not applicable | | | |
| SMTC configuration | |  | Config 1,4 | SMTC.2 | | | | SMTC.5 | | | |
| defined in A.3.11 | |  | Config 2,3,5,6 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH | | kHz | Config 1,2,4,5 | 30 | | | | 15 | | | |
| subcarrier spacing | |  | Config 3,6 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL=0.9375 | | | | Not applicable | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | Not applicable | | | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | | | Not applicable | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | | | Not applicable | | | |
| 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 | |  | Config 1,2,3,4,5,6 | 0 | | | | 0 | | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | | |  | | | |
| Note2 | | dBm/15kHz | Config 1,2,3,4,5,6 | -104 | | | | -98 | | | |
| Note2 | | dBm/SCS | Config 1,2,4,5 | -101 | | | | -98 | | | |
|  | | Config 3,6 | -101 | | | | -95 | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2,4,5 | -94 | | -94 | | -Infinity | | -91 | |
|  | | Config 3,6 | -91 | | -91 | | -Infinity | | -88 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | | 4 | | -Infinity | | 7 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | dBm/9.36MHz | NR Config 1,2,4,5 | -58.49 | | -58.49 | | -70.05 | | -62.26 | |
| dBm/38.16MHz | NR Config 3,6 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | |  | Config 1,2,3,4,5,6 | AWGN | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | |

Table A.10.4.2.8.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
|  | Value | Value |  |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |  |
| drx-RetransmissionTimerDL | sl1 | sl1 |  |
| drx-RetransmissionTimerUL | sl1 | sl1 |  |
| drx-LongCycleStartOffset | ms40 | Ms640 |  |
| shortDRX | disable | disable |  |

Table A.10.4.2.8.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.10.4.2.8.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.9 EN-DC event triggered reporting tests for FR1 cell with SSB time index detection when DRX is not used

##### A.10.4.2.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.9.1-1, A.10.4.2.9.1-2, and A.10.4.2.9.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.9.1-2 is provided for a UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.2.9.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.9.1-1.

Table A.10.4.2.9.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | E-UTRAN cell: LTE FDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 5 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode,  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mod |
| 6 | E-UTRAN cell: LTE TDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 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 | |

Table A.10.4.2.9.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | Comment |
|  |  | configuration | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | | Two FR1 NR carrier frequencies are used. NR RF channel 1 is with CCA. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | | NR cell 3 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3,4,5,6 | -6 | |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 | |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 | |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | OFF | | DRX is not used |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 s | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2,3,4,5,6 | 3 ms | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | Config 1,2,3,4,5,6 | 3 s | | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 | |  |
| T2 | s | Config 1,2,3,4,5,6 | 2 | 2 |  |

Table A.10.4.2.9.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | Cell 3 | |
|  | |  | configuration | T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3,4,5,6 | 1 | | 2 | |
| Duplex mode | |  | Config 1,4 | TDD | | FDD | |
|  | |  | Config 2,3,5,6 | TDD | | TDD | |
| BWchannel | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3,6 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3,6 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| TDD configuration | |  | Config 1,4 | TDDConf.1.1 CCA | | NA | |
|  | |  | Config 2,5 | TDDConf.1.1 CCA | | TDDConf.1.1 | |
|  | |  | Config 3,6 | TDDConf.1.1 CCA | | TDDConf.2.1 | |
| Initial DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | | NA | |
| TRS configuration | |  | Config 1,2,3,4,5,6 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3,4,5,6 | OP.1 | | OP.1 | |
| PDSCH Reference  measurement channel | |  | Config 1,4 | SR.1.1 CCA | | SR.1.1 FDD | |
| Config 2,5 | SR.1.1 CCA | | SR.1.1 TDD | |
| Config 3,6 | SR.1.1 CCA | | SR.2.1 TDD | |
| CORESET Reference  Channel | |  | Config 1,4 | CR.1.1 CCA | | CR.1.1 FDD | |
| Config 2,5 | CR.1.1 CCA | | CR.1.1 TDD | |
| Config 3,6 | CR.1.1 CCA | | CR.2.1 TDD | |
| SSB | Semi-static channel access Note 5,7  Semi-static channel access Note 5,7 |  | Config 1,4 | SSB.1 CCA | | SSB.1 FR1 | |
| parameters |  | Config 2,5 | SSB.1 CCA | | SSB.1 FR1 | |
|  |  | Config 3,6 | SSB.1 CCA | | SSB.2 FR1 | |
|  | Dynamic channel access Note 6,7 |  | Config 1,4 | SSB.2 CCA | | SSB.1 FR1 | |
|  |  | Config 2,5 | SSB.2 CCA | | SSB.1 FR1 | |
|  |  | Config 3,6 | SSB.2 CCA | | SSB.2 FR1 | |
| DBT window configuration | |  | Config 1,2,3,4,5,6 | As defined in A.3.28.1 | | Not applicable | |
| SMTC configuration | |  | Config 1,4 | SMTC.2 | | SMTC.5 | |
| defined in A.3.11 | |  | Config 2,3,5,6 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH | | kHz | Config 1,2,4,5 | 30 | | 15 | |
| subcarrier spacing | |  | Config 3,6 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL=0.9375 | | Not applicable | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | Not applicable | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | Not applicable | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | Not applicable | |
| LCCA\_DL | |  | Config 1,2,3,4,5,6 | 5 | | 5 | |
| WCCA\_DL | | ms | Config 1,2,3,4,5,6 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| 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 | |  | Config 1,2,3,4,5,6 | 0 | | 0 | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | |  | |
| Note2 | | dBm/15kHz | Config 1,2,3,4,5,6 | -104 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2,4,5 | -101 | | -98 | |
|  | | Config 3,6 | -101 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2,4,5 | -94 | -94 | -Infinity | -91 |
|  | | Config 3,6 | -91 | -91 | -Infinity | -88 |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | NR Config 1,2,4,5 | -58.49 | -58.49 | -70.05 | -62.26 |
| dBm/38.16MHz | NR Config 3,6 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | |  | Config 1,2,3,4,5,6 | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | |

##### A.10.4.2.9.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.10.4.2.10 EN-DC event triggered reporting tests for FR1 cell with SSB time index detection when DRX is used

##### A.10.4.2.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the EN-DC inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 on NR RF channel 2. The test parameters and configurations are given in Tables A.10.4.2.10.1-1, A.10.4.2.10.1-2, and A.10.4.2.10.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.10.4.2.10.1-2 is provided for a UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.10.4.2.10.1-2 is provided for UE that support per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

The configuration of LTE cell 1 is defined in table A.3.7.2.1-1. Supported test configurations are shown in table A.10.4.2.10.1-1.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.10.4.2.10.1-1: EN-DC event triggered reporting tests without SSB index reading for FR1-FR1

|  |  |
| --- | --- |
| Config | Description |
| 1 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | E-UTRAN cell: LTE FDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | E-UTRAN cell: LTE FDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 5 | E-UTRAN cell: LTE TDD  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode,  NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mod |
| 6 | E-UTRAN cell: LTE TDD  NR cell without CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell with CCA: 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 | |

Table A.10.4.2.10.1-2: General test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test | Value | | | | Comment |
|  |  | configuration | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number |  | Config 1,2,3,4,5,6 | 1 | | | | One E-UTRAN carrier frequency is used. |
| NR RF Channel Number |  | Config 1,2,3,4,5,6 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. NR RF channel 1 is with CCA. |
| Active cell |  | Config 1,2,3,4,5,6 | LTE Cell 1 (PCell) and NR cell 2 (PScell) | | | | LTE Cell 1 is on E-UTRA RF channel number 1.  NR Cell 2 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3,4,5,6 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3,4,5,6 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3,4,5,6 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3,4,5,6 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3,4,5,6 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3,4,5,6 | 0 | | | |  |
| CP length |  | Config 1,2,3,4,5,6 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3,4,5,6 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3,4,5,6 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3,4,5,6 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between PCell and PSCell |  | Config 1,2,3,4,5,6 | 3 s | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2,3,4,5,6 | 3 ms | | | | Asynchronous cells.  The timing of Cell 3 is 3ms later than the timing of Cell 2. |
|  |  | Config 1,2,3,4,5,6 | 3 s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3,4,5,6 | 5 | | | |  |
| T2 | s | Config 1,2,3,4,5,6 | 3 | 20 | 3 | 20 |  |

Table A.10.4.2.10.1-3: Cell specific test parameters for EN-DC inter-frequency event triggered reporting with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test | Cell 2 | | | | Cell 3 | | | |
|  | |  | configuration | T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | |  | Config 1,2,3,4,5,6 | 1 | | | | 2 | | | |
| Duplex mode | |  | Config 1,4 | TDD | | | | FDD | | | |
|  | |  | Config 2,3,5,6 | TDD | | | | TDD | | | |
| BWchannel | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3,6 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP BW | | MHz | Config 1,2,4,5 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3,6 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| TDD configuration | |  | Config 1,4 | TDDConf.1.1 CCA | | | | NA | | | |
|  | |  | Config 2,5 | TDDConf.1.1 CCA | | | | TDDConf.1.1 | | | |
|  | |  | Config 3,6 | TDDConf.1.1 CCA | | | | TDDConf.2.1 | | | |
| Initial DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | Config 1,2,3,4,5,6 | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | Config 1,2,3,4,5,6 | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | |  | Config 1,2,3,4,5,6 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3,4,5,6 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference  measurement channel | |  | Config 1,4 | SR.1.1 CCA | | | | SR.1.1 FDD | | | |
| Config 2,5 | SR.1.1 CCA | | | | SR.1.1 TDD | | | |
| Config 3,6 | SR.1.1 CCA | | | | SR.2.1 TDD | | | |
| CORESET Reference  Channel | |  | Config 1,4 | CR.1.1 CCA | | | | CR.1.1 FDD | | | |
| Config 2,5 | CR.1.1 CCA | | | | CR.1.1 TDD | | | |
| Config 3,6 | CR.1.1 CCA | | | | CR.2.1 TDD | | | |
| SSB | Semi-static channel access Note 5,7  Semi-static channel access Note 5,7 |  | Config 1,4 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
| parameters |  | Config 2,5 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 3,6 | SSB.1 CCA | | | | SSB.2 FR1 | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,4 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 2,5 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  |  | Config 3,6 | SSB.2 CCA | | | | SSB.2 FR1 | | | |
| DBT window configuration | |  | Config 1,2,3,4,5,6 | As defined in A.3.28.1 | | | | Not applicable | | | |
| SMTC configuration | |  | Config 1,4 | SMTC.2 | | | | SMTC.5 | | | |
| defined in A.3.11 | |  | Config 2,3,5,6 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH | | kHz | Config 1,2,4,5 | 30 | | | | 15 | | | |
| subcarrier spacing | |  | Config 3,6 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL=0.9375 | | | | Not applicable | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | Not applicable | | | |
| UL CCA probability PCCA\_UL | Semi-static channel access Note 5,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | | | Not applicable | | | |
|  | Dynamic channel access Note 6,7 |  | Config 1,2,3,4,5,6 | PCCA\_UL=1 | | | | Not applicable | | | |
| 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 | |  | Config 1,2,3,4,5,6 | 0 | | | | 0 | | | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  |  | | | |  | | | |
| EPRE ratio of PDSCH to PDSCH | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  |  | | | |  | | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  |  | | | |  | | | |
| Note2 | | dBm/15kHz | Config 1,2,3,4,5,6 | -104 | | | | -98 | | | |
| Note2 | | dBm/SCS | Config 1,2,4,5 | -101 | | | | -98 | | | |
|  | | Config 3,6 | -101 | | | | -95 | | | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2,4,5 | -94 | | -94 | | -Infinity | | -91 | |
|  | | Config 3,6 | -91 | | -91 | | -Infinity | | -88 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | | 4 | | -Infinity | | 7 | |
|  | | dB | Config 1,2,3,4,5,6 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | dBm/9.36MHz | NR Config 1,2,4,5 | -58.49 | | -58.49 | | -70.05 | | -62.26 | |
| dBm/38.16MHz | NR Config 3,6 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | |  | Config 1,2,3,4,5,6 | AWGN | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | |

Table A.10.4.2.10.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
|  | Value | Value |  |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |  |
| drx-RetransmissionTimerDL | sl1 | sl1 |  |
| drx-RetransmissionTimerUL | sl1 | sl1 |  |
| drx-LongCycleStartOffset | ms40 | Ms640 |  |
| shortDRX | disable | disable |  |

Table A.10.4.2.10.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.10.4.2.10.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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 2>

<Start of change 3>

#### A.11.5.2.3 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is not used

##### A.11.5.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements for NR cell with CCA in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 with CCA as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.11.5.2.3.1-1, A.11.5.2.3.1-2 and A.11.5.2.3.1-3.

In test 1, measurement gap pattern configuration # 0 as defined in Table A.11.5.2.3.1-2 is provided for UE that does not support per-FR gap. In test 2, measurement gap pattern configuration #4 as defined in Table A.11.5.2.3.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.11.5.2.3.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 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 | |

Table A.11.5.2.3.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1 | 1, 2 | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cells |  | Config 1 | NR cell 1 with CCA (PCell) | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1 | NR cell 2 with CCA | | NR cell 2 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1 | 9 | 9 |  |
| A3-Offset | dB | Config 1 | -6 | |  |
| Hysteresis | dB | Config 1 | 0 | |  |
| CP length |  | Config 1 | Normal | |  |
| TimeToTrigger | s | Config 1 | 0 | |  |
| Filter coefficient |  | Config 1 | 0 | | L3 filtering is not used |
| DRX |  | Config 1 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1 | 3s | | Synchronous cells. |
| T1 | s | Config 1 | 5 | |  |
| T2 | s | Config 1 | 1.7 | 1.7 |  |

Table A.11.5.2.3.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
| T1 | T2 | | T1 | T2 |
| NR RF Channel Number | | |  | Config 1 | 1 | | | 2 | |
| Duplex mode | | |  | Config 1 | TDD | | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | |
| BWchannel | | | MHz | Config 1 | 40: NRB,c = 106 | | | | |
| BWP BW | | | MHz | Config 1 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP | | Config 1 | Config 1 | DLBWP.0.1 | | | NA | |
| Initial UL BWP | | Config 1 | ULBWP.0.1 | | | NA | |
| Dedicated DL BWP | | Config 1 | DLBWP.1.1 | | | NA | |
| Dedicated UL BWP | | Config 1 | ULBWP.1.1 | | | NA | |
| TRS configuration | | |  | Config 1 | TRS.1.2 TDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 CCA | | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 CCA | | |  | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.1 CCA | | | SSB.1 CCA | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | SSB.2 CCA | | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1 | As defined in A.3.28.1 | | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1 | SMTC.1 | | | SMTC.4 | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_UL=1 | | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_UL=1 | | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1 | 12 | | | 12 | |
| WCCA\_DL | | | ms | Config 1 | TPSS/SSS\_sync\_inter\_cca | | | TPSS/SSS\_sync\_inter\_cca | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 30 | | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1 | -104 | | -104 | | |
| Note2 | | | dBm/SCS | Config 1 | -101 | | -101 | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1 | -91 | -91 | | -Infinity | -88 |
|  | | | dB | Config 1 | 4 | 4 | | -Infinity | 7 |
|  | | | dB | Config 1 | 4 | 4 | | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1 | -58.49 | -58.49 | | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | |

##### A.11.5.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.4 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is used

##### A.11.5.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 as PCell in FR1 with CCA on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.11.5.2.4.1-1, A.11.5.2.4.1-2 and A.11.5.2.4.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.11.5.2.4.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.11.5.2.4.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 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 | |

Table A.11.5.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cells |  | Config 1 | NR cell 1 with CCA (PCell) | | | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1 | NR cell 2 with CCA | | | | NR cell 2 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1 | -6 | | | |  |
| Hysteresis | dB | Config 1 | 0 | | | |  |
| CP length |  | Config 1 | Normal | | | |  |
| TimeToTrigger | s | Config 1 | 0 | | | |  |
| Filter coefficient |  | Config 1 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1 | 5 | | | |  |
| T2 | s | Config 1 | 2.5 | 17 | 2.5 | 17 |  |

Table A.11.5.2.4.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | | | Cell 2 | | | |
| T1 | T2 | T3 | T4 | | T1 | T2 | T3 | T4 |
| NR RF Channel Number | | |  | Config 1 | 1 | | | | | 2 | | | |
| Duplex mode | | |  | Config 1 | TDD | | | | | | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | | | | | |
| BWchannel | | | MHz | Config 1 | 40: NRB,c = 106 | | | | | | | | |
| BWP BW | | | MHz | Config 1 | 40: NRB,c = 106 | | | | | | | | |
| BWP configuration | Initial DL BWP | | Config 1 | Config 1 | DLBWP.0.1 | | | | | NA | | | |
| Initial UL BWP | | Config 1 | ULBWP.0.1 | | | | | NA | | | |
| Dedicated DL BWP | | Config 1 | DLBWP.1.1 | | | | | NA | | | |
| Dedicated UL BWP | | Config 1 | ULBWP.1.1 | | | | | NA | | | |
| TRS configuration | | |  | Config 1 | TRS.1.2 TDD | | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1 | OP.1 | | | | | OP.1 | | | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 CCA | | | | |  | | | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 CCA | | | | |  | | | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.1 CCA | | | | | SSB.1 CCA | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | SSB.2 CCA | | | | | SSB.2 CCA | | | |
| DBT window configuration | | |  | Config 1 | As defined in A.3.28.1 | | | | | As defined in A.3.28.1 | | | |
| SMTC configuration defined in A.3.11 | | |  | Config 1 | SMTC.1 | | | | | SMTC.4 | | | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_DL=0.9375 | | | | | PCCA\_DL=0.9375 | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_UL=1 | | | | | PCCA\_UL=1 | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_UL=1 | | | | | PCCA\_UL=1 | | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 30 | | | | | | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1 | 0 | | | | | 0 | | | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1 | -104 | | | | -104 | | | | |
| Note2 | | | dBm/SCS | Config 1 | -101 | | | | -101 | | | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1 | -91 | | -91 | | | -Infinity | | -88 | |
|  | | | dB | Config 1 | 4 | | 4 | | | -Infinity | | 7 | |
|  | | | dB | Config 1 | 4 | | 4 | | | -Infinity | | 7 | |
| IoNote3 | | | dBm/9.36MHz | Config 1 | -58.49 | | -58.49 | | | -63.94 | | -56.15 | |
| Propagation Condition | | |  | Config 1 | AWGN | | | | AWGN | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | | | |

Table A.11.5.2.4.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.11.5.2.4.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.11.5.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.5 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is not used

##### A.11.5.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 as PCell in FR1 with CCA on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.11.5.2.5.1-1, A.11.5.2.5.1-2 and A.11.5.2.5.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.5.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.11.5.2.5.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.11.5.2.5.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 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 | |

Table A.11.5.2.5.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1 | 1, 2 | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cells |  | Config 1 | NR cell 1 with CCA (PCell) | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1 | NR cell 2 with CCA | | NR cell 2 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1 | 9 | 9 |  |
| A3-Offset | dB | Config 1 | -6 | |  |
| Hysteresis | dB | Config 1 | 0 | |  |
| CP length |  | Config 1 | Normal | |  |
| TimeToTrigger | s | Config 1 | 0 | |  |
| Filter coefficient |  | Config 1 | 0 | | L3 filtering is not used |
| DRX |  | Config 1 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1 | 3s | | Synchronous cells. |
| T1 | s | Config 1 | 5 | |  |
| T2 | s | Config 1 | 2 | 2 |  |

Table A.11.5.2.5.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | Cell 2 | |
| T1 | T2 | | T1 | T2 |
| NR RF Channel Number | | |  | Config 1 | 1 | | | 2 | |
| Duplex mode | | |  | Config 1 | TDD | | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | |
| BWchannel | | | MHz | Config 1 | 40: NRB,c = 106 | | | | |
| BWP BW | | | MHz | Config 1 | 40: NRB,c = 106 | | | | |
| BWP configuration | Initial DL BWP | | Config 1 | Config 1 | DLBWP.0.1 | | | NA | |
| Initial UL BWP | | Config 1 | ULBWP.0.1 | | | NA | |
| Dedicated DL BWP | | Config 1 | DLBWP.1.1 | | | NA | |
| Dedicated UL BWP | | Config 1 | ULBWP.1.1 | | | NA | |
| TRS configuration | | |  | Config 1 | TRS.1.2 TDD | | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1 | OP.1 | | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 CCA | | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 CCA | | |  | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.1 CCA | | | SSB.1 CCA | |
|  | |  |
|  | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.2 CCA | | | SSB.2 CCA | |
|  | |  |
| DBT window configuration | | |  | Config 1 | As defined in A.3.28.1 | | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1 | SMTC.1 | | | SMTC.4 | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_UL=1 | | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_UL=1 | | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1 | 5 | | | 5 | |
| WCCA\_DL | | | ms | Config 1 | TPSS/SSS\_sync\_inter\_cca | | | TPSS/SSS\_sync\_inter\_cca | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 30 | | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1 | -104 | | -104 | | |
| Note2 | | | dBm/SCS | Config 1 | -101 | | -101 | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1 | -91 | -91 | | -Infinity | -88 |
|  | | | dB | Config 1 | 4 | 4 | | -Infinity | 7 |
|  | | | dB | Config 1 | 4 | 4 | | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1 | -58.49 | -58.49 | | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1 | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | |

##### A.11.5.2.5.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.6 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is used

##### A.11.5.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 as PCell in FR1 with CCA on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.11.5.2.6.1-1, A.11.5.2.6.1-2 and A.11.5.2.6.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.6.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.11.5.2.6.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.11.5.2.6.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 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 | |

Table A.11.5.2.6.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. Channels 1 and 2 are with CCA. |
| Active cells |  | Config 1 | NR cell 1 with CCA (PCell) | | | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1 | NR cell 2 with CCA | | | | NR cell 2 is on NR RF channel number 2 with CCA. |
| DL CCA model |  | Config 1 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1 | -6 | | | |  |
| Hysteresis | dB | Config 1 | 0 | | | |  |
| CP length |  | Config 1 | Normal | | | |  |
| TimeToTrigger | s | Config 1 | 0 | | | |  |
| Filter coefficient |  | Config 1 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1 | 5 | | | |  |
| T2 | s | Config 1 | 3 | 20 | 3 | 20 |  |

Table A.11.5.2.6.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | | | Cell 2 | | | |
| T1 | T2 | T3 | T4 | | T1 | T2 | T3 | T4 |
| NR RF Channel Number | | |  | Config 1 | 1 | | | | | 2 | | | |
| Duplex mode | | |  | Config 1 | TDD | | | | | | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | | | | | |
| BWchannel | | | MHz | Config 1 | 40: NRB,c = 106 | | | | | | | | |
| BWP BW | | | MHz | Config 1 | 40: NRB,c = 106 | | | | | | | | |
| BWP configuration | Initial DL BWP | | Config 1 | Config 1 | DLBWP.0.1 | | | | | NA | | | |
| Initial UL BWP | | Config 1 | ULBWP.0.1 | | | | | NA | | | |
| Dedicated DL BWP | | Config 1 | DLBWP.1.1 | | | | | NA | | | |
| Dedicated UL BWP | | Config 1 | ULBWP.1.1 | | | | | NA | | | |
| TRS configuration | | |  | Config 1 | TRS.1.2 TDD | | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1 | OP.1 | | | | | OP.1 | | | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 CCA | | | | |  | | | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 CCA | | | | |  | | | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.1 CCA | | | | | SSB.1 CCA | | | |
|  | |  |
|  | | Semi-static channel access Note 5,7 |  | Config 1 | SSB.2 CCA | | | | | SSB.2 CCA | | | |
|  | |  |
| DBT window configuration | | |  | Config 1 | As defined in A.3.28.1 | | | | | As defined in A.3.28.1 | | | |
| SMTC configuration defined in A.3.11 | | |  | Config 1 | SMTC.1 | | | | | SMTC.4 | | | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_DL=0.9375 | | | | | PCCA\_DL=0.9375 | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1 | PCCA\_UL=1 | | | | | PCCA\_UL=1 | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1 | PCCA\_UL=1 | | | | | PCCA\_UL=1 | | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 30 | | | | | | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1 | 0 | | | | | 0 | | | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1 | -104 | | | | -104 | | | | |
| Note2 | | | dBm/SCS | Config 1 | -101 | | | | -101 | | | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1 | -91 | | -91 | | | -Infinity | | -88 | |
|  | | | dB | Config 1 | 4 | | 4 | | | -Infinity | | 7 | |
|  | | | dB | Config 1 | 4 | | 4 | | | -Infinity | | 7 | |
| IoNote3 | | | dBm/9.36MHz | Config 1 | -58.49 | | -58.49 | | | -63.94 | | -56.15 | |
| Propagation Condition | | |  | Config 1 | AWGN | | | | AWGN | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | | | |

Table A.11.5.2.6.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.11.5.2.6.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.11.5.2.6.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%. In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.7 Event triggered reporting tests for FR1 without SSB time index detection when DRX is not used

##### A.11.5.2.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements for NR cell with CCA in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 with CCA as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.11.5.2.7.1-1, A.11.5.2.7.1-2 and A.11.5.2.7.1-3.

In test 1, measurement gap pattern configuration # 0 as defined in Table A.11.5.2.7.1-2 is provided for UE that does not support per-FR gap. In test 2, measurement gap pattern configuration #4 as defined in Table A.11.5.2.7.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.11.5.2.7.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 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 | |

Table A.11.5.2.7.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies are used. NR channel 1 is with CCA. |
| Active cell |  | Config 1,2,3 | NR cell 1 (PCell) | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 2 | | NR cell 2 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| CP length |  | Config 1,2,3 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 1,2,3 | 3s | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.7 | 1.7 |  |

Table A.11.5.2.7.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | |
| Duplex mode | | |  | Config 1 | TDD | | FDD | |
|  | Config 2,3 | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | Not Applicable | |
|  | Config 2 | TDDConf.1.1 CCA | | TDDConf.1.1 | |
|  | Config 3 | TDDConf.1.1 CCA | | TDDConf.2.1 | |
| BWchannel | | | MHz | Config 1,2 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | NA | |
| TRS configuration | | |  | Config 1,2,3 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1,2,3 | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1,2,3 | CR.1.1 CCA | |  | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | SSB.1 FR1 | |
|  | |  | Config 3 | SSB.1 CCA | | SSB.2 FR1 | |
|  | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.2 CCA | | SSB.1 FR1 | |
|  | |  | Config 3 | SSB.2 CCA | | SSB.2 FR1 | |
| DBT window configuration | | |  | Config 1,2,3 | As defined in A.3.28.1 | | Not applicable | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1,2 | 30 | | 15 | |
| Config 3 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_DL=0.9375 | | NA | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | NA | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_UL=1 | | NA | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_UL=1 | | NA | |
| LCCA\_DL | | |  | Config 1,2,3 | 12 | | 12 | |
| WCCA\_DL | | | ms | Config 1,2,3 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -104 | | -98 | |
| Note2 | | | dBm/SCS | Config 1,2 | -101 | | -98 | |
| Config 3 | -101 | | -95 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -91 | -91 | -Infinity | -91 |
| Config 3 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -58.49 | -58.49 | -70.05 | -62.26 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | |

##### A.11.5.2.7.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.8 Event triggered reporting tests for FR1 without SSB time index detection when DRX is used

##### A.11.5.2.8.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 with CCA as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.11.5.2.8.1-1, A.11.5.2.8.1-2 and A.11.5.2.8.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.8.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.11.5.2.8.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.11.5.2.8.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 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 | |

Table A.11.5.2.8.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. NR channel 1 is with CCA. |
| Active cell |  | Config 1,2,3 | NR cell 1 (PCell) | | | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 2 | | | | NR cell 2 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| CP length |  | Config 1,2,3 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3ms | | | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 1,2,3 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 2.5 | 17 | 2.5 | 17 |  |

Table A.11.5.2.8.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | | Cell 2 | | | |
| T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | | | 2 | | | |
| Duplex mode | | |  | Config 1 | TDD | | | | FDD | | | |
|  | Config 2,3 | TDD | | | | TDD | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | Not Applicable | | | |
|  | Config 2 | TDDConf.1.1 CCA | | | | TDDConf.1.1 | | | |
|  | Config 3 | TDDConf.1.1 CCA | | | | TDDConf.2.1 | | | |
| BWchannel | | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP BW | | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | | |  | Config 1,2,3 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference measurement channel | | |  | Config 1,2,3 | SR.1.1 CCA | | | |  | | | |
| CORESET Reference Channel | | |  | Config 1,2,3 | CR.1.1 CCA | | | |  | | | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
|  | |  | Config 3 | SSB.1 CCA | | | | SSB.2 FR1 | | | |
|  | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  | |  | Config 3 | SSB.2 CCA | | | | SSB.2 FR1 | | | |
| DBT window configuration | | |  | Config 1,2,3 | As defined in A.3.28.1 | | | | Not applicable | | | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1,2 | 30 | | | | 15 | | | |
| Config 3 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_DL=0.9375 | | | | NA | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | NA | | | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_UL=1 | | | | NA | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_UL=1 | | | | NA | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | | | 0 | | | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -104 | | | | -98 | | | |
| Note2 | | | dBm/SCS | Config 1,2 | -101 | | | | -98 | | | |
| Config 3 | -101 | | | | -95 | | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -91 | | -91 | | -Infinity | | -91 | |
| Config 3 | -91 | | -91 | | -Infinity | | -88 | |
|  | | | dB | Config 1,2,3 | 4 | | 4 | | -Infinity | | 7 | |
|  | | | dB | Config 1,2,3 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -58.49 | | -58.49 | | -70.05 | | -62.26 | |
| dBm/38.16MHz | Config 3 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | | |

Table A.11.5.2.8.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.11.5.2.8.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.11.5.2.8.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.9 Event triggered reporting tests for FR1 with SSB time index detection when DRX is not used

##### A.11.5.2.9.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 with CCA as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.11.5.2.9.1-1, A.11.5.2.9.1-2 and A.11.5.2.9.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.9.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.11.5.2.9.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.11.5.2.9.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 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 | |

Table A.11.5.2.9.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | Two FR1 NR carrier frequencies are used. NR channel 1 is with CCA. |
| Active cell |  | Config 1,2,3 | NR cell 1 (PCell) | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 2 | | NR cell 2 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| CP length |  | Config 1,2,3 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3ms | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 1,2,3 | 3s | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 2 | 2 |  |

Table A.11.5.2.9.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | |
| Duplex mode | | |  | Config 1 | TDD | | FDD | |
|  | Config 2,3 | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | Not Applicable | |
|  | Config 2 | TDDConf.1.1 CCA | | TDDConf.1.1 | |
|  | Config 3 | TDDConf.1.1 CCA | | TDDConf.2.1 | |
| BWchannel | | | MHz | Config 1,2 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 40: NRB,c = 106 | | 10: NRB,c = 52 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | NA | |
| Initial UL BWP | |  | ULBWP.0.1 | | NA | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | NA | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | NA | |
| TRS configuration | | |  | Config 1,2,3 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1,2,3 | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1,2,3 | CR.1.1 CCA | |  | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | SSB.1 FR1 | |
|  | |  | Config 3 | SSB.1 CCA | | SSB.2 FR1 | |
|  | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.2 CCA | | SSB.1 FR1 | |
|  | |  | Config 3 | SSB.2 CCA | | SSB.2 FR1 | |
| DBT window configuration | | |  | Config 1,2,3 | As defined in A.3.28.1 | | Not applicable | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1,2 | 30 | | 15 | |
| Config 3 | 30 | | 30 | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_DL=0.9375 | | NA | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | NA | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_UL=1 | | NA | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_UL=1 | | NA | |
| LCCA\_DL | | |  | Config 1,2,3 | 5 | | 5 | |
| WCCA\_DL | | | ms | Config 1,2,3 | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -104 | | -98 | |
| Note2 | | | dBm/SCS | Config 1,2 | -101 | | -98 | |
| Config 3 | -101 | | -95 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -91 | -91 | -Infinity | -91 |
| Config 3 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -58.49 | -58.49 | -70.05 | -62.26 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | |

##### A.11.5.2.9.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.11.5.2.10 Event triggered reporting tests for FR1 with SSB time index detection when DRX is used

##### A.11.5.2.10.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are two cells: NR cell 1 with CCA as PCell in FR1 on NR RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 2. The test parameters are given in Tables A.11.5.2.10.1-1, A.11.5.2.10.1-2 and A.11.5.2.10.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.11.5.2.10.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.11.5.2.10.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.11.5.2.10.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 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 | |

Table A.11.5.2.10.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | | | | Two FR1 NR carrier frequencies are used. NR channel 1 is with CCA. |
| Active cell |  | Config 1,2,3 | NR cell 1 (PCell) | | | | NR cell 1 is on NR RF channel number 1 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 2 | | | | NR cell 2 is on NR RF channel number 2. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| CP length |  | Config 1,2,3 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3ms | | | | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 1,2,3 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 3 | 20 | 3 | 20 |  |

Table A.11.5.2.10.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | | | Cell 2 | | | |
| T1 | T2 | T3 | T4 | T1 | T2 | T3 | T4 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | | | 2 | | | |
| Duplex mode | | |  | Config 1 | TDD | | | | FDD | | | |
|  | Config 2,3 | TDD | | | | TDD | | | |
| TDD configuration | | |  | Config 1 | TDDConf.1.1 CCA | | | | Not Applicable | | | |
|  | Config 2 | TDDConf.1.1 CCA | | | | TDDConf.1.1 | | | |
|  | Config 3 | TDDConf.1.1 CCA | | | | TDDConf.2.1 | | | |
| BWchannel | | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP BW | | | MHz | Config 1,2 | 40: NRB,c = 106 | | | | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | | 40: NRB,c = 106 | | | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | | | NA | | | |
| Initial UL BWP | |  | ULBWP.0.1 | | | | NA | | | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | | | NA | | | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | | | NA | | | |
| TRS configuration | | |  | Config 1,2,3 | TRS.1.2 TDD | | | | NA | | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | | | OP.1 | | | |
| PDSCH Reference measurement channel | | |  | Config 1,2,3 | SR.1.1 CCA | | | |  | | | |
| CORESET Reference Channel | | |  | Config 1,2,3 | CR.1.1 CCA | | | |  | | | |
| SSB parameters | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.1 CCA | | | | SSB.1 FR1 | | | |
|  | |  | Config 3 | SSB.1 CCA | | | | SSB.2 FR1 | | | |
|  | | Semi-static channel access Note 5,7 |  | Config 1,2 | SSB.2 CCA | | | | SSB.1 FR1 | | | |
|  | |  | Config 3 | SSB.2 CCA | | | | SSB.2 FR1 | | | |
| DBT window configuration | | |  | Config 1,2,3 | As defined in A.3.28.1 | | | | Not applicable | | | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | | | SMTC.4 | | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1,2 | 30 | | | | 15 | | | |
| Config 3 | 30 | | | | 30 | | | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_DL=0.9375 | | | | NA | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | NA | | | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | PCCA\_UL=1 | | | | NA | | | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | PCCA\_UL=1 | | | | NA | | | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | | | 0 | | | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -104 | | | | -98 | | | |
| Note2 | | | dBm/SCS | Config 1,2 | -101 | | | | -98 | | | |
| Config 3 | -101 | | | | -95 | | | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -91 | | -91 | | -Infinity | | -91 | |
| Config 3 | -91 | | -91 | | -Infinity | | -88 | |
|  | | | dB | Config 1,2,3 | 4 | | 4 | | -Infinity | | 7 | |
|  | | | dB | Config 1,2,3 | 4 | | 4 | | -Infinity | | 7 | |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -58.49 | | -58.49 | | -70.05 | | -62.26 | |
| dBm/38.16MHz | Config 3 | -58.49 | | -58.49 | | -63.94 | | -56.15 | |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | | | |

Table A.11.5.2.10.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.11.5.2.10.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.11.5.2.10.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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 3>

<Start of change 4>

#### A.13.3.2.3 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is not used

##### A.13.3.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements for NR cell with CCA in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.3.1-1, A.13.3.2.3.1-2 and A.13.3.2.3.1-3.

In test 1, measurement gap pattern configuration # 0 as defined in Table A.13.3.2.3.1-2 is provided for UE that does not support per-FR gap. In test 2, measurement gap pattern configuration #4 as defined in Table A.13.3.2.3.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.13.3.2.3.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: 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 | |

Table A.13.3.2.3.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| CP length |  | Config 1,2,3 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3s | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 1.7 | 1.7 |  |

Table A.13.3.2.3.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 12 | | 12 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

##### A.13.3.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

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

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.13.3.2.4 Event triggered reporting tests for FR1 with CCA without SSB time index detection when DRX is used

##### A.13.3.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.4.1-1, A.13.3.2.4.1-2 and A.13.3.2.4.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.4.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.13.3.2.4.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.13.3.2.4.1-1: SA event triggered reporting tests without SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: 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 | |

Table A.13.3.2.4.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| CP length |  | Config 1,2,3 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 2.5 | 17 | 2.5 | 17 |  |

Table A.13.3.2.4.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA without SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

Table A.13.3.2.4.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.13.3.2.4.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.13.3.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is not required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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

#### A.13.3.2.5 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is not used

##### A.13.3.2.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.5.1-1, A.13.3.2.5.1-2 and A.13.3.2.5.1-3.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.5.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.13.3.2.5.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 2. Otherwise it is only required to pass test 1.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.13.3.2.5.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: 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 | |

Table A.13.3.2.5.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| Test 1 | Test 2 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | 4 | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | 9 |  |
| A3-Offset | dB | Config 1,2,3 | -6 | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | |  |
| CP length |  | Config 1,2,3 | Normal | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3s | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | |  |
| T2 | s | Config 1,2,3 | 2 | 2 |  |

Table A.13.3.2.5.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 5 | | 5 | |
| WCCA\_DL | | | ms | Config 1,2,3 | Not Applicable | | TPSS/SSS\_sync\_inter\_cca | | TPSS/SSS\_sync\_inter\_cca | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration | | | | | | | | | | |

##### A.13.3.2.5.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and 2 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For test 1, MGRP = 40 ms and for test 2 MGRP = 20 ms.

SMTC period = 20 ms.

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

#### A.13.3.2.6 Event triggered reporting tests for FR1 with CCA with SSB time index detection when DRX is used

##### A.13.3.2.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3A.4 and 9.3A.5.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as SCell in FR1 with CCA on NR RF channel 2 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 3. The test parameters are given in Tables A.13.3.2.6.1-1, A.13.3.2.6.1-2 and A.13.3.2.6.1-3.

In test 1&2 measurement gap pattern configuration # 0 as defined in Table A.13.3.2.6.1-2 is provided for UE that does not support per-FR gap and in test 3&4 measurement gap pattern configuration #4 as defined in Table A.13.3.2.6.1-2 is provided for UE that supports per-FR gap. If a UE supports per-FR gap and gap pattern configuration #4, it is only required to pass test 3&4. Otherwise it is only required to pass test 1&2.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

UE needs to be provided at least once every 500 ms with new Timing Advance Command MAC control element to restart the Time alignment timer to keep UE uplink time alignment. Furthermore, UE is allocated with PUSCH resource at every DRX cycle.

Table A.13.3.2.6.1-1: SA event triggered reporting tests with SSB index reading for FR1-FR1 with CCA

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR cell without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR cell with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode,  NR cell without CCA: 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 | |

Table A.13.3.2.6.1-2: General test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
| Test 1 | Test 2 | Test 3 | Test 4 |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2, 3 | | | | Three FR1 NR carrier frequencies are used. Channels 2 and 3 are with CCA. |
| Active cells |  | Config 1,2,3 | NR cell 1 (PCell), NR cell 2 with CCA (SCell) | | | | NR cell 1 is on NR RF channel number 1. NR cell 2 is on NR RF channel number 2 with CCA. |
| Neighbour cell |  | Config 1,2,3 | NR cell 3 with CCA | | | | NR cell 3 is on NR RF channel number 3 with CCA. |
| DL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  | Config 1,2,3 | As specified in clause A.3.26.2.2 | | | |  |
| Gap Pattern Id |  | Config 1,2,3 | 0 | | 4 | | As specified in clause 9.1.2-1. |
| Measurement gap offset |  | Config 1,2,3 | 9 | | 9 | |  |
| A3-Offset | dB | Config 1,2,3 | -6 | | | |  |
| Hysteresis | dB | Config 1,2,3 | 0 | | | |  |
| CP length |  | Config 1,2,3 | Normal | | | |  |
| TimeToTrigger | s | Config 1,2,3 | 0 | | | |  |
| Filter coefficient |  | Config 1,2,3 | 0 | | | | L3 filtering is not used |
| DRX |  | Config 1,2,3 | DRX.1 | DRX.2 | DRX.1 | DRX.2 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | Config 1,2,3 | 3s | | | | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 | | | |  |
| T2 | s | Config 1,2,3 | 3 | 20 | 3 | 20 |  |

Table A.13.3.2.6.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 with CCA with SSB time index detection

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test configuration | Cell 1 | | Cell 2 | | Cell 3 | |
| T1 | T2 | T1 | T2 | T1 | T2 |
| NR RF Channel Number | | |  | Config 1,2,3 | 1 | | 2 | | 3 | |
| Duplex mode | | |  | Config 1 | FDD | | TDD | | TDD | |
|  | Config 2,3 | TDD | | TDD | | TDD | |
| TDD configuration | | |  | Config 1 | Not Applicable | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 2 | TDDConf.1.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
|  | Config 3 | TDDConf.2.1 | | TDDConf.1.1 CCA | | TDDConf.1.1 CCA | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL=0.9375 | | PCCA\_DL=0.9375 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 5,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
|  | | Dynamic channel access Note 6,7 |  | Config 1,2,3 | Not Applicable | | PCCA\_UL=1 | | PCCA\_UL=1 | |
| BWchannel | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP BW | | | MHz | Config 1,2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| Config 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | 40: NRB,c = 106 | |
| BWP configuration | Initial DL BWP | |  | Config 1,2,3 | DLBWP.0.1 | | DLBWP.0.1 | |  | |
| Initial UL BWP | |  | ULBWP.0.1 | | ULBWP.0.1 | |  | |
| Dedicated DL BWP | |  | DLBWP.1.1 | | DLBWP.1.1 | |  | |
| Dedicated UL BWP | |  | ULBWP.1.1 | | ULBWP.1.1 | |  | |
| TRS configuration | | |  | Config 1 | TRS.1.1 FDD | | TRS.1.2 TDD | |  | |
| Config 2 | TRS.1.1 TDD | | TRS.1.2 TDD | |  | |
| Config 3 | TRS.1.2 TDD | | TRS.1.2 TDD | |  | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | | |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | | |  | Config 1 | SR.1.1 FDD | | SR.1.1 CCA | |  | |
| Config 2 | SR.1.1 TDD | | SR.1.1 CCA | |  | |
| Config 3 | SR2.1 TDD | | SR.1.1 CCA | |  | |
| CORESET Reference Channel | | |  | Config 1 | CR.1.1 FDD | | CR.1.1 CCA | |  | |
| Config 2 | CR.1.1 TDD | | CR.1.1 CCA | |  | |
| Config 3 | CR2.1 TDD | | CR.1.1 CCA | |  | |
| SSB | | Semi- |  | Config 1 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
| parameters | | static channel Note 5,7 |  | Config 2 | SSB.1 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | |  |  | Config 3 | SSB.2 FR1 | | SSB.1 CCA | | SSB.1 CCA | |
|  | | Dynamic |  | Config 1 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | channel |  | Config 2 | SSB.1 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
|  | | Access Note 6,7 |  | Config 3 | SSB.2 FR1 | | SSB.2 CCA | | SSB.2 CCA | |
| DBT window configuration | | |  | Config 1,2,3 | Not Applicable | | As defined in A.3.28.1 | | As defined in A.3.28.1 | |
| SMTC configuration defined in A.3.11 | | |  | Config 1,2,3 | SMTC.1 | | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | Config 1 | 15 | | 30 | | 30 | |
| Config 2 | 15 | | 30 | | 30 | |
| Config 3 | 30 | | 30 | | 30 | |
| EPRE ratio of PSS to SSS | | |  | Config 1,2,3 | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | |  |
| EPRE ratio of PDSCH to PDSCH | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |
| Note2 | | | dBm/15kHz | Config 1,2,3 | -98 | | -104 | | -104 | |
| Note2 | | | dBm/SCS | Config 1,2 | -98 | | -101 | | -101 | |
| Config 3 | -95 | | -101 | | -101 | |
| SS-RSRP Note 3 | | | dBm/SCS | Config 1,2 | -94 | -94 | -91 | -91 | -Infinity | -88 |
| Config 3 | -91 | -91 | -91 | -91 | -Infinity | -88 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
|  | | | dB | Config 1,2 | 4 | 4 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -58.49 | -58.49 | -63.94 | -56.15 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | | |  | Config 1,2,3 | AWGN | | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic channel access, the UE must be tested under dynamic channel access configuration. | | | | | | | | | | |

Table A.13.3.2.6.1-4: DRX-Configuration for SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |  |
| --- | --- | --- | --- |
| Field | Test1&3 | Test2&4 | Comment |
| Value | Value |
| drx-onDurationTimer | ms1 | ms1 | As specified in clause 6.3.2 in TS 38.331 [2] |
| drx-InactivityTimer | ms1 | ms1 |
| drx-RetransmissionTimerDL | sl1 | sl1 |
| drx-RetransmissionTimerUL | sl1 | sl1 |
| drx-LongCycleStartOffset | ms40 | Ms640 |
| shortDRX | disable | disable |  |

Table A.13.3.2.6.1-5: *TimeAlignmentTimer* -Configuration SA inter-frequency event triggered reporting without SSB time index detection

|  |  |  |
| --- | --- | --- |
| Field | Value | Comment |
| TimeAlignmentTimer | ms500 | As specified in clause 6.3.2 in TS 38.331 [2] |

##### A.13.3.2.6.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.In test 2 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-UE gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than Tidentify\_inter\_cca\_with\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1, 2, 3 and 4 UE is required to report SSB time index.

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

TPSS/SSS\_sync\_inter\_cca: it is the time period used in PSS/SSS detection given in table 9.3A.4-1.

TSSB\_time\_index\_inter\_cca: it is the time period used to acquire the index of the SSB being measured given in table 9.3A.4-2.

T SSB\_measurement\_period\_inter\_cca: equal to a measurement period of SSB based measurement given in table 9.3A.5-1.

For tests 1 and 2, MGRP = 40 ms and for tests 3 and 4 MGRP = 20 ms.

For tests 1 and 3, DRX cycle = 40 ms and for tests 2 and 4 DRX cycle = 640 ms.

SMTC period = 20 ms.

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 4>

<Start of change 5>

### A.10.3.7 Void

## A.10.4 Measurement procedure

### A.10.4.1 Intra-frequency measurements

#### A.10.4.1.1 Event-triggered reporting tests on PSCC without gaps under non-DRX

##### A.10.4.1.1.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.5.1 and 9.2A.5.2.

<End of change 5>

<Start of change 6>

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

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

### A.11.4.6 Void

## A.11.5 Measurement procedure

### A.11.5.1 Intra-frequency measurements

#### A.11.5.1.1 Event-triggered reporting tests on PCC without gaps under non-DRX

##### A.11.5.1.1.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.5.1 and 9.2A.5.2.

<End of change 6>

<Start of change 7>

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%.

### A.13.2.3 Void

## A.13.3 Measurement procedure

### A.13.3.1 Intra-frequency measurements

#### A.13.3.1.1 Event-triggered reporting tests on SCC without gaps under non-DRX

##### A.13.3.1.1.1 Test purpose and environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the intra-frequency cell search requirements in clauses 9.2A.5.1 and 9.2A.5.2.

<End of change 7>

<Start of change 8>

#### 9.2A.5.3 Scheduling availability of UE during intra-frequency measurements

UE shall be capable of measuring without measurement gaps when the SSB is completely contained in the active bandwidth part of the UE. When any of the conditions in the following clauses is met, there are restrictions on the scheduling availability; otherwise, there is no scheduling restriction. Note that the SSB symbols indicated by the union set of *SSB-ToMeasure* from all the configured measurement objects on the same serving carrier which can be merged[2], if it is configured; otherwise, all *L* SSB symbols within SMTC window duration defined in clause 4.1 of TS 38.213 [3] are included.

<End of change 8>

<Start of change 9>

### 9.3A.8 Inter-frequency RSSI measurements

An RSSI measurement is defined as an inter-frequency measurement provided that the RSSI measurement bandwidth is not contained within the current carrier bandwidth of the UE.

The UE physical layer shall be capable of performing the RSSI measurements, defined in TS 38.215 [4] on one or more inter-frequency carriers operating with CCA, TS 37.213 [33], if the carrier(s) are indicated by higher layers [2], and report the RSSI measurements to higher layers. The UE physical layer shall provide to higher layers a single RSSI sample for each OFDM symbol within each configured RSSI measurement duration [2] occurring with a configured RSSI measurement timing configuration periodicity [2], *rmtc-Periodicity*. The requirements apply if *rmtc-SubframeOffset* [2] is configured.

Table 9.3A.8-1: Measurement period for inter-frequency RSSI measurements with gaps

|  |  |
| --- | --- |
| Condition NOTE1,2,3,4 | T RSSI\_measurement\_period\_inter\_cca |
| No DRX | max(*reportInterval*, max(*rmtc-Periodicity, MGRP*) x CSSFinter) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, MGRP,DRX cycle) x CSSFinter) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: CSSFinter is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps. | |

If the UE requires measurement gaps to perform inter-frequency measurements, a single measurement gap pattern is used for all concurrent inter-frequency measurements, including inter-frequency RSSI measurements. The RSSI measurement duration and the measurement gap should be aligned, and the following additional condition should be fulfilled:

- Entire RSSI measurement duration should be contained in the measurement gap.

The RSSI measurement performed and reported according to this clause shall meet the RSSI measurement accuracy requirement in Clause 10.1.34.2. The reported RSSI measurement values contained in measurement reports shall be based on the measurement report mapping requirements specified in Clause 10.1.34.3.

### 9.3A.9 Inter-frequency channel occupancy measurements

The UE shall be capable of estimating the channel occupancy on one or more carrier frequencies indicated by higher layers [2], based on RSSI samples provided by the physical layer. The requirements apply if *rmtc-SubframeOffset* [2] is configured.

Table 9.3A.9-1: Measurement period for inter-frequency Channel Occupancy measurements with gaps

|  |  |
| --- | --- |
| Condition NOTE1,2,3,4 | T CO\_measurement\_period\_inter\_cca |
| No DRX | max(*reportInterval*, max(*rmtc-Periodicity, MGRP*) x CSSFinter) |
| DRX | max(*reportInterval*, max(*rmtc-Periodicity*, MGRP,DRX cycle) x CSSFinter) |
| NOTE 1: DRX or non DRX requirements apply according to the conditions described in clause 3.6.1  NOTE 2: CSSFinter is a carrier specific scaling factor and is determined according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps. | |

If the UE requires measurement gaps to perform inter-frequency measurements, a single measurement gap pattern is used for all concurrent inter-frequency measurements, including inter-frequency channel occupancy measurements. The RSSI measurement duration used for channel occupancy measurement and the measurement gap should be aligned, and the following additional condition should be fulfilled:

- Entire RSSI measurement duration should be contained in the measurement gap.

The channel occupancy measurement performed and reported according to this clause shall meet the channel occupancy measurement accuracy requirements in Clause 10.1.35.2. The reported channel occupancy measurement values contained in measurement reports shall be based on the measurement reporting range specified in TS 38.331 [2].

<End of change 9>

<Start of change 10>

### A.10.3.4 Beam failure detection and link recovery procedures

A.10.3.4.1 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in non-DRX mode

A.10.3.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving PSCell and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the PSCell, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5A.

The test parameters are given in Tables A.10.3.4.1.1-1, A.10.3.4.1.1-2, and A.10.3.4.1.1-3 below. There are two cells, cell 1 is the E-UTRAN PCell, and cell 2 is the PSCell which operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.10.3.4.1.1-1 shows the variation of the downlink SNR of the PCell and the SNR of the SSB in set q0 in the active PSCell to emulate SSB based beam failure. Figure A.10.3.4.1.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 2 ms. The UE transmits the reporting according to UL CCA model. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40 ms) in test 1.

**Table A.10.3.4.1.1-1: Supported test configurations for FR1 PSCell with CCA**

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 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.10.3.4.1.1-2: General test parameters for FR1 PSCell for SSB-based beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | | **Unit** | **Value** |  | **Comment** |
|  | | | | |  | **Test 1** |  |  |
| Active E-UTRA PCell | | | | |  | Cell 1 |  |  |
| E-UTRA RF Channel Number | | | | |  | 1 |  |  |
| Active PSCell | | | | |  | Cell 2 |  |  |
| RF Channel Number | | | | |  | 2 |  |  |
| DL CCA model | | | | |  | As specified in A.3.26.2.1 |  |  |
| UL CCA model | | | | |  | As specified in A.3.26.2.2 |  |  |
| Duplex mode | | | | Config 1, 2 |  | TDD |  |  |
| BWchannel | | | | Config 1, 2 | MHz | 40: NRB,c = 106 |  |  |
| DL initial BWP configuration | | | | Config 1, 2 |  | DLBWP.0.1 |  |  |
| DL dedicated BWP configuration | | | | Config 1, 2 |  | DLBWP.1.1 |  |  |
| UL initial BWP configuration | | | | Config 1, 2 |  | ULBWP.0.1 |  |  |
| UL dedicated BWP configuration | | | | Config 1, 2 |  | ULBWP.1.1 |  |  |
| TDD configuration | | | | Config 1, 2 |  | TDDConf.1.1 CCA |  |  |
| CORESET Reference Channel | | | | Config 1, 2 |  | CR.1.1 CCA |  |  |
| SSB Configuration | | | | Config 1, 2 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |  |
| DBT Window Configuration | | | | Config 1, 2 |  | DBT.1 |  |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1, 2 |  | 30 KHz |  |  |
| PRACH Configuration | | | | Config 1, 2 |  | Table A.3.8.2.2-1 |  |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 |  |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 |  |  |
| OCNG parameters | | | | |  | OP.1 |  |  |
| CP length | | | | |  | Normal |  |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low |  |  |
| Beam failure | | DCI format | | |  | 1-0 |  |  |
| detection transmission parameters | | Number of Control OFDM symbols | | |  | 2 |  |  |
|  | | Aggregation level | | | CCE | 8 |  |  |
|  | | 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 |  |  |
| DRX | | | | |  | OFF |  |  |
| Gap pattern ID | | | | |  | gp0 |  |  |
| gapOffset | | | | |  | 0 |  |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent |  | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | Config 1, 2 | | | | dBm/SCS kHz | -95 |  | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 |  | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 |  | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | | | | |  | pbfd4 |  | see TS 38.321 [7], clause 5.17 |
| CSI-RS configuration for CSI reporting | | | Config 1, 2 | |  | CSI-RS.2.1 TDD |  |  |
| CSI-RS for tracking | | | Config 1, 2 | |  | TRS.1.2 TDD |  |  |
| SSB Index assigned as RLM RS | | | | |  | 0,1 |  |  |
| T310 timer | | | | | ms | 1000 |  |  |
| N310 | | | | |  | 2 |  |  |
| T1 | | | | | s | 0.2 |  | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | 0.93 |  |  |
| T3 | | | | | s | 0.52 |  |  |
| T4 | | | | | s | 0 |  |  |
| T5 | | | | | s | 0.45 |  |  |
| D1 | | | | | s | 0.41 |  |  |
| 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.10.3.4.1.1-3: Cell specific test parameters for FR1 PSCell for SSB-based beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Test 1** | | | | |
|  | | |  | **T1** | **T2** | **T3** | **T4** | **T5** |
| DL CCA probability PCCA,DL | Note 10, 12 | |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | Note 11, 12 | |  | 1.0/1.0 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 |
| UL CCA probability PCCA,UL | | |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| LCCA\_DL | | |  | N/A | 7 | | | |
| WCCA\_DL | | | ms | N/A | TEvaluate\_CBD\_SSB\_CCA Note 13 | | | |
| EPRE ratio of PDCCH DMRS to SSS | | | dB |  | | | | |
| 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 | | | | |
| 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\_SSB of set q0 | | Config 1, 2 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | | Config 1, 2 | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | | Config 1, 2 | dBm/SCS kHz | -105 | -105 | -85 | -85 | -85 |
|  | | Config 1, 2 | dBm/15 KHz | -98 | | | | |
| 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. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window.  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 transmitted SSS REs during DBT window.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6A.  Note 10: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 11: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 12: For UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1. | | | | | | | | |



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**Figure A.10.3.4.1.1-1: SNR and L1-RSRP variation SSB for SSB-based beam failure detection and link recovery testing in non-DRX mode**

A.10.3.4.1.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 410 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

A.10.3.4.2 EN-DC Beam Failure Detection and Link Recovery Test for FR1 PSCell configured with SSB-based BFD and LR in DRX mode

A.10.3.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving PSCell and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the PSCell, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5A.

The test parameters are given in Tables A.10.3.4.2.1-1, A.10.3.4.2.1-2, and A.4.5.5.2.1-3 below. There are two cells, cell 1 is the E-UTRAN PCell, and cell 2 is the PSCell which operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.10.3.4.2.1-1 shows the variation of the downlink SNR of the PCell and the SNR of the SSB in set q0 in the active PSCell to emulate SSB based beam failure. Figure A.10.3.4.2.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 2 ms. The UE transmits the reporting according to UL CCA model. In the test, DRX configuration is enabled in PSCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.10.3.4.2.1-1: Supported test configurations for FR1 PSCell with CCA**

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 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.10.3.4.2.1-2: General test parameters for FR1 PSCell for SSB-based beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | | **Unit** | **Value** |  | **Comment** |
|  | | | | |  | **Test 1** |  |  |
| Active E-UTRA PCell | | | | |  | Cell 1 |  |  |
| E-UTRA RF Channel Number | | | | |  | 1 |  |  |
| Active PSCell | | | | |  | Cell 2 |  |  |
| RF Channel Number | | | | |  | 2 |  |  |
| DL CCA model | | | | |  | As specified in A.3.26.2.1 |  |  |
| UL CCA model | | | | |  | As specified in A.3.26.2.2 |  |  |
| Duplex mode | | | | Config 1, 2 |  | TDD |  |  |
| BWchannel | | | | Config 1, 2 | MHz | 40: NRB,c = 106 |  |  |
| DL initial BWP configuration | | | | Config 1, 2 |  | DLBWP.0.1 |  |  |
| DL dedicated BWP configuration | | | | Config 1, 2 |  | DLBWP.1.1 |  |  |
| UL initial BWP configuration | | | | Config 1, 2 |  | ULBWP.0.1 |  |  |
| UL dedicated BWP configuration | | | | Config 1, 2 |  | ULBWP.1.1 |  |  |
| TDD configuration | | | | Config 1, 2 |  | TDDConf.1.1 CCA |  |  |
| CORESET Reference Channel | | | | Config 1, 2 |  | CR.1.1 CCA |  |  |
| SSB Configuration | | | | Config 1, 2 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |  |
| DBT Window Configuration | | | | Config 1, 2 |  | DBT.1 |  |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1, 2 |  | 30 KHz |  |  |
| PRACH Configuration | | | | Config 1, 2 |  | Table A.3.8.2.2-1 |  |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 |  |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 |  |  |
| OCNG parameters | | | | |  | OP.1 |  |  |
| CP length | | | | |  | Normal |  |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low |  |  |
| Beam failure | | DCI format | | |  | 1-0 |  |  |
| detection transmission parameters | | Number of Control OFDM symbols | | |  | 2 |  |  |
|  | | Aggregation level | | | CCE | 8 |  |  |
|  | | 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 |  |  |
| DRX | | | | |  | DRX.7 |  | A.3.3.7 |
| Gap pattern ID | | | | |  | N.A. |  |  |
| gapOffset | | | | |  | 0 |  |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent |  | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | Config 1, 2 | | | | dBm/SCS kHz | -95 |  | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 |  | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 |  | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | | | | |  | pbfd4 |  | see TS 38.321 [7], clause 5.17 |
| CSI-RS configuration for CSI reporting | | | Config 1, 2 | |  | CSI-RS.2.1 TDD |  |  |
| CSI-RS for tracking | | | Config 1, 2 | |  | TRS.1.2 TDD |  |  |
| SSB Index assigned as RLM RS | | | | |  | 0,1 |  |  |
| T310 timer | | | | | ms | 1000 |  |  |
| N310 | | | | |  | 2 |  |  |
| T1 | | | | | s | 1 |  | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | 9.01 |  |  |
| T3 | | | | | s | 5.16 |  |  |
| T4 | | | | | s | 0 |  |  |
| T5 | | | | | s | 3.89 |  |  |
| D1 | | | | | s | 3.85 |  |  |
| 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.10.3.4.2.1-3: Cell specific test parameters for FR1 PSCell for SSB-based beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Test 1** | | | | |
|  | | |  | **T1** | **T2** | **T3** | **T4** | **T5** |
| DL CCA probability PCCA,DL | Note 10, 12 | |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | Note 11, 12 | |  | 1.0/1.0 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 |
| UL CCA probability PCCA,UL | | |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| EPRE ratio of PDCCH DMRS to SSS | | | dB |  | | | | |
| 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 | | | | |
| 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\_SSB of set q0 | | Config 1, 2 | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | | Config 1, 2 | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | | Config 1, 2 | dBm/SCS kHz | -105 | -105 | -85 | -85 | -85 |
|  | | Config 1, 2 | dBm/15 KHz | -98 | | | | |
| 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. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window.  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 transmitted SSS REs during DBT window.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6A.  Note 10: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 11: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 12: For UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | |



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**Figure A.10.3.4.2.1-1: SNR and L1-RSRP variation for SSB-based beam failure detection and link recovery testing in non-DRX mode**

A.10.3.4.2.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 3850 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 10>

<Start of change 11>

### A.11.4.4 Beam failure detection and link recovery procedures

#### A.11.4.4.1 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in non-DRX mode

##### A.11.4.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5A.

The test parameters are given in Tables A.11.4.4.1.1-1, A.11.4.4.1.1-2, A.11.4.4.1.1-3 and A.11.4.4.1.1-4 below. There is one cell, cell 1 which is the active cell, in the test. Cell 1 operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.11.4.4.1.1-1 shows the variation of the downlink SNR of the SSB in set q0 in the active cell to emulate SSB based beam failure. Figure A.11.4.4.1.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 2 ms. The UE transmits the reporting according to UL CCA mode. In the test, DRX configuration is not enabled. The UE is configured to perform inter-frequency measurements using GP ID #0 (40 ms) in test 1.

Table A.11.4.4.1.1-1: Supported test configurations for FR1 PCell with CCA

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD duplex mode, 30 kHz SSB SCS, 40 MHz bandwidth |
| Note: void | |

Table A.11.4.4.1.1-2: General test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Value |  | Comment |
|  | | | | |  | Test 1 |  |  |
| Active PSCell | | | | |  | Cell 1 |  |  |
| RF Channel Number | | | | |  | 1 |  |  |
| DL CCA model | | | | |  | As specified in A.3.26.2.1 |  |  |
| UL CCA model | | | | |  | As specified in A.3.26.2.2 |  |  |
| Duplex mode | | | | Config 1 |  | TDD |  |  |
| BWchannel | | | | Config 1 | MHz | 40: NRB,c = 106 |  |  |
| DL initial BWP configuration | | | | Config 1 |  | DLBWP.0.1 |  |  |
| DL dedicated BWP configuration | | | | Config 1 |  | DLBWP.1.1 |  |  |
| UL initial BWP configuration | | | | Config 1 |  | ULBWP.0.1 |  |  |
| UL dedicated BWP configuration | | | | Config 1 |  | ULBWP.1.1 |  |  |
| TDD Configuration | | | | Config 1 |  | TDDConf.1.1 CCA |  |  |
| CORESET Reference Channel | | | | Config 1 |  | CR.1.1 CCA |  |  |
| SSB Configuration | | | | Config 1 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |  |
| DBT Window Configuration | | | | Config 1 |  | DBT.1 |  |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1 |  | 30 KHz |  |  |
| PRACH Configuration | | | | Config 1 |  | Table A.3.8.2.2-1 |  |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 |  |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 |  |  |
| OCNG parameters | | | | |  | OP.1 |  |  |
| CP length | | | | |  | Normal |  |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low |  |  |
| Beam failure detection 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 | 0 |  |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |  |  |
|  | | DMRS precoder granularity | | |  | REG bundle size |  |  |
|  | | REG bundle size | | |  | 6 |  |  |
| DRX | | | | |  | OFF |  |  |
| Gap pattern ID | | | | |  | gp0 |  |  |
| gapOffset | | | | |  | 0 |  |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent |  | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | Config 1 | | | | dBm/SCS kHz | -95 |  | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 |  | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 |  | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | | |  | pbfd4 |  | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for CSI reporting | | | Config 1 | |  | CSI-RS.2.1 TDD |  |  |
| CSI-RS for tracking | | | Config 1 | |  | TRS.1.2 TDD |  |  |
| SSB Index assigned as RLM RS | | |  | |  | 0, 1 |  |  |
| T310 Timer | | |  | | ms | 1000 |  |  |
| N310 | | |  | |  | 2 |  |  |
| T1 | | | | | s | 0.2 |  | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | 0.93 |  |  |
| T3 | | | | | s | 0.52 |  |  |
| T4 | | | | | s | 0 |  |  |
| T5 | | | | | s | 0.45 |  |  |
| D1 | | | | | s | 0.41 |  |  |
| 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.11.4.4.1.1-3: Cell specific test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in non-DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | | |
|  | | |  | T1 | T2 | T3 | T4 | T5 |
| DL CCA probability PCCA,DL | | Note 10, 12 |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | | Note 11, 12 |  | 1.0/1.0 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 |
| UL CCA probability PCCA,UL | | |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| LCCA\_DL | | |  | N/A | 7 | | | |
| WCCA\_DL | | | ms | N/A | TEvaluate\_CBD\_SSB\_CCA Note 13 | | | |
| 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 |  | | | | |
| 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\_SSB of set q0 | Config 1 | | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1 | | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1 | | dBm/SCS kHz | -105 | -105 | -85 | -85 | -85 |
|  | Config 1 | | dBm/15 KHz | -98 | | | | |
| 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. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window.  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 the transmitted SSS REs during DBT window.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6A.  Note 10: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 11: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 12: For UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1. | | | | | | | | |





**Figure A.11.4.4.1.1-1: SNR and L1-RSRP variation SSB for SSB-based beam failure detection and link recovery testing in non-DRX mode**

##### A.11.4.4.1.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 410 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

#### A.11.4.4.2 Beam Failure Detection and Link Recovery Test for FR1 PCell configured with SSB-based BFD and LR in DRX mode

##### A.11.4.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects SSB-based beam failure in the set q0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the SSB based beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5A.

The test parameters are given in Tables A.11.4.4.2.1-1, A.11.4.4.2.1-2, and A.11.4.4.2.1-3 below. There is one cell, cell 1 which is the active cell, in the test. Cell 1 operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.11.4.4.2.1-1 shows the variation of the downlink SNR of the SSB in set q0 in the active cell to emulate SSB based beam failure. Figure A.11.4.4.2.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 2 ms. The UE transmits the reporting according to UL CCA mode. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.11.4.4.2.1-1: Supported test configurations for FR1 PCell with CCA

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD duplex mode, 30 kHz SSB SCS, 40 MHz bandwidth |
| Note: Void | |

Table A.11.4.4.2.1-2: General test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Value |  | Comment |
|  | | | | |  | Test 1 |  |  |
| Active PSCell | | | | |  | Cell 1 |  |  |
| RF Channel Number | | | | |  | 1 |  |  |
| DL CCA model | | | | |  | As specifieed in A.3.20.2.1 |  |  |
| UL CCA model | | | | |  | As specified in A.3.20.2.2 |  |  |
| Duplex mode | | | | Config 1 |  | TDD |  |  |
| BWchannel | | | | Config 1 | MHz | 40: NRB,c = 106 |  |  |
| DL initial BWP configuration | | | | Config 1 |  | DLBWP.0.1 |  |  |
| DL dedicated BWP configuration | | | | Config 1 |  | DLBWP.1.1 |  |  |
| UL initial BWP configuration | | | | Config 1 |  | ULBWP.0.1 |  |  |
| UL dedicated BWP configuration | | | | Config 1 |  | ULBWP.1.1 |  |  |
| TDD Configuration | | | | Config 1 |  | TDDConf.1.1 CCA |  |  |
| CORESET Reference Channel | | | | Config 1 |  | CR.1.1 CCA |  |  |
| SSB Configuration | | | | Config 1 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |  |
| DBT Window Configuration | | | | Config 1 |  | DBT.1 |  |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1 |  | 30 KHz |  |  |
| PRACH Configuration | | | | Config 1 |  | Table A.3.8.2.2-1 |  |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 |  |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 |  |  |
| OCNG parameters | | | | |  | OP.1 |  |  |
| CP length | | | | |  | Normal |  |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low |  |  |
| Beam failure detection 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 | 0 |  |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average SSS RE energy | | | dB | 0 |  |  |
|  | | DMRS precoder granularity | | |  | REG bundle size |  |  |
|  | | REG bundle size | | |  | 6 |  |  |
| DRX | | | | |  | DRX.7 |  | A.3.3.7 |
| Gap pattern ID | | | | |  | N.A. |  |  |
| gapOffset | | | | |  | 0 |  |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent |  | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdSSB | Config 1 | | | | dBm/SCS kHz | -95 |  | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 |  | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 |  | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | | |  | pbfd4 |  | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for CSI reporting | | | Config 1 | |  | CSI-RS.2.1 TDD |  |  |
| CSI-RS for tracking | | | Config 1 | |  | TRS.1.2 TDD |  |  |
| SSB Index assigned as RLM RS | | |  | |  | 0, 1 |  |  |
| T310 Timer | | |  | | ms | 1000 |  |  |
| N310 | | |  | |  | 2 |  |  |
| T1 | | | | | s | 1 |  | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | 9.01 |  |  |
| T3 | | | | | s | 5.16 |  |  |
| T4 | | | | | s | 0 |  |  |
| T5 | | | | | s | 3.89 |  |  |
| D1 | | | | | s | 3.85 |  |  |
| 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.11.4.4.2.1-3: Cell specific test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | | |
|  | | |  | T1 | T2 | T3 | T4 | T5 |
| DL CCA probability PCCA | | Note 10, 12 |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | | Note 11, 12 |  | 1.0/1.0 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 | 0.75/0.75 |
| UL CCA probability PCCA | | |  | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 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 |  | | | | |
| 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\_SSB of set q0 | Config 1 | | dB | 5 | -3 | -12 | -12 | -12 |
| SNR\_SSB of set q1 | Config 1 | | dB | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1 | | dBm/SCS kHz | -105 | -105 | -85 | -85 | -85 |
|  | Config 1 | | dBm/15 KHz | -98 | | | | |
| 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. For cells with CCA model, OCNG is transmitted only in the slots with downlink transmission burst and is not transmitted during the muted slots or during DBT window.  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 the transmitted SSS REs during DBT window.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6A.  Note 10: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 11: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 12: For UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | |



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**Figure A.11.4.4.2.1-1: SNR and L1-RSRP variation for SSB-based beam failure detection and link recovery testing in non-DRX mode**

##### A.11.4.4.2.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initiate link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 3850 ms after the start of T5, the UE shall transmit preamble on a beam associated with the candidate beam set q1. The UE shall not transmit preamble on a beam associated with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 11>

<Start of change 12>

### A.10.4.4 E-UTRAN−NR inter-RAT measurements on NR carrier frequency under CCA

#### A.10.4.4.1 E-UTRA-NR inter-RAT event triggered reporting tests for FR1 without SSB time index detection when DRX is not used

##### A.10.4.4.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21A of TS 36.133 [15] for E-UTRAN FDD-NR measurements under CCA and clause 8.1.2.4.22A of TS 36.133 [15] for E-UTRAN TDD-NR measurements under CCA.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.10.4.4.1.1-1, A.10.4.4.1.1-2, A.10.4.4.1.1-3 and A.10.4.4.1.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.4.1.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.4.1.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.10.4.4.1.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.10.4.4.1.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | | Comment |
|  | |  |  | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number | |  | 1, 2 | 1 | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number | |  | 1, 2 | 1,2 | | Two FR1 NR carrier frequency under CCA is used. |
| DL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.1 | |  |
| Semi-static channel access Note 4, 5 |
| UL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.2 | |  |
| Semi-static channel access Note 4, 5 |
| Active cell | |  | 1, 2 | E-UTRA cell 1 (PCell) and NR cell 2 with CCA (PSCell) | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell | |  | 1, 2 | NR cell 3 | | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id | |  | 1, 2 | 0 | 4 | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset | |  | 1, 2 | 39 | 19 | As specified in TS 36.331 [16]. |
| b2-Threshold1 | | dBm | 1, 2 | Note 1 | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | | dBm | 1, 2 | Note 2 | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 3 for event B2 [16] |
| Hysteresis | | dB | 1, 2 | 0 | |  |
| CP length | |  | 1, 2 | Normal | |  |
| TimeToTrigger | | s | 1, 2 | 0 | |  |
| Filter coefficient | |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX | |  | 1, 2 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells | |  | 1, 2 | 3μs | | Synchronous cells. |
| T1 | | s | 1, 2 | 5 | |  |
| T2 | | s | 1, 2 | ≥Tidentify\_irat\_cca\_without\_index | ≥Tidentify\_irat\_cca\_without\_index | Tidentify\_irat\_cca\_without\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| NOTE 1: The value of b2-Threshold1 is defined in Table A.10.4.4.1.1-3  NOTE 2: The value of b2-Threshold2NR is defined in Table A.10.4.4.1.1-4  NOTE 3: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 4: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 5: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | |

Table A.10.4.4.1.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.10.4.4.1.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | | | Cell 3 | |
|  |  |  | T1 | T2 | | T2 | T2 |
| NR RF Channel Number |  | 1, 2 | 2 | | | 3 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| PCCA\_DL for dynamic channel access Note 6,8 |  | 1, 2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| PCCA\_DL for semi-static channel access Note 7,8 |  | 1, 2 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
| PCCA\_UL for dynamic channel access Note 6,8 |  | 1, 2 | 1 | | | 1 | |
| PCCA\_UL for semi-static channel access Note 7,8 |  | 1, 2 | 1 | | | 1 | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | | | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | | | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | | | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | | | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | | | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | | | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | NA | | | -98 for SS-RSRP | |
| dB | 1, 2 | NA | | | 55 for SS-RSRQ | |
| 1, 2 | NA | | | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | | |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | | | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | | | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -91 | | -91 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -58.49 | | -58.49 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | | | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | | | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | |

##### A.10.4.4.1.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is not required to report SSB time index. Tidentify\_irat\_cca\_without\_index is defined in defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133.

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

#### A.10.4.4.2 E-UTRA-NR inter-RAT event triggered reporting tests for FR1 without SSB time index detection when DRX is used

##### A.10.4.4.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21 of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.10.4.4.2.1-1, A.10.4.4.2.1-2, A.10.4.4.2.1-3 and A.10.4.4.2.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In tests 1 and 2, measurement gap pattern configuration # 0 as defined in Table A.10.4.4.2.1-2 is provided for UE that does not support per-FR gap and in tests 3 and 4, measurement gap pattern configuration #4 as defined in Table A.10.4.4.2.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.10.4.4.2.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.10.4.4.2.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | | | | Comment |
|  | |  |  | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number | |  | 1, 2 | 1 | | | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number | |  | 1, 2 | 1,2 | | | | Two FR1 NR carrier frequency under CCA is used. |
| Active cell | |  | 1, 2 | E-UTRA cell 1 (PCell) and NR cell 2 with CCA (PSCell) | | | | E-UTRA cell 1 is on E-UTRA RF channel  number 1. |
| DL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.1 | | | |  |
| Semi-static channel access Note 4, 5 |
| UL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.2 | | | |  |
| Semi-static channel access Note 4, 5 |
| Neighbour cell | |  | 1, 2 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id | |  | 1, 2 | 0 | | 4 | | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset | |  | 1, 2 | 39 | | 19 | | As specified in TS 36.331 [16]. |
| b2-Threshold1 | | dBm | 1, 2 | Note 1 | | | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | | dBm | 1, 2 | Note 2 | | | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 3 for event B2 [16] |
| Hysteresis | | dB | 1, 2 | 0 | | | |  |
| CP length | |  | 1, 2 | Normal | | | |  |
| TimeToTrigger | | s | 1, 2 | 0 | | | |  |
| Filter coefficient | |  | 1, 2 | 0 | | | | L3 filtering is not used |
| DRX | |  | 1, 2 | DRX.9 | DRX.12 | DRX.9 | DRX.12 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells | |  | 1, 2 | 3μs | | | | Synchronous cells. |
| T1 | | s | 1, 2 | 5 | | | |  |
| T2 | | s | 1, 2 | ≥Tidentify\_irat\_cca\_without\_index | | | | Tidentify\_irat\_cca\_without\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| NOTE 1: The value of b2-Threshold1 is defined in Table A.10.4.4.1.1-3  NOTE 2: The value of b2-Threshold2NR is defined in Table A.10.4.4.1.1-4  NOTE 3: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 4: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 5: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | |

Table A.10.4.4.2.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.10.4.4.2.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | | | Cell 3 | |
|  |  |  | T1 | T2 | | T2 | T2 |
| NR RF Channel Number |  | 1, 2 | 2 | | | 3 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| PCCA\_DL for dynamic channel access Note 6,8 |  | 1, 2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| PCCA\_DL for semi-static channel access Note 7,8 |  | 1, 2 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
| PCCA\_UL for dynamic channel access Note 6,8 |  | 1, 2 | 1 | | | 1 | |
| PCCA\_UL for semi-static channel access Note 7,8 |  | 1, 2 | 1 | | | 1 | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | | | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | | | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | | | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | | | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | | | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | | | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | NA | | | -98 for SS-RSRP | |
| dB | 1, 2 | NA | | | 55 for SS-RSRQ | |
| 1, 2 | NA | | | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | | |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | | | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | | | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -91 | | -91 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -58.49 | | -58.49 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | | | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | | | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | |

##### A.10.4.4.2.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is not required to report SSB time index.

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

#### A.10.4.4.3 NR Inter-RAT event triggered reporting tests for FR1 with SSB time index detection when DRX is not used

##### A.10.4.4.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.10.4.4.3.1-1, A.10.4.4.3.1-2, A.10.4.4.3.1-3 and A.10.4.4.3.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.10.4.4.3.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.10.4.4.3.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. In the measurement configuration the UE shall be indicated to report the SSB index of the identified NR cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.10.4.4.3.1-1: NR inter-RAT event triggered reporting tests with SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.10.4.4.3.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | | Comment |
|  | |  |  | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number | |  | 1, 2 | 1 | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number | |  | 1, 2 | 1,2 | | Two FR1 NR carrier frequency under CCA is used. |
| DL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.1 | |  |
| Semi-static channel access Note 4, 5 |
| UL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.2 | |  |
| Semi-static channel access Note 4, 5 |
| Active cell | |  | 1, 2 | E-UTRA cell 1 (PCell) and NR cell 2 with CCA (PSCell) | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell | |  | 1, 2 | NR cell 3 | | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id | |  | 1, 2 | 0 | 4 | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset | |  | 1, 2 | 39 | 19 | As specified in TS 36.331 [16]. |
| b2-Threshold1 | | dBm | 1, 2 | Note 1 | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | | dBm | 1, 2 | Note 2 | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 3 for event B2 [16] |
| Hysteresis | | dB | 1, 2 | 0 | |  |
| CP length | |  | 1, 2 | Normal | |  |
| TimeToTrigger | | s | 1, 2 | 0 | |  |
| Filter coefficient | |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX | |  | 1, 2 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells | |  | 1, 2 | 3μs | | Synchronous cells. |
| T1 | | s | 1, 2 | 5 | |  |
| T2 | | s | 1, 2 | ≥ Tidentify\_irat\_cca\_with\_index | ≥ Tidentify\_irat\_cca\_with\_index | Tidentify\_irat\_cca\_with\_index is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| NOTE 1: The value of b2-Threshold1 is defined in Table A.10.4.4.3.1-3  NOTE 2: The value of b2-Threshold2NR is defined in Table A.10.4.4.3.1-4  NOTE 3: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 4: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 5: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | |

Table A.10.4.4.3.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.10.4.4.3.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | | | Cell 3 | |
|  |  |  | T1 | T2 | | T2 | T2 |
| NR RF Channel Number |  | 1, 2 | 2 | | | 3 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| PCCA\_DL for dynamic channel access Note 6,8 |  | 1, 2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| PCCA\_DL for semi-static channel access Note 7,8 |  | 1, 2 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
| PCCA\_UL for dynamic channel access Note 6,8 |  | 1, 2 | 1 | | | 1 | |
| PCCA\_UL for semi-static channel access Note 7,8 |  | 1, 2 | 1 | | | 1 | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | | | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | | | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | | | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | | | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | | | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | | | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | NA | | | -98 for SS-RSRP | |
| dB | 1, 2 | NA | | | 55 for SS-RSRQ | |
| 1, 2 | NA | | | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | | |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | | | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | | | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -91 | | -91 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -58.49 | | -58.49 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | | | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | | | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | |

##### A.10.4.4.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is required to report SSB time index.

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

#### A.10.4.4.4 NR Inter-RAT event triggered reporting tests for FR1 with SSB time index detection when DRX is used

##### A.10.4.4.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are three cells: LTE cell 1 as PCell on E-UTRA RF channel 1, NR cell 2 as PSCell in FR1 with CCA on NR RF channel 1 and NR cell 3 as neighbour cell in FR1 with CCA on NR RF channel 2. The test parameters are given in Tables A.10.4.4.4.1-1, A.10.4.4.4.1-2, A.10.4.4.4.1-3 and A.10.4.4.4.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In tests 1 and 2, measurement gap pattern configuration # 0 as defined in Table A.10.4.4.4.1-2 is provided for UE that does not support per-FR gap and in tests 3 and 4, measurement gap pattern configuration #4 as defined in Table A.10.4.4.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. In the measurement configuration the UE shall be indicated to report the SSB index of the identified NR cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 3.

Table A.10.4.4.4.1-1: NR inter-RAT event triggered reporting tests with SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.10.4.4.4.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | | | | Comment |
|  | |  |  | Test 1 | Test 2 | Test 3 | Test |  |
| E-UTRA RF Channel Number | |  | 1, 2 | 1 | | | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number | |  | 1, 2 | 1,2 | | | | Two FR1 NR carrier frequency under CCA is used. |
| DL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.1 | | | |  |
| Semi-static channel access Note 4, 5 |
| UL CCA model | Dynamic channel accessNote 3, 5 |  |  | As specified in clause A.3.26.2.2 | | | |  |
| Semi-static channel access Note 4, 5 |
| Active cell | |  | 1, 2 | E-UTRA cell 1 (PCell) and NR cell 2 with CCA (PSCell) | | | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell | |  | 1, 2 | NR cell 3 | | | | NR cell 3 is on NR RF channel number 2. |
| Gap Pattern Id | |  | 1, 2 | 0 | | 4 | | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset | |  | 1, 2 | 39 | | 19 | | As specified in TS 36.331 [16]. |
| b2-Threshold1 | | dBm | 1, 2 | Note 1 | | | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | | dBm | 1, 2 | Note 2 | | | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 3 for event B2 [16] |
| Hysteresis | | dB | 1, 2 | 0 | | | |  |
| CP length | |  | 1, 2 | Normal | | | |  |
| TimeToTrigger | | s | 1, 2 | 0 | | | |  |
| Filter coefficient | |  | 1, 2 | 0 | | | | L3 filtering is not used |
| DRX | |  | 1, 2 | DRX.9 | DRX.12 | DRX.9 | DRX.12 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells | |  | 1, 2 | 3μs | | | | Synchronous cells. |
| T1 | | s | 1, 2 | 5 | | | |  |
| T2 | | s | 1, 2 | ≥Tidentify\_irat\_cca\_with\_index | | | | Tidentify\_irat\_cca\_with\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| NOTE 1: The value of b2-Threshold1 is defined in Table A.10.4.4.4.1-3  NOTE 2: The value of b2-Threshold2NR is defined in Table A.10.4.4.4.1-4  NOTE 3: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 4: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 5: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | |

Table A.10.4.4.4.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.10.4.4.4.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | | | Cell 3 | |
|  |  |  | T1 | T2 | | T2 | T2 |
| NR RF Channel Number |  | 1, 2 | 2 | | | 3 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| PCCA\_DL for dynamic channel access Note 6,8 |  | 1, 2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| PCCA\_DL for semi-static channel access Note 7,8 |  | 1, 2 | PCCA\_DL=0.9375 | | | PCCA\_DL=0.9375 | |
| PCCA\_UL for dynamic channel access Note 6,8 |  | 1, 2 | 1 | | | 1 | |
| PCCA\_UL for semi-static channel access Note 7,8 |  | 1, 2 | 1 | | | 1 | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | | | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | | | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | | | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | | | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | | | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | | | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | NA | | | -98 for SS-RSRP | |
| dB | 1, 2 | NA | | | 55 for SS-RSRQ | |
| 1, 2 | NA | | | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | | | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | | |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | | |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | | |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | | |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | | | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | | | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -91 | | -91 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | 4 | | 4 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -58.49 | | -58.49 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | | | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | | | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | | | | |

##### A.10.4.4.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is required to report SSB time index.

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

<End of change 12>

<Start of change 13>

### A.12.4.2 E-UTRAN−NR inter-RAT measurements on NR carrier frequency under CCA

#### A.12.4.2.1 E-UTRA-NR inter-RAT event triggered reporting tests for FR1 without SSB time index detection when DRX is not used

##### A.12.4.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21A of TS 36.133 [15] for E-UTRAN FDD-NR measurements under CCA and clause 8.1.2.4.22A of TS 36.133 [15] for E-UTRAN TDD-NR measurements under CCA.

In this test, there are two cells: E-UTRA cell 1 as PCell on E-UTRA RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 1 on a carrier frequency with CCA. The test parameters are given in Tables A.12.4.2.1.1-1, A.12.4.2.1.1-2, A.12.4.2.1.1-3 and A.12.4.2.1.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.12.4.2.1.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.12.4.2.1.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.12.4.2.1.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.12.4.2.1.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | 1, 2 | 1 | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number |  | 1, 2 | 1 | | One FR1 NR carrier frequency under CCA is used. |
| DL CCA model |  |  | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  |  | As specified in clause A.3.26.2.2 | |  |
| Active cell |  | 1, 2 | E-UTRA cell 1 (PCell) | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell |  | 1, 2 | NR cell 2 | | NR cell 2 is on NR RF channel number 1. |
| Gap Pattern Id |  | 1, 2 | 0 | 4 | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset |  | 1, 2 | 39 | 19 | As specified in TS 36.331 [16]. |
| b2-Threshold1 | dBm | 1, 2 | Note 1 | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | dBm | 1, 2 | Note 2 | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 2 for event B2 [16] |
| Hysteresis | dB | 1, 2 | 0 | |  |
| CP length |  | 1, 2 | Normal | |  |
| TimeToTrigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | 1, 2 | 3μs | | Synchronous cells. |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | ≥Tidentify\_irat\_cca\_without\_index | ≥Tidentify\_irat\_cca\_without\_index | Tidentify\_irat\_cca\_without\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| Note 1: The value of b2-Threshold1 is defined in Table A.12.4.2.1.1-3  Note 2: The value of b2-Threshold2NR is defined in Table A.12.4.2.1.1-4 | | | | | |

Table A.12.4.2.1.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.12.4.2.1.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | |
|  |  |  | T1 | T2 |
| NR RF Channel Number |  | 1, 2 | 2 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | |
| PCCA\_DL |  | 1, 2 | [TBD] | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | -98 for SS-RSRP | |
| dB | 1, 2 | 55 for SS-RSRQ | |
| 1, 2 | 50 for SS-RSRQ | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | |

##### A.12.4.2.1.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is not required to report SSB time index. Tidentify\_irat\_cca\_without\_index is defined in defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133.

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

#### A.12.4.2.2 E-UTRA-NR inter-RAT event triggered reporting tests for FR1 without SSB time index detection when DRX is used

##### A.12.4.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21 of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are two cells: E-UTRA cell 1 as PCell on E-UTRA RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 1 on a carrier frequency with CCA. The test parameters are given in Tables A.12.4.2.2.1-1, A.12.4.2.2.1-2, A.12.4.2.2.1-3 and A.12.4.2.2.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In tests 1 and 2, measurement gap pattern configuration # 0 as defined in Table A.12.4.2.2.1-2 is provided for UE that does not support per-FR gap and in tests 3 and 4, measurement gap pattern configuration #4 as defined in Table A.12.4.2.2.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.12.4.2.2.1-1: NR inter-RAT event triggered reporting tests without SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.12.4.2.2.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
|  |  |  | Test 1 | Test 2 | Test 3 | Test 4 |  |
| E-UTRA RF Channel Number |  | 1, 2 | 1 | | | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number |  | 1, 2 | 1 | | | | One FR1 NR carrier frequency under CCA is used. |
| Active cell |  | 1, 2 | E-UTRA cell 1 (PCell) | | | | E-UTRA cell 1 is on E-UTRA RF channel  number 1. |
| DL CCA model |  |  | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  |  | As specified in clause A.3.26.2.2 | | | |  |
| Neighbour cell |  | 1, 2 | NR cell 2 | | | | NR cell 2 is on NR RF channel number 1. |
| Gap Pattern Id |  | 1, 2 | 0 | | 4 | | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset |  | 1, 2 | 39 | | 19 | | As specified in TS 36.331 [16]. |
| b2-Threshold1 | dBm | 1, 2 | Note 1 | | | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | dBm | 1, 2 | Note 2 | | | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 2 for event B2 [16] |
| Hysteresis | dB | 1, 2 | 0 | | | |  |
| CP length |  | 1, 2 | Normal | | | |  |
| TimeToTrigger | s | 1, 2 | 0 | | | |  |
| Filter coefficient |  | 1, 2 | 0 | | | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.9 | DRX.12 | DRX.9 | DRX.12 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | 1, 2 | 3μs | | | | Synchronous cells. |
| T1 | s | 1, 2 | 5 | | | |  |
| T2 | s | 1, 2 | ≥Tidentify\_irat\_cca\_without\_index | | | | Tidentify\_irat\_cca\_without\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| Note 1: The value of b2-Threshold1 is defined in Table A.12.4.2.1.1-3  Note 2: The value of b2-Threshold2NR is defined in Table A.12.4.2.1.1-4 | | | | | | | |

Table A.12.4.2.2.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.12.4.2.2.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | |
|  |  |  | T1 | T2 |
| NR RF Channel Number |  | 1, 2 | 1 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | |
| PCCA\_DL |  |  | [TBD] | |
| CCA model |  | 1, 2 | TBD | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | -98 for SS-RSRP | |
| dB | 1, 2 | 55 for SS-RSRQ | |
| 1, 2 | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | |

##### A.12.4.2.2.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_without\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is not required to report SSB time index.

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

#### A.12.4.2.3 NR Inter-RAT event triggered reporting tests for FR1 with SSB time index detection when DRX is not used

##### A.12.4.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are two cells: E-UTRA cell 1 as PCell on E-UTRA RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 1 on a carrier frequency with CCA. The test parameters are given in Tables A.12.4.2.3.1-1, A.12.4.2.3.1-2, A.12.4.2.3.1-3 and A.12.4.2.3.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In test 1 measurement gap pattern configuration # 0 as defined in Table A.12.4.2.3.1-2 is provided for UE that does not support per-FR gap and in test 2 measurement gap pattern configuration #4 as defined in Table A.12.4.2.3.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. The UE is tested when MeasTriggerQuantity is configured as RSRP, RSRQ and SINR for each test. In the measurement configuration the UE shall be indicated to report the SSB index of the identified NR cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.12.4.2.3.1-1: NR inter-RAT event triggered reporting tests with SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.12.4.2.3.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| E-UTRA RF Channel Number |  | 1, 2 | 1 | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number |  | 1, 2 | 1 | | One FR1 NR carrier frequency under CCA is used. |
| DL CCA model |  |  | As specified in clause A.3.26.2.1 | |  |
| UL CCA model |  |  | As specified in clause A.3.26.2.2 | |  |
| Active cell |  | 1, 2 | E-UTRA cell 1 (PCell) | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell |  | 1, 2 | NR cell 2 | | NR cell 2 is on NR RF channel number 1. |
| Gap Pattern Id |  | 1, 2 | 0 | 4 | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset |  | 1, 2 | 39 | 19 | As specified in TS 36.331 [16]. |
| b2-Threshold1 | dBm | 1, 2 | Note 1 | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | dBm | 1, 2 | Note 2 | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 2 for event B2 [16] |
| Hysteresis | dB | 1, 2 | 0 | |  |
| CP length |  | 1, 2 | Normal | |  |
| TimeToTrigger | s | 1, 2 | 0 | |  |
| Filter coefficient |  | 1, 2 | 0 | | L3 filtering is not used |
| DRX |  | 1, 2 | OFF | | DRX is not used |
| Time offset between serving and neighbour cells |  | 1, 2 | 3μs | | Synchronous cells. |
| T1 | s | 1, 2 | 5 | |  |
| T2 | s | 1, 2 | ≥ Tidentify\_irat\_cca\_with\_index | ≥ Tidentify\_irat\_cca\_with\_index | Tidentify\_irat\_cca\_with\_index is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| Note 1: The value of b2-Threshold1 is defined in Table A.12.4.2.3.1-3  Note 2: The value of b2-Threshold2NR is defined in Table A.12.4.2.3.1-4 | | | | | |

Table A.12.4.2.3.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.12.4.2.3.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | |
|  |  |  | T1 | T2 |
| NR RF Channel Number |  | 1, 2 | 1 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | |
| PCCA\_DL |  |  | [TBD] | |
| CCA model |  | 1, 2 | TBD | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | SMTC.1 | |
| DBT window configuration |  | 1, 2 | DBT.1 | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | |
| b2-Threshold2NR | dBm | 1, 2 | -98 for SS-RSRP | |
| dB | 1, 2 | 55 for SS-RSRQ | |
| 1, 2 | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | |

##### A.12.4.2.3.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 1 and test 2, the UE is required to report SSB time index.

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

#### A.12.4.2.4 NR Inter-RAT event triggered reporting tests for FR1 with SSB time index detection when DRX is used

##### A.12.4.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the NR inter-RAT cell search requirements in clause 8.1.2.4.21of TS 36.133 [15] for E-UTRAN FDD-NR measurements and clause 8.1.2.4.22 of TS 36.133 [15] for E-UTRAN TDD-NR measurements.

In this test, there are two cells: E-UTRA cell 1 as PCell on E-UTRA RF channel 1 and NR cell 2 as neighbour cell in FR1 on NR RF channel 1 on a carrier frequency with CCA. The test parameters are given in Tables A.12.4.2.4.1-1, A.12.4.2.4.1-2, A.12.4.2.4.1-3 and A.12.4.2.4.1-4. Cell transmits SSBs in DBT windows according to DL CCA model.

In tests 1 and 2, measurement gap pattern configuration # 0 as defined in Table A.12.4.2.4.1-2 is provided for UE that does not support per-FR gap and in tests 3 and 4, measurement gap pattern configuration #4 as defined in Table A.12.4.2.4.1-2 is provided for UE that supports per-FR gap.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event B2 (PCell becomes worse than threshold1 and inter RAT neighbour becomes better than threshold2) [16] is used. In the measurement configuration the UE shall be indicated to report the SSB index of the identified NR cell. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR cell 2.

Table A.12.4.2.4.1-1: NR inter-RAT event triggered reporting tests with SSB index reading for FR1

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| 2 | LTE TDD; NR with CCA: SCS 30 kHz, BW 40 MHz, TDD |
| NOTE: The UE is only required to pass in one of the supported test configurations in FR1 | |

Table A.12.4.2.4.1-2: General test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | | | Comment |
|  |  |  | Test 1 | Test 2 | Test 3 | Test |  |
| E-UTRA RF Channel Number |  | 1, 2 | 1 | | | | One E-UTRAcarrier frequency is used. |
| NR RF Chanel Number |  | 1, 2 | 1 | | | | One FR1 NR carrier frequency under CCA is used. |
| DL CCA model |  |  | As specified in clause A.3.26.2.1 | | | |  |
| UL CCA model |  |  | As specified in clause A.3.26.2.2 | | | |  |
| Active cell |  | 1, 2 | E-UTRA cell 1 (PCell) | | | | E-UTRA cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell |  | 1, 2 | NR cell 2 | | | | NR cell 2 is on NR RF channel number 1. |
| Gap Pattern Id |  | 1, 2 | 0 | | 4 | | As specified in clause Table 8.1.2.1-1 of TS 36.133 [15]. |
| Measurement gap offset |  | 1, 2 | 39 | | 19 | | As specified in TS 36.331 [16]. |
| b2-Threshold1 | dBm | 1, 2 | Note 1 | | | | E-UTRA RSRP/RSRQ/SINR threshold for E-UTRA RSRP measurement on cell 1 for event B2 [16] |
| b2-Threshold2NR | dBm | 1, 2 | Note 2 | | | | SS-RSRP/ SS-RSRQ/ SS-SINR threshold measurement on cell 2 for event B2 [16] |
| Hysteresis | dB | 1, 2 | 0 | | | |  |
| CP length |  | 1, 2 | Normal | | | |  |
| TimeToTrigger | s | 1, 2 | 0 | | | |  |
| Filter coefficient |  | 1, 2 | 0 | | | | L3 filtering is not used |
| DRX |  | 1, 2 | DRX.9 | DRX.12 | DRX.9 | DRX.12 | As specified in clause A.3.3 |
| Time offset between serving and neighbour cells |  | 1, 2 | 3μs | | | | Synchronous cells. |
| T1 | s | 1, 2 | 5 | | | |  |
| T2 | s | 1, 2 | ≥Tidentify\_irat\_cca\_with\_index | | | | Tidentify\_irat\_cca\_with\_index­ is defined in clause 8.1.2.4.21A.1 and 8.1.2.4.22A.1 in TS 36.133 |
| Note 1: The value of b2-Threshold1 is defined in Table A.12.4.2.4.1-3  Note 2: The value of b2-Threshold2NR is defined in Table A.12.4.2.4.1-4 | | | | | | | |

Table A.12.4.2.4.1-3: E-UTRAN PCell specific test parameters for NR inter-RAT event triggered reporting in non-DRX with NR neigbour cell in FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | |
|  |  |  | T1 | T2 |
| RF channel number |  | 1, 2 | 1 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | |
|  |  | 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | |
|  |  | 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | |
| OCNG PatternsNote2 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | |
|  |  | 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | |
| b2-Threshold1 | dBm | 1, 2 | -77 for RSRP | |
| dB | 1, 2 | 77 for RSRQ | |
| dB | 1, 2 | 90 for SINR | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |  |  |  | |
| PSS\_RA |  |  |  | |
| SSS\_RA |  |  |  | |
| PCFICH\_RB |  |  |  | |
| PHICH\_RA |  |  |  | |
| PHICH\_RB |  |  |  | |
| PDCCH\_RA |  |  |  | |
| PDCCH\_RB |  |  |  | |
| PDSCH\_RA |  |  |  | |
| PDSCH\_RB |  |  |  | |
| OCNG\_RANote3 |  |  |  | |
| OCNG\_RBNote3 |  |  |  | |
| NocNote4 | dBm/15kHz | 1, 2 | -104 | |
| Ês/Noc | dB | 1, 2 | 17 | 17 |
| Ês/IotNote5 | dB | 1, 2 | 17 | 17 |
| RSRPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2 | -87 | -87 |
| IoNote5 | dBm/9MHz | 1, 2 | -59.13+10log (NRB,c /50) | -59.13+10log (NRB,c /50) |
| Propagation Condition Note6 |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix Note6 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 3: OCNG shall be used such that all cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 4: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 5: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 6: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

Table A.12.4.2.4.1-4: NR neighbour cell specific test parameters for NR inter-RAT event triggered reporting for FR1 with SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 2 | |
|  |  |  | T1 | T2 |
| NR RF Channel Number |  | 1, 2 | 1 | |
| TDD configuration |  | 1, 2 | TDDConf.1.1 CCA | |
| BWchannel | MHz | 1, 2 | 40: NRB,c = 106 | |
| PCCA\_DL |  |  | TBD | |
| CCA model |  | 1, 2 | TBD | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | 1, 2 | OP.1 | |
| SMTC configuration defined in A.3.11.1 and A.3.11.2 |  | 1, 2 | TBD | |
| DBT window configuration |  | 1, 2 | TBD | |
| SSB configuration for semi-static channel access |  | 1, 2 | SSB.1 CCA | |
| SSB configuration for dynamic channel access |  | 1, 2 | SSB.2 CCA | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1, 2 | 30 | |
| b2-Threshold2NR | dBm/SCS | 1, 2 | -98 for SS-RSRP | |
| dB | 1, 2 | 55 for SS-RSRQ | |
| 1, 2 | 50 for SS-SINR | |
| EPRE ratio of PSS to SSS |  | 1, 2 | 0 | |
| EPRE ratio of PBCH DMRS to SSS |  |  |  | |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  | |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  | |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  | |
| EPRE ratio of PDSCH to PDSCH |  |  |  | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) |  |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  | |
| Note2 | dBm/15kHz | 1, 2 | -98 | |
| Note2 | dBm/SCS | 1, 2 | -95 | |
| SS-RSRP Note 3,5 | dBm/SCS | 1, 2 | -Infinity | -88 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| Note 5 | dB | 1, 2 | -Infinity | 7 |
| IoNote3 | dBm/38.16MHz | 1, 2 | -63.95 | -56.16 |
| Propagation Condition |  | 1, 2 | ETU70 | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, | 1x2 Low | |
| NOTE 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows. | | | | |

##### A.12.4.2.4.2 Test Requirements

In test 1 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 2 with per-UE gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 3 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In test 4 with per-FR gap, the UE shall send one Event B2 triggered measurement report, with a measurement reporting delay less than Tidentify\_irat\_cca\_with\_index ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

In tests 1, 2, 3 and 4, the UE is required to report SSB time index.

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

<End of change 13>

<Start of change 14>

### A.12.4.1 E-UTRAN−NR inter-RAT SFTD measurements

#### A.12.4.1.1 E-UTRA – NR Inter-RAT SFTD Measurement Delay with NR under CCA in non-DRX

##### A.12.4.1.1.1 Test Purpose and Environment

The purpose of this test is to partly verify that measurement reporting delay for SFTD between E-UTRA PCell and inter-RAT NR neighbour cell under CCA is within the requirements stated in clauses 8.1.2.4.25 and 8.1.2.4.26 of TS 36.133 [15] for E-UTRA FDD and TDD, respectively, when no measurement gaps are provided and no DRX is configured.

The tests consist of a single time period of duration T1. Two carriers are used in the tests: one E-UTRA carrier with the PCell (Cell 1), and one NR carrier under CCA with the NR neighbour cell (Cell 2).

Prior to the start of time duration T1, the UE is connected to Cell 1 and configured to carry out intra-frequency measurements only. The point in time at which the UE receives, at the UE antenna connector(s), a RRC message containing a measurement configuration for SFTD measurements on RF channel 2 defines the start of time duration T1. Following the start of T1 the UE shall detect Cell 2, determine the SFN and frame time difference of Cell 2 relative to Cell 1, and send a measurement report.

The supported test configurations are listed in Table A.12.4.1.1.1-1 below. General test parameters and cell-specific parameters for the NR cell are provided in Tables A.12.4.1.1.1-2 and A.12.4.1.1.1-3 below, respectively. Cell-specific parameters for the E-UTRA cell are provided in clause A.3.7.2.1.

Table A.12.4.1.1.1-1: Applicable test configurations for inter-RAT SFTD measurement delay test with NR under CCA

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

Table A.12.4.1.1.1-2: General test parameters for inter-RAT SFTD measurement delay test with NR under CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
| **Test 1** | **Test 2** |
| E-UTRA RF Channel Number |  | Config 1,2 | 1 | | One E-UTRAN carrier frequencies is used. |
| NR RF Channel Number |  | Config 1,2 | 1 | | One NR carrier frequencies is used. |
| Active cell |  | Config 1,2 | Cell 1 | | Cell 1 is on E-UTRA RF channel number 1. |
| Neighbour cell |  | Config 1,2 | Cell 2 | | Cell 2 is on NR RF channel number 1. |
| CP length |  | Config 1,2 | Normal | | Applicable to both cells. |
| DRX |  | Config 1,2 | OFF | | DRX is not used |
| Frame time offset between serving and neighbour cells | ms | Config 1 | 3 | 7 | Asynchronous cells.  The timing of Cell 2 relative to the timing of Cell 1. |
| s | Config 2 | 3 | | Synchronous cells. |
| SFN offset between serving and neighbour cells |  | Config 1,2 | 0 | 1 | SFN of Cell 2 relative to SFN of Cell 1. |
| SS-RSRP reporting |  | Config 1,2 | No | | Only SFTD is reported. |
| T1 | s | Config 1,2 | 2 | | T1 shall exceed Tmeasure\_SFTD\_LBT\_max = 56 × SMTC |

Table A.12.4.1.1.1-3: Cell specific test parameters for Cell 2 in inter-RAT SFTD measurement delay test with NR under CCA

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 |
| NR RF Channel Number | |  | 1 |
| Duplex mode | |  | TDD |
| BWchannel | | MHz | 40: NRB,c = 106 |
| TDD configuration | |  | TDDConf.1.1 CCA |
| DL CCA model | |  | As specified in clause A.3.20.2.1 |
| DL CCA probability for semi-static channel accessNote5,7 | PCCA\_DL |  | 0.9375 |
| DL CCA probability for dynamic channel accessNote6,7 | PCCA\_DL\_1 |  | 0.75 |
| PCCA\_DL\_2 |  | 0.75 |
| OCNG Pattern defined in A.3.2.1.1Note 1 | |  | OP.1 |
| SMTC configuration defined in A.3.2.11.1 and A.3.2.11.2 | |  | SMTC.2 |
| SSB configuration for semi-static channel accessNote5,7 | |  | SSB.1 CCA |
| SSB configuration for dynamic channel accessNote6,7 | |  | SSB.2 CCA |
| DBT window configuration | |  | DBT.1 |
| PDSCH/PDCCH subcarrier spacing | | kHz | 30 |
| EPRE ratio of PSS to SSS | | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS | | dB |
| EPRE ratio of PBCH to PBCH DMRS | | dB |
| EPRE ratio of OCNG DMRS to SSS Note 1 | | dB |
| EPRE ratio of OCNG to OCNG DMRS Note 1 | | dB |
| Noc Note2 | | dBm/15 kHz | -98 |
| Noc Note2 | | dBm/SCS | -95 |
| SS-RSRP Note 3, 4 | | dBm/SCS | -91 |
| Ês/Iot | | dB | 4 |
| Ês/Noc | | dB | 4 |
| Io Note 3 | | dBm/38.16MHz | -58.50 |
| Propagation Condition | |  | AWGN |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols in slots with downlink transmission bursts.  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: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 6: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 7: For UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel access only.. | | | |

##### A.12.4.1.1.2 Test Requirements

Following the start of T1, the UE shall detect Cell 2 and determine the relative time difference between Cell 1 and Cell 2. At latest at TRRC\_procedure\_delay + Tmeasure\_SFTD\_LBT\_max after the beginning of time duration T1, the UE shall send a measurement report on SFTD between Cell 1 and Cell 2.

The observed rate of successful SFTD reports in repeated tests shall be at least 90%.

NOTE: The actual overall delays measured in the test may be up to 2×TTIDCCH longer than the measurement reporting delays above due to TTI insertion uncertainty of the measurement report in DCCH.

<End of change 14>

<Start of change 15>

#### A.10.5.1.1 Intra-frequency measurement accuracy on a CCA serving cell

##### A.10.5.1.1.1 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 clause 10.1.36.1.1 and 10.1.36.1.2 when the serving cell is subject to CCA.

##### A.10.5.1.1.2 Test parameters

In this set of test cases there are two cells in the test, E-UTRAN PCell (Cell 1), FR1 PSCell under CCA (Cell 2). Cell 2 operates on a carrier frequency with CCA and transmits SSBs in DBT window according to DL CCA model. Supported test configurations are shown in Table A.10.5.1.1.1-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in Table A.10.5.1.1.1-2. The configuration of cell 1 (E-UTRA PCell) is specified in clause A.3.7A.2.1. In all test cases, Cell 2 is the PSCell, and Cell 3 is the target cell.

Table A.10.5.1.1.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

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

Table A.10.5.1.1.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | Test 2 | |
|  | | |  | Cell 2 | Cell 3 | Cell 2 | Cell 3 |
| Physical cell ID | | |  | 489 | 0 | 489 | 0 |
| SSB ARFCN | | |  | freq1 | | | |
| Duplex mode | | Config 1, 2 |  | TDD | | | |
| TDD configuration | | Config 1, 2 |  | TDDConf.1.1 CCA | | | |
| BWchannel | | Config 1, 2 | MHz | 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, 2 |  | TRS.1.2 TDD | NA | TRS.1.2 TDD | NA |
| DRX Cycle | | | ms | Not Applicable | | | |
| PDSCH Reference measurement channel | | Config 1, 2 |  | SR.1.1 CCA |  | SR.1.1 CCA |  |
| RMSI CORESET Reference Channel | | Config 1, 2 |  | CR.1.1 CCA |  | CR.1.1 CCA |  |
| Control Channel RMC | | Config 1, 2 |  | CCR.1.1 CCA |  | CCR.1.1 CCA |  |
| DL CCA model | |  |  | As specified in clause A.3.26.2.1 | | | |
| UL CCA model | |  |  | As specified in clause A.3.26.2.2 | | | |
| PCCA\_DL for dynamic channel access Note 7,8 | | Config 1, 2 |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 |
| PCCA\_DL for semi-static channel access Note 6.8 | | Config 1, 2 |  | PCCA\_DL=0.9375 | PCCA\_DL=0.9375 | PCCA\_DL=0.9375 | PCCA\_DL=0.9375 |
| PCCA\_UL | | Config 1, 2 |  | 1 | 1 | 1 | 1 |
| SSB configuration | Semi-static channel access | Config 1, 2 |  | SSB.1 CCA  (As defined in A.3.10A ) | SSB.1 CCA  (As defined in A.3.10A ) | SSB.1 CCA  (As defined in A.3.10A ) | SSB.1 CCA  (As defined in A.3.10A ) |
| Dynamic channel access | SSB.2 CCA  (As defined in A.3.10A ) | SSB.2 CCA  (As defined in A.3.10A ) | SSB.2 CCA  (As defined in A.3.10A ) | SSB.2 CCA  (As defined in A.3.10A ) |
| Time offset with Cell 2 | | Config 1, 2 | μs | - | 3 | - | 3 |
| SMTC configuration | | Config 1, 2 |  | SMTC.1 | | | |
| DBT Window Configuration | | Config 1, 2 |  | As defined in A.3.28.1 | | | |
| DL CCA model | | Config 1, 2 |  | As specified in clause A.3.26.2.1 | | | |
| UL CCA model | | Config 1, 2 |  | As specified in clause A.3.26.2.2 | | | |
| OCNG Patterns | | |  | OP.1 | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2 | kHz | 30kHz | | | |
| 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\_CCA\_FR1\_I | dBm/15KhZ | -94 | | -110 | |
|  |  | NR\_CCA\_FR1\_J | -109.5 | |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Note2 | Config 1, 2 | NR\_CCA\_FR1\_I | dBm/SCS | -91 | | -107.0 | |
|  |  |
|  |  |
|  |  |
|  |  | NR\_CCA\_FR1\_J | -106.5 | |
|  |  |
|  |  |
|  |  |
|  | | | dB | 2.46 | -5.97 | -2.01 | -3.54 |
|  | | | dB | 6 | 1 | 1 | 0 |
| SS-RSRPNote3 | Config 1, 2 | NR\_CCA\_FR1\_I | dBm/SCS | -85 | -90 | -106.00 | -107.00 |
|  |  | NR\_CCA\_FR1\_J | -105.50 | -106.50 |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| IoNote3 | Config 1, 2 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.99 | | -70.82 | |
|  |  | NR\_CCA\_FR1\_J | -70.32 | |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| Propagation condition | | | - | AWGN | | | |
| Antenna configuration | | |  | 1x2 | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations.  Note 6 For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 8: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | |

##### A.10.5.1.1.3 Test Requirements

The SS-RSRP measurement accuracy for cell 2 and cell 3 shall fulfil absolute requirement in clause 10.1.2.1.1 and relative requirement in clause 10.1.36.1.1 and 10.1.36.1.2.

<End of change 15>

<Start of change 16>

#### A.11.6.1.1 Intra-frequency measurement accuracy on a carrier frequency with CCA

##### A.11.6.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy on the carrier frequency with CCA is within the specified limits. This test will verify the requirements in clauses 10.1.36.1.1 and 10.1.36.1.2 for intra-frequency measurements under CCA.

##### A.11.6.1.1.2 Test parameters

In this set of test cases all cells are on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model. Supported test configurations are shown in table A.11.6.1.1.2-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in A.11.6.1.1.2-2. In all test cases, Cell 1 is the PCell, and Cell 2 is the target cell.

Table A.11.6.1.1.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

Table A.11.6.1.1.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | | Unit | Test 1 | | | Test 2 | | | | | | Test 3 | | | | | |
|  | | | | | |  | Cell 1 | Cell 2 | | Cell 1 | | Cell 2 | | | | Cell 1 | | | Cell 2 | | |
| Cell ID | | | | | |  | 489 | 0 | | 489 | | 0 | | | | 489 | | 0 | | | |
| SSB ARFCN | | | | | |  | freq1 | | | freq1 | | | | | | freq1 | | | | | |
| TDD configuration | | | | Config 1 | |  | TDDConf.1.1 CCA | | | | | | | | | | | | | | |
| BWchannel | | | | Config 1 | | MHz | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| BWP BW | | | | Config 1 | |  | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| DL CCA model | | | | | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | | | | |
| UL CCA model | | | | | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | | | | |
| PCCA\_DL for dynamic channel access Note 7,9 | | | | | |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | | | | | | | | | | |
| PCCA\_DL for semi-static channel access Note 8,9 | | | | | |  | PCCA\_DL=0.9375 | | | | | | | | | | | | | | |
| PCCA\_UL | | | | | |  | 1 | | | | | | | | | | | | | | |
| Downlink initial BWP configuration | | | | | |  | DLBWP.0.1 | | | | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | | | | |  | DLBWP.1.1 | | | | | | | | | | | | | | |
| Uplink initial BWP configuration | | | | | |  | ULBWP.0.1 | | | | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | | | | |  | ULBWP.1.1 | | | | | | | | | | | | | | |
| TRS configuration | | | | | Config 1 |  | TRS.1.2 TDD | | NA | | TRS.1.2 TDD | | | NA | TRS.1.2 TDD | | | | | | NA |
| DRX Cycle | | | | | | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | | Config 1 | |  | SR.1.1 CCA | | - | SR.1.1 CCA | | - | | | | SR.1.1 CCA | | | | | - |
| RMSI CORESET Reference Channel | | | | Config 1 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| Control channel RMC | | | | Config 1 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| SSB configuration for semi-static channel access | | | | Config 1 | |  | SSB.1 CCA | | SSB.1 CCA | SSB.1 CCA | | SSB.1 CCA | | | | SSB.1 CCA | | | | | SSB.1 CCA |
| SSB configuration for dynamic channel access | | | | Config 1 | |  | SSB.2 CCA | | SSB.2 CCA | SSB.2 CCA | | SSB.2 CCA | | | | SSB.2 CCA | | | | | SSB.2 CCA |
| DBT window configuration | | | | Config 1,2,3 | |  | DBT.1 | | DBT.1 | DBT.1 | | DBT.1 | | | | DBT.1 | | | | | DBT.1 |
| Time offset with Cell 1 | | Config 1 | | | | μs | - | | 3 | - | | 3 | | | | - | | | | 3 | |
| SMTC configuration | | Config 1 | | | |  | SMTC.1 | | | | | | | | | | | | | | |
| OCNG Patterns | | | | | |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1 | | kHz | 30 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | | | dB | 0 | | 0 | 0 | | | 0 | | | | 0 | | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH to PDSCH | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| Note2 | Config 1 | | | | NR\_CCA\_FR1\_I |  | Not applicableNote 5 | | | -94 | | | | | | | -110 | | | | |
| NR\_CCA\_FR1\_J | -109.5 | | | | |
| Note2 | Config 1 | NR\_CCA\_FR1\_I | | | | dBm/SCS | Not applicableNote 5 | | | -91 | | | | | | | -107.0 | | | | |
| NR\_CCA\_FR1\_J | | | | -106.5 | | | | |
| Note6 | | | | | | dB | 2.46 | | -5.97 | 2.46 | | | -5.97 | | | | -2.01 | | | | -3.54 |
| Note6 | | | | | | dB | 6 | | 1 | 6 | | | 1 | | | | 1 | | | | 0 |
| SS-RSRPNote3,6 | Config 1 | | NR\_CCA\_FR1\_I | | | dBm/SCS | Not applicableNote 5 | | Not applicableNote 5 | -85 | | | -90 | | | | -106.00 | | | | -107.00 |
| NR\_CCA\_FR1\_J | | | -105.50 | | | | -106.50 |
| IoNote3 | Config 1 | | | NR\_CCA\_FR1\_I | | dBm/  38.16MHz | Not applicableNote 5- | | | -51.99 | | | | | | | -70.82 | | | | |
| NR\_CCA\_FR1\_J | | -70.32 | | | | |
| Propagation condition | | | | | | - | AWGN | | | | | | | | | | | | | | |
| Antenna configuration | | | | | |  | 1x2 | | | | | | | | | | | | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: Subtest 1 is not used when testing with 30kHz SSB SCS.  NOTE 6: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 9: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | | | | | | | | | | | |

##### A.11.6.1.1.3 Test Requirements

The SS-RSRP measurement accuracy for cell 1 and cell 2 shall fulfil absolute requirement in clause 10.1.36.1.1 and relative requirement in clause 10.1.36.1.2.

#### A.11.6.1.2 Intra-frequency measurement accuracy on SCC on a carrier frequency with CCA

##### A.11.6.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy on the carrier frequency with CCA is within the specified limits. This test will verify the requirements in clauses 10.1.36.1.1 and 10.1.36.1.2 for intra-frequency measurements under CCA.

##### A.11.6.1.2.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1) on the carrier frequency with CCA, and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). Supported test configurations are shown in table A.11.6.1.2.2-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in A.11.6.1.2.2-2.

Table A.11.6.1.2.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 30kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

Table A.11.6.1.2.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | | Unit | Test 1 | | | Test 2 | | | | | | Test 3 | | | | | |
|  | | | | | |  | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 | | | | Cell 2 | | | Cell 3 | | |
| Cell ID | | | | | |  | 489 | 0 | | 489 | | 0 | | | | 489 | | 0 | | | |
| SSB ARFCN | | | | | |  | freq1 | | | freq1 | | | | | | freq1 | | | | | |
| TDD configuration | | | | Config 1 | |  | TDDConf.1.1 CCA | | | | | | | | | | | | | | |
| BWchannel | | | | Config 1 | | MHz | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| BWP BW | | | | Config 1 | |  | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| DL CCA model | | | | | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | | | | |
| UL CCA model | | | | | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | | | | |
| PCCA\_DL for dynamic channel access Note 7,9 | | | | | |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | | | | | | | | | | |
| PCCA\_DL for semi-static channel access Note 8,9 | | | | | |  | PCCA\_DL=0.9375 | | | | | | | | | | | | | | |
| PCCA\_UL | | | | | |  | 1 | | | | | | | | | | | | | | |
| Downlink initial BWP configuration | | | | | |  | DLBWP.0.1 | | | | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | | | | |  | DLBWP.1.1 | | | | | | | | | | | | | | |
| Uplink initial BWP configuration | | | | | |  | ULBWP.0.1 | | | | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | | | | |  | ULBWP.1.1 | | | | | | | | | | | | | | |
| TRS configuration | | | | | Config 1 |  | TRS.1.2 TDD | | NA | | TRS.1.2 TDD | | | NA | TRS.1.2 TDD | | | | | | NA |
| DRX Cycle | | | | | | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | | Config 1 | |  | SR.1.1 CCA | | - | SR.1.1 CCA | | - | | | | SR.1.1 CCA | | | | | - |
| RMSI CORESET Reference Channel | | | | Config 1 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| Control channel RMC | | | | Config 1 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| SSB configuration for semi-static channel access | | | | Config 1 | |  | SSB.1 CCA | | SSB.1 CCA | SSB.1 CCA | | SSB.1 CCA | | | | SSB.1 CCA | | | | | SSB.1 CCA |
| SSB configuration for dynamic channel access | | | | Config 1 | |  | SSB.2 CCA | | SSB.2 CCA | SSB.2 CCA | | SSB.2 CCA | | | | SSB.2 CCA | | | | | SSB.2 CCA |
| DBT window configuration | | | | Config 1,2,3 | |  | DBT.1 | | DBT.1 | DBT.1 | | DBT.1 | | | | DBT.1 | | | | | DBT.1 |
| Time offset with Cell 1 | | Config 1 | | | | μs | - | | 3 | - | | 3 | | | | - | | | | 3 | |
| SMTC configuration | | Config 1 | | | |  | SMTC.1 | | | | | | | | | | | | | | |
| OCNG Patterns | | | | | |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1 | | kHz | 30 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | | | dB | 0 | | 0 | 0 | | | 0 | | | | 0 | | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH to PDSCH | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| Note2 | Config 1 | | | | NR\_CCA\_FR1\_I |  | Not applicableNote 5 | | | -94 | | | | | | | -110 | | | | |
| NR\_CCA\_FR1\_J | -109.5 | | | | |
| Note2 | Config 1 | NR\_CCA\_FR1\_I | | | | dBm/SCS | Not applicableNote 5 | | | -91 | | | | | | | -107.0 | | | | |
| NR\_CCA\_FR1\_J | | | | -106.5 | | | | |
| Note6 | | | | | | dB | 2.46 | | -5.97 | 2.46 | | | -5.97 | | | | -2.01 | | | | -3.54 |
| Note6 | | | | | | dB | 6 | | 1 | 6 | | | 1 | | | | 1 | | | | 0 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I | | | dBm/SCS | Not applicableNote 5 | | Not applicableNote 5 | -85 | | | -90 | | | | -106.00 | | | | -107.00 |
| NR\_CCA\_FR1\_J | | | -105.50 | | | | -106.50 |
| IoNote3 | Config 1 | | | NR\_CCA\_FR1\_I | | dBm/  38.16MHz | Not applicableNote 5- | | | -51.99 | | | | | | | -70.82 | | | | |
| NR\_CCA\_FR1\_J | | -70.32 | | | | |
| Propagation condition | | | | | | - | AWGN | | | | | | | | | | | | | | |
| Antenna configuration | | | | | |  | 1x2 | | | | | | | | | | | | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: Subtest 1 is not used when testing with 30kHz SSB SCS.  NOTE 6: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 9: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | | | | | | | | | | | |

##### A.11.6.1.2.3 Test Requirements

The SS-RSRP measurement accuracy for cell 2 and cell 3 shall fulfil absolute requirement in clause 10.1.36.1.1 and relative requirement in clause 10.1.36.1.2.

<End of change 16>

<Start of change 17>

#### A.13.4.1.1 Intra-frequency measurement accuracy on a carrier frequency with CCA

##### A.13.4.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRP measurement accuracy on the carrier frequency with CCA is within the specified limits. This test will verify the requirements in clauses 10.1.36.1.1 and 10.1.36.1.2 for intra-frequency measurements under CCA.

##### A.13.4.1.1.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1), and two cells on the same carrier frequency with CCA and transmit SSBs in DBT windows according to DL CCA model: SCell (Cell 2) and a neighbour cell (Cell 3). Supported test configurations are shown in table A.13.4.1.1.2-1. Both absolute and relative accuracy of SS-RSRP intra-frequency measurements are tested by using the parameters in A.13.4.1.1.2-2.

Table A.13.4.1.1.2-1: SS-RSRP Intra frequency SS-RSRP supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR carrier with CCA: 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  NR carrier without CCA: 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 for each supported band | |

Table A.13.4.1.1.2-2: SS-RSRP Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | | Unit | Test 1 | | | Test 2 | | | | | | Test 3 | | | | | |
|  | | | | | |  | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 | | | | Cell 2 | | | Cell 3 | | |
| Cell ID | | | | | |  | 489 | 0 | | 489 | | 0 | | | | 489 | | 0 | | | |
| SSB ARFCN | | | | | |  | freq1 | | | freq1 | | | | | | freq1 | | | | | |
| DL CCA model | | | | | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | | | | |
| UL CCA model | | | | | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | | | | |
| PCCA\_DL for dynamic channel access Note 7,9 | | | | | |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | | | | | | | | | | |
| PCCA\_DL for semi-static channel access Note 8,9 | | | | | |  | PCCA\_DL=0.9375 | | | | | | | | | | | | | | |
| PCCA\_UL | | | | | |  | 1 | | | | | | | | | | | | | | |
| TDD configuration | | | | Config 1,2,3 | |  | TDDConf.1.1 CCA | | | | | | | | | | | | | | |
| BWchannel | | | | Config 1,2,3 | | MHz | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| BWP BW | | | | Config 1,2,3 | |  | 40: NRB,c = 106 | | | | | | | | | | | | | | |
| CCA model | | | | Config 1,2,3 | |  | TBD | | | | | | | | | | | | | | |
| 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 1,2,3 |  | TRS.1.2 TDD | | NA | | TRS.1.2 TDD | | | NA | TRS.1.2 TDD | | | | | | NA |
| DRX Cycle | | | | | | ms | Not Applicable | | | | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | | Config 1,2,3 | |  | SR.1.1 CCA | | - | SR.1.1 CCA | | - | | | | SR.1.1 CCA | | | | | - |
| RMSI CORESET Reference Channel | | | | Config 1,2,3 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| Control channel RMC | | | | Config 1,2,3 | |  | CR.1.1 CCA | | - | CR.1.1 CCA | | - | | | | CR.1.1 CCA | | | | | - |
| SSB configuration for semi-static channel access | | | | Config 1,2,3 | |  | SSB.1 CCA | | SSB.1 CCA | SSB.1 CCA | | SSB.1 CCA | | | | SSB.1 CCA | | | | | SSB.1 CCA |
| SSB configuration for dynamic channel access | | | | Config 1,2,3 | |  | SSB.2 CCA | | SSB.2 CCA | SSB.2 CCA | | SSB.2 CCA | | | | SSB.2 CCA | | | | | SSB.2 CCA |
| DBT window configuration | | | | Config 1,2,3 | |  | DBT.1 | | DBT.1 | DBT.1 | | DBT.1 | | | | DBT.1 | | | | | DBT.1 |
| Time offset with Cell 1 | | Config 1,2,3 | | | | μs | - | | 3 | - | | 3 | | | | - | | | | 3 | |
| SMTC configuration | | Config 1,2,3 | | | |  | SMTC.1 | | | | | | | | | | | | | | |
| OCNG Patterns | | | | | |  | OCNG pattern 1 | | | | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1,2,3 | | kHz | 30 kHz | | | | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | | | dB | 0 | | 0 | 0 | | | 0 | | | | 0 | | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of PDSCH to PDSCH | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | | | |  |  | |  |  | | |  | | | |  | | | |  |
| Note2 | Config 1,2,3 | | | | NR\_CCA\_FR1\_I |  | Not applicableNote 5 | | | -94 | | | | | | | -110 | | | | |
| NR\_CCA\_FR1\_J | -109.5 | | | | |
| Note2 | Config 1,2,3 | NR\_CCA\_FR1\_I | | | | dBm/SCS | Not applicableNote 5 | | | -91 | | | | | | | -107.0 | | | | |
| NR\_CCA\_FR1\_J | | | | -106.5 | | | | |
| Note6 | | | | | | dB | 2.46 | | -5.97 | 2.46 | | | -5.97 | | | | -2.01 | | | | -3.54 |
| Note6 | | | | | | dB | 6 | | 1 | 6 | | | 1 | | | | 1 | | | | 0 |
| SS-RSRPNote3,6 | Config 1,2,3 | | NR\_CCA\_FR1\_I | | | dBm/SCS | Not applicableNote 5 | | Not applicableNote 5 | -85 | | | -90 | | | | -106.00 | | | | -107.00 |
| NR\_CCA\_FR1\_J | | | -105.50 | | | | -106.50 |
| IoNote3 | Config 1,2,3 | | | NR\_CCA\_FR1\_I | | dBm/  38.16MHz | Not applicableNote 5- | | | -51.99 | | | | | | | -70.82 | | | | |
| NR\_CCA\_FR1\_J | | -70.32 | | | | |
| Propagation condition | | | | | | - | AWGN | | | | | | | | | | | | | | |
| Antenna configuration | | | | | |  | 1x2 | | | | | | | | | | | | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  NOTE 5: Subtest 1 is not used when testing with 30kHz SSB SCS.  NOTE 6: The signal levels apply for SSS REs when the discovery burst is transmitted during DBT windows.  NOTE 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 9: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | | | | | | | | | | | |

##### A.13.4.1.1.3 Test Requirements

The SS-RSRP measurement accuracy for cell 2 and cell 3 shall fulfil absolute requirement in clause 10.1.36.1.1 and relative requirement in clause 10.1.36.1.2.

<End of change 17>

<Start of change 18>

### A.10.3.1 Radio link monitoring

#### A.10.3.1.1 Introduction

In the test cases specified in clause A.10.3.1, 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 based on the UE output power:

* UE output power higher than Transmit OFF power -50 dBm (as defined in TS 38.101-3 [20]) means uplink signal
* UE output power equal to or less than Transmit OFF power -50 dBm (as defined in TS 38.101-3 [20]) means no uplink signal.

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.

#### A.10.3.1.2 Radio link monitoring out-of-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

##### A.10.3.1.2.1 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 8.1A.

In the test, UE is configured to perform RLM based on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.10.3.1.2.1-1. The test parameters are given in Tables A.10.3.1.2.1-2, A.10.3.1.2.1-3, and A.10.3.1.2.1-4 below. There are two cells in the test: Cell 1 is the E-UTRAN PCell, and Cell 2 is the FR1 PSCell which operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model. 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.10.3.1.2.1-1 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. The UE transmits according to UL CCA model. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40 ms) in the test.

Table A.10.3.1.2.1-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| 2 | LTE TDD; NR: 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 above. | |

Table A.10.3.1.2.1-2: General test parameters for PSCell 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 |
| DL CCA model | | |  | As specified in clause A.3.26.2.1 |
| UL CCA model | | |  | As specified in clause A.3.26.2.2 |
| Duplex mode | | Config 1,2 |  | TDD |
| BWchannel | | Config 1,2 | MHz | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1,2 |  | [DLBWP.0.1] |
| DL dedicated BWP configuration | | Config 1,2 |  | [DLBWP.1.1] |
| UL initial BWP configuration | | Config 1,2 |  | [ULBWP.0.1] |
| UL dedicated BWP configuration | | Config 1,2 |  | [ULBWP.1.1] |
| TDD configuration | | Config 1,2 |  | TDDConf.1.1 CCA |
| CORESET Reference Channel | | Config 1,2 |  | CR.1.1 CCA |
| SSB configuration for semi-static channel accessNote 4, 6 | | Config 1,2 |  | SSB.1 CCA |
| SSB configuration for dynamic channel accessNote 5, 6 | | Config 1,2 |  | SSB.2 CCA |
| DBT window configuration | | Config 1,2 |  | DBT.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 |  | 30 kHz |
| PRACH Configuration | | Config 1,2 |  | FR1 PRACH configuration 1 under CCA |
| 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 1,2 |  | [CSI-RS.2.1 TDD] |
| CSI-RS for tracking | | Config 1,2 |  | [TRS.1.2 TDD] |
| T1 | | | s | 0.2 |
| T2 | | | s | 1.04 |
| T3 | | | s | 1.04 |
| D1 | | | s | 1 |
| 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.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | |

Table A.10.3.1.2.1-3: Cell-specific test parameters for PSCell out-of-sync testing in non-DRX mode.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | |  | | |
| T1 | T2 | T3 |  |  |  |
| DL CCA probability PCCA\_DL | | Note 6,8 |  | PCCA\_DL=0.9375 | | |  | | |
| Note 7,8 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| UL CCA probability PCCA\_UL | | |  | 1 | | |  | | |
| 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 |
| SNRNote 3,4 on RLM-RS | Config 1,2 | | dB | 1 | [-7] | -15 |  |  |  |
| SNR on other channels and signals | Config 1,2 | | dB | 1 | | |  | | |
|  | Config 1,2 | | dBm/SCS | -95 | | |  | | |
| Propagation condition | | |  | TDL-C 300 ns 100 Hz | | |  | | |
| 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. For cells with CCA model, OCNG is transmitted only in slots with RMC burst transmission and is not transmitted during muted slots or during DBT windows.  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 transmitted SSS REs during DBT windows.  NOTE 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3, respectively, in Figure A.10.3.1.2.1-1.  NOTE 5: The SNR values are specified for testing a UE which supports 2 RX on at least one band. For testing of a UE which supports 4 RX on all bands, the SNR during T3 is A.3.6.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | |

Table A.10.3.1.2.1-4: Measurement gap configuration for PSCell out-of-sync testing in non-DRX mode.

|  |  |  |
| --- | --- | --- |
| Field | Test 1 |  |
| Value |  |
| *gapOffset* | 0 |  |
| NOTE 1: E-UTRAN PCell and PSCell are SFN-synchronous and frame boundary aligned.  NOTE 2: Ensure that RLM RS is partially overlapped with measurement gap. | | |

****

**Figure A.10.3.1.2.1-1: SNR variation for out-of-sync testing.**

##### A.10.3.1.2.2 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.10.3.1.3 Radio link monitoring in-sync test for PSCell configured with SSB-based RLM RS in non-DRX mode

##### A.10.3.1.3.1 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. This test will partly verify the FR1 PSCell radio link monitoring requirements in clause 8.1A.

In the test, UE is configured to perform RLM on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.10.3.1.3.1-1. The test parameters are given in Tables A.10.3.1.3.1-2, and A.10.3.1.3.1-3 below. There are two cells in the test: Cell 1 is the E-UTRAN PCell, and Cell 2 is the FR1 PSCell which operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model. 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.10.3.1.3.1-1 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. The UE transmits according to UL CCA model.

Table A.10.3.1.3.1-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | LTE FDD; NR: TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |
| 2 | LTE TDD; NR: 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 above. | |

Table A.10.3.1.3.1-2: General test parameters for PSCell 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 |
| DL CCA model | | | |  | As specified in clause A.3.26.2.1 |
| UL CCA model | | | |  | As specified in clause A.3.26.2.2 |
| Duplex mode | | | Config 1,2 |  | TDD |
| BWchannel | | | Config 1,2 | MHz | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1,2 |  | [DLBWP.0.1] |
| DL dedicated BWP configuration | | | Config 1,2 |  | [DLBWP.1.1] |
| UL initial BWP configuration | | | Config 1,2 |  | [ULBWP.0.1] |
| UL dedicated BWP configuration | | | Config 1,2 |  | [ULBWP.1.1] |
| TDD Configuration | | | Config 1,2 |  | TDDConf.1.1 CCA |
| CORESET Reference Channel | | | Config 1,2 |  | CR.1.1 CCA |
| SSB configuration for semi-static channel accessNote 3, 5 | | | Config 1,2 |  | SSB.1 CCA |
| SSB configuration for dynamic channel accessNote 4,5 | | | Config 1,2 |  | SSB.2 CCA |
| DBT window configuration | | | Config 1,2 |  | DBT.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 |  | 30 kHz |
| PRACH Configuration | | | Config 1,2 |  | FR1 PRACH configuration 1 under CCA |
| 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 | 2000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1,2 | |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1,2 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.52 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 2.04 |
| D1 | | | | s | 2 |
| 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: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 4: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 5: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.10.3.1.3.1-3: Cell-specific test parameters for PSCell in-sync testing in non-DRX mode.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | | |
| T1 | T2 | T3 | T4 | T5 |
| DL CCA probability PCCA\_DL | | Note 6,8 |  | PCCA\_DL=0.9375 | | | | |
| Note 7,8 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | |
| UL CCA probability PCCA\_UL | | |  | 1 | | | | |
| LCCA\_DL | | |  | 7 | | | | |
| WCCA\_DL | | | ms | TEvaluate\_in\_SSB,CCANOTE 9 | | | | |
| 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 1,2 | | dB | 1 | [-7] | [-15] | [-4.5] | 1 |
| SNR on other channels and signals | Config 1,2 | | dB | 1 | | | | |
|  | Config 1,2 | | dBm/SCS | -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. For cells with CCA model, OCNG is transmitted only in slots with RMC burst transmission and is not transmitted during muted slots or during DBT windows.  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 transmitted SSS REs during DBT windows.  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.10.3.1.2.1-1.  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 4 RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only.  NOTE 9: As defined in Table 8.1A.2.2-1. | | | | | | | | |

****

**Figure A.10.3.1.2.1-1: SNR variation for in-sync testing.**

##### A.10.3.1.3.2 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 18>

<Start of change 19>

### A.11.4.1 Radio link monitoring

#### A.11.4.1.1 Introduction

In the test cases specified in clause A.11.4.1, 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 based on the UE output power:

* 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.

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.

#### A.11.4.1.2 Radio link monitoring out-of-sync test for PCell configured with SSB-based RLM RS in non-DRX mode

##### A.11.4.1.2.1 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 PCell radio link monitoring requirements in clause 8.1A.

In the test, UE is configured to perform RLM based on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.11.4.1.2.1-1. The test parameters are given in Tables A.11.4.1.2.1-2, A.11.4.1.2.1-3, and A.11.4.1.2.1-4 below. There is one cell (Cell 1), which is the active NR cell in FR1, in the test. Cell 1 operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model.

The test consists of three successive time periods, with time duration of T1, T2 and T3, respectively. Figure A.11.4.1.2.1-1 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. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 5 ms. The UE transmits according to UL CCA model. The UE is configured to perform inter-frequency measurements using Gap Pattern ID #0 (40 ms) in the test.

Table A.11.4.1.2.1-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | TDD, SSB SCS 30 kHz, data SCS 30 kHz, bandwidth 40 MHz |

Table A.11.4.1.2.1-2: General test parameters for PCell out-of-sync testing in non-DRX mode.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value |
| Test 1 |
| Active PCell | | |  | Cell 1 |
| RF Channel Number | | |  | 1 |
| DL CCA model | | |  | As specified in clause A.3.26.2.1 |
| UL CCA model | | |  | As specified in clause A.3.26.2.2 |
| Duplex mode | | Config 1 |  | TDD |
| BWchannel | | Config 1 | MHz | 40: NRB,c = 106 |
| DL initial BWP configuration | | Config 1 |  | [DLBWP.0.1] |
| DL dedicated BWP configuration | | Config 1 |  | [DLBWP.1.1] |
| UL initial BWP configuration | | Config 1 |  | [ULBWP.0.1] |
| UL dedicated BWP configuration | | Config 1 |  | [ULBWP.1.1] |
| TDD configuration | | Config 1 |  | TDDConf.1.1 CCA |
| CORESET Reference Channel | | Config 1 |  | CR.1.1 CCA |
| SSB configuration for semi-static channel accessNote 3, 5 | | Config 1 |  | SSB.1 CCA |
| SSB configuration for dynamic channel accessNote 4, 5 | | Config 1 |  | SSB.2 CCA |
| DBT window configuration | | Config 1 |  | DBT.1 |
| PDSCH/PDCCH subcarrier spacing | | Config 1 |  | 30 kHz |
| PRACH Configuration | | Config 1 |  | FR1 PRACH configuration 1 under CCA |
| 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.2.1 TDD] |
| CSI-RS for tracking | | Config 1 |  | [TRS.1.2 TDD] |
| T1 | | | s | 0.2 |
| T2 | | | s | 1.04 |
| T3 | | | s | 1.04 |
| D1 | | | s | 1 |
| 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 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | |

Table A.11.4.1.2.1-3: Cell-specific test parameters for PCell out-of-sync testing in non-DRX mode.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | |  | | |
| T1 | T2 | T3 |  |  |  |
| DL CCA probability PCCA\_DL | | Note 6,8 |  | PCCA\_DL=0.9375 | | |  | | |
| Note 7,8 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| UL CCA probability PCCA\_UL | | |  | 1 | | |  | | |
| 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 |
| SNRNote 3,4 on RLM-RS | Config 1 | | dB | 1 | [-7] | -15 |  |  |  |
| SNR on other channels and signals | Config 1 | | dB | 1 | | |  | | |
|  | Config 1 | | dBm/SCS | -95 | | |  | | |
| Propagation condition | | |  | TDL-C 300 ns 100 Hz | | |  | | |
| 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. For cells with CCA model, OCNG is transmitted only in slots with RMC burst transmission and is not transmitted during muted slots or during DBT windows.  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 transmitted SSS REs during DBT windows.  NOTE 4: The SNR in time periods T1, T2 and T3 is denoted as SNR1, SNR2 and SNR3, respectively, in Figure A.10.3.1.2.1-1.  NOTE 5: The SNR values are specified for testing a UE which supports 2 RX on at least one band. For testing of a UE which supports 4 RX on all bands, the SNR during T3 is A.3.6.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | |

Table A.11.4.1.2.1-4: Measurement gap configuration for PCell out-of-sync testing in non-DRX mode.

|  |  |  |
| --- | --- | --- |
| Field | Test 1 |  |
| Value |  |
| *gapOffset* | 0 |  |
| NOTE: Ensure that RLM RS is partially overlapped with measurement gap0 | | |

****

**Figure A.11.4.1.2.1-1: SNR variation for out-of-sync testing.**

##### A.11.4.1.2.2 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.11.4.1.3 Radio link monitoring in-sync test for PCell configured with SSB-based RLM RS in non-DRX mode

##### A.11.4.1.3.1 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. This test will partly verify the FR1 PCell radio link monitoring requirements in clause 8.1A.

In the test, UE is configured to perform RLM based on SSB, with *detectionResource* included in *RadioLinkMonitoringRS* set to SSB#0 and SSB#1, and *purpose* set to ‘*rlf*’. Supported test configurations are shown in table A.11.4.1.3.1-1. The test parameters are given in Tables A.11.4.1.3.1-2, and A.11.4.1.3.1-3 below. There is one cell (Cell 1), which is the active NR cell in FR1, in the test. Cell 1 operates on a carrier frequency with CCA and transmits SSBs in DBT windows according to DL CCA model.

The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5, respectively. Figure A.11.4.1.3.1-1 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. The UE transmits according to UL CCA model.

Table A.11.4.1.3.1-1: Supported test configurations.

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | NR TDD, SSB SCS 30 kHz, data SCS 30 kHz, BW 40 MHz |

Table A.11.4.1.3.1-2: General test parameters for PCell in-sync testing in non-DRX mode.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Value |
| Test 1 |
| Active PCell | | | |  | Cell 1 |
| RF Channel Number | | | |  | 1 |
| DL CCA model | | | |  | As specified in clause A.3.26.2.1 |
| UL CCA model | | | |  | As specified in clause A.3.26.2.2 |
| Duplex mode | | | Config 1 |  | TDD |
| BWchannel | | | Config 1 | MHz | 40: NRB,c = 106 |
| DL initial BWP configuration | | | Config 1 |  | [DLBWP.0.1] |
| DL dedicated BWP configuration | | | Config 1 |  | [DLBWP.1.1] |
| UL initial BWP configuration | | | Config 1 |  | [ULBWP.0.1] |
| UL dedicated BWP configuration | | | Config 1 |  | [ULBWP.1.1] |
| TDD Configuration | | | Config 1 |  | TDDConf.1.1 CCA |
| CORESET Reference Channel | | | Config 1 |  | CR.1.1 CCA |
| SSB configuration for semi-static channel accessNote 3, 5 | | | Config 1 |  | SSB.1 CCA |
| SSB configuration for dynamic channel accessNote 4,5 | | | Config 1 |  | SSB.2 CCA |
| DBT window configuration | | | Config 1 |  | DBT.1 |
| PDSCH/PDCCH subcarrier spacing | | | Config 1 |  | 30 kHz |
| PRACH Configuration | | | Config 1 |  | FR1 PRACH configuration 1 under CCA |
| 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 | 2000 |
| T311 timer | | | | ms | 1000 |
| N310 | | | |  | 1 |
| N311 | | | |  | 1 |
| CSI-RS configuration for CSI reporting | | Config 1 | |  | CSI-RS.2.1 TDD |
| CSI-RS for tracking | | Config 1 | |  | TRS.1.2 TDD |
| T1 | | | | s | 0.2 |
| T2 | | | | s | 0.2 |
| T3 | | | | s | 0.52 |
| T4 | | | | s | 0.2 |
| T5 | | | | s | 2.04 |
| D1 | | | | s | 2 |
| 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 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

Table A.11.4.1.3.1-3: Cell-specific test parameters for PCell in-sync testing in non-DRX mode.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | | |
| T1 | T2 | T3 | T4 | T5 |
| DL CCA probability PCCA\_DL | | Note 6,8 |  | PCCA\_DL=0.9375 | | | | |
| Note 7,8 |  | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | |
| UL CCA probability PCCA\_UL | | |  | 1 | | | | |
| LCCA\_DL | | |  | 7 | | | | |
| WCCA\_DL | | | ms | TEvaluate\_in\_SSB,CCANOTE 9 | | | | |
| 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] | [-4.5] | 1 |
| SNR on other channels and signals | Config 1 | | dB | 1 | | | | |
|  | Config 1 | | dBm/SCS | -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. For cells with CCA model, OCNG is transmitted only in slots with RMC burst transmission and is not transmitted during muted slots or during DBT windows.  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 transmitted SSS REs during DBT windows.  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.11.4.1.3.1-1.  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 4 RX on all bands, the SNR during T3 and T4 is modified as specified in clause A.3.6.  NOTE 6: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 7: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 8: For UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only.  NOTE 9: As defined in Table 8.1A.2.2-1. | | | | | | | | |

****

**Figure A.11.4.1.3.1-1: SNR variation for in-sync testing.**

##### A.11.4.1.3.2 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 19>

<Start of change 20>

#### 8.1A.2.2 Minimum Requirement

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_out\_SSB,CCA [ms] period becomes worse than the threshold Qout\_SSB,CCA within TEvaluate\_out\_SSB,CCA [ms] evaluation period.

UE shall be able to evaluate whether the downlink radio link quality on the configured RLM-RS resource estimated over the last TEvaluate\_in\_SSB,CCA [ms] period becomes better than the threshold Qin\_SSB,CCA within TEvaluate\_in\_SSB,CCA [ms] evaluation period. During the in-sync evaluation procedure, layer 1 of the UE shall not send any in-sync indication for the cell to the higher layers when Lin exceeds Lin,max, where Lin and Lin,max are defined in Table 8.1A.2.2-1.

TEvaluate\_out\_SSB,CCA and TEvaluate\_in\_SSB,CCA are defined in Table 8.1A.2.2-1, where

- , when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, and these measurement gaps are overlapping with some but not all occasions of the SSB RLM-RS resources; and

- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB RLM-RS resources.

If the high layer in TS 38.331 [2] signaling of *smtc2*is present, TSMTCperiod follows *smtc2*; Otherwise TSMTCperiod follows *smtc1.*

Longer evaluation period would be expected if the combination of RLM-RS, SMTC occasion, and measurement gap configurations does not meet previous conditions.

Table 8.1A.2.2-1: Evaluation period TEvaluate\_out\_SSB,CCA and TEvaluate\_in\_SSB,CCA

|  |  |  |  |
| --- | --- | --- | --- |
| Configuration | TEvaluate\_out\_SSB,CCA (ms) | | TEvaluate\_in\_SSB,CCA (ms) |
|  | RLM-RS SSB Es/IotNote4 ≥-7 dB | RLM-RS SSB Es/Iot Note4 <-7 dB |  |
| no DRX | Max(200, Ceil(17\*P)\*TSSB) | Max(200, Ceil(24\*P)\*TSSB) | Max(100, Ceil((5+Lin)\*P)\*TSSB) |
| DRX cycle≤320 | Max(200, Ceil(1.5\*15\*P)\*Max(TDRX,TSSB)) | Max(200, Ceil(1.5\*20\*P)\*Max(TDRX,TSSB)) | Max(100, Ceil(1.5\*(5+Lin)\*P)\*Max(TDRX,TSSB)) |
| DRX cycle>320 | Ceil(13\*P)\*TDRX | Ceil(16\*P)\*TDRX | Ceil((5+Lin)\*P)\*TDRX |
| NOTE 1: TSSB is the periodicity of the SSB configured for RLM. TDRX is the DRX cycle length.  NOTE 2: When DRX is not configured, Lin is the number of RLM-RS SSB occasions which are not available at the UE during TEvaluate\_in\_SSB,CCA, where Lin ≤ Lin,max. When DRX is configured, Lin is the number of DRX cycles in which at least one RLM-RS SSB occasion is not available at the UE during TEvaluate\_in\_SSB,CCA, where Lin ≤ Lin,max. The UE is not required to determine the availability of SSB occasions more frequent than  Once per Max(10ms, P \* TSSB) if no DRX is used,  Once per Max(10ms, Ceil(1.5 \* P) \* Max(TDRX, TSSB)) if DRX cycle ≤ 320ms,  Once per P \* TDRX if DRX cycle > 320ms.  NOTE 3: Lin,max=7 for Max(TDRX,TSSB) ≤ 40 assuming TDRX=0 for non-DRX case,  Lin,max=5 for 40<Max(TDRX,TSSB)≤320,  Lin,max=3 for TDRX>320.  NOTE 4: RLM-RS SSB Es/Iot is the averaged Es/Iot over the most recent previous out-of-sync evaluation period. | | | |

<End of change 20>

<Start of change 21>

### 8.5A.5 Requirements for SSB based candidate beam detection

#### 8.5A.5.1 Introduction

The requirements in this clause apply for each CBD-RS SSB resource in the set configured for a serving cell, provided that the SSBs configured for candidate beam detection are actually transmitted within UE active DL BWP during the entire evaluation period specified in clause 8.5A.5.2, but occasionally may not be transmitted due to CCA operation.

#### 8.5A.5.2 Minimum requirement

Upon request the UE shall be able to evaluate whether the L1-RSRP measured on the configured CBD-RS SSB resource in set  estimated over the last TEvaluate\_CBD\_SSB\_CCA ms period becomes better than the threshold Qin\_LR,CCA provided SSB\_RP and SSB Ês/Iot are according to Annex Table B.2.4.1 for a corresponding band.

The UE shall monitor the configured SSB resources using the evaluation period in table 8.5A.5.2-1 corresponding to the non-DRX mode, if the configured DRX cycle ≤ 320ms.

The value of TEvaluate\_CBD\_SSB\_CCA is defined in Table 8.5A.5.2-1, where

- , when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the CBD-RS SSB,

- P = 1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the CBD-RS SSB.

Table 8.5A.5.2-1: Evaluation period TEvaluate\_CBD\_SSB\_CCA

|  |  |
| --- | --- |
| Configuration | TEvaluate\_CBD\_SSB\_CCA (ms) |
| non-DRX, DRX cycle ≤ 320ms | Max(25, Ceil((3 + LCBD) × P) × TSSB) |
| DRX cycle > 320ms | Ceil((3 + LCBD) × P) × TDRX |
| Note 1: TSSB is the periodicity of SSB in the set . TDRX is the DRX cycle length.  Note 2: When DRX is not configured, LCBD is the number of CBD-RS SSB occasions not available at the UE during TEvaluate\_CBD\_SSB\_CCA where LCBD ≤ LCBD,max. When DRX is configured, LCBD is the number of DRX cycles in which at least one of the CBD-RS SSB occasions not available at the UE during TEvaluate\_CBD\_SSB\_CCA where LCBD ≤ LCBD,max. The UE, which is configured with DRX, is not required to determine the availability of SSB occasions more frequent than  Once per Max(25ms, P \* TSSB) if DRX cycle ≤ 320ms,  Once per P \* TDRX if DRX cycle > 320ms.  Note 3: LCBD,max=7 for Max(TDRX, TSSB) ≤ 40 assuming TDRX=0 for non-DRX,  LCBD,max=5 for 40 < Max(TDRX, TSSB) ≤ 320,  LCBD,max=3 for TDRX > 320.  Note 4 If LCBD>LCBD,max, the UE shall assume no new candidate beams are found for this evaluation period. | |

<End of change 21>

<Start of change 22>

### 9.5A.4 L1-RSRP measurement requirements

#### 9.5A.4.1 SSB based L1-RSRP Reporting

The UE shall be capable of performing L1-RSRP measurements based on the configured SSB resource for L1-RSRP computation, and the UE physical layer shall be capable of reporting L1-RSRP measured over the measurement period of TL1-RSRP\_Measurement\_Period\_SSB\_CCA.

The value of TL1-RSRP\_Measurement\_Period\_SSB\_CCA is defined in Table 9.5A.4.1-1 for FR1, where

- M=1 if higher layer parameter *timeRestrictionForChannelMeasurement* is configured, and M=3 otherwise

For FR1,

- P=, when in the monitored cell there are measurement gaps configured for intra-frequency, inter-frequency or inter-RAT measurements, which are overlapping with some but not all occasions of the SSB; and

- P=1 when in the monitored cell there are no measurement gaps overlapping with any occasion of the SSB.

Where:

TSSB = ssb-periodicityServingCell

TSMTCperiod = the configured SMTC1 period or SMTC2 period if configured

If the high layer in TS 38.331 [2] signaling of *smtc2* is configured, TSMTCperiod corresponds to the value of higher layer parameter *smtc2*; Otherwise TSMTCperiod corresponds to the value of higher layer parameter *smtc1*.

Longer evaluation period would be expected if the combination of SSB, SMTC occasion and measurement gap configurations does not meet pervious conditions.

UE shall report RSRP\_0 (Not valid) if L1>L1max, where L1 and L1max are defined in Table 9.5A.4.1-1.

Table 9.5A.4.1-1: Measurement period TL1-RSRP\_Measurement\_Period\_SSB\_CCA for FR1

|  |  |
| --- | --- |
| Configuration | TL1-RSRP\_Measurement\_Period\_SSB\_CCA (ms) |
| non-DRX | max(TReport, ceil((M+L1)\*P)\*TSSB) |
| DRX cycle ≤ 320ms | max(TReport, ceil(1.5\*(M+L1)\*P)\*max(TDRX,TSSB)) |
| DRX cycle > 320ms | ceil((M+L1)\*P)\*TDRX |
| Note 1: TSSB = ssb-periodicityServingCell is the periodicity of the SSB-Index configured for L1-RSRP measurement. TDRX is the DRX cycle length.  TReport is configured periodicity for reporting.  Note 2: L1=0 if higher layer parameter timeRestrictionForChannelMeasurement is configured. Otherwise, when DRX is not configured L1 is the number of SSBs not available at the UE during TL1-RSRP\_Measurement\_Period\_SSB\_CCA, and when DRX is configured L1 is the number of DRX cycles in which at least one SSB is not available at the UE during TL1-RSRP\_Measurement\_Period\_SSB\_CCA, where L1 ≤ L1max. The UE is not required to determine the availability of SSB occasions more frequent than Once per Max(TReport, P \* TSSB) if no DRX is used,  Once per Max(TReport, Ceil(1.5 \* P) \* Max(TDRX, TSSB)) if DRX cycle ≤ 320ms,  Once per P \* TDRX if DRX cycle > 320ms.  Note 3: L1max =7 for Max(TDRX,TSSB) ≤ 40ms assuming TDRX=0 for non-DRX, L1max =5 for 40ms < Max(TDRX, TSSB) ≤ 320ms,  L1max =3 for TDRX > 320ms. | |

<End of change 22>

<Start of change 23>

### A.10.5.3 SS-SINR

#### A.10.5.3.1 Intra-frequency measurement accuracy on PSCC

##### A.10.5.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.

##### A.10.5.3.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.10.5.3.1.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.10.5.3.1.2-2. The configuration of cell 1 (E-UTRA PCell) is specified in clause A.3.7A.2.1. In all test cases, Cell 2 is the PSCell with CCA and Cell 3 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 2 and 3.

Table A.10.5.3.1.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

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

Table A.10.5.3.1.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 2 | Cell 3 | | Cell 2 | | | Cell 3 |
| SSB ARFCN | | | |  | freq1 | | | freq1 | | | |
| DL CCA model | | | Config 1,2 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1,2 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | | - | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | | - | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | | - | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | | - | | 0.75 | - | |
| Duplex mode | | | Config 1,2 |  | TDD | | | | | | |
| TDD configuration | | | Config 1,2 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS Configuration | | | Config 1,2 |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1,2 |  | SR.1.1 CCA |  | | SR1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1,2 |  | CR.1.1 CCA |  | | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1,2 |  | CCR.1.1 CCA |  | | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| Time offset with Cell 2 | | | Config 1,2 | μs | - | | 3 | | - | 3 | |
| DBT Window Configuration | | | Config 1,2 |  | DBT.1 | | | | | | |
| SSB configuration | | | Config 1,2 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1,2 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | | 0 | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1,2 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | 2.66 | | -4 | | | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | -87.34 | | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  |  | |  | | |  |
| IoNote3 | | Config 1,2 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in Clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

##### A.10.5.3.1.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

#### A.10.5.3.2 Inter-frequency measurement accuracy on PSCC

##### A.10.5.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.32.1.1 and 10.1.32.1.2 for inter-frequency measurement.

##### A.10.5.3.2.2 Test Parameters

In this test case the two NR cells (i.e., Cell 2 and Cell 3) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.10.5.3.2.2-1. Both absolute accuracy and relative accuracy requirements of SS-SINR inter-frequency measurement are tested by using test parameters in Table A.10.5.3.2.2-2. In all test cases, Cell 2 is the PSCell with CCA and Cell 3 is target cell with CCA. Cell 1 is the E-UTRA cell of which specific test parameters for this test case are specified in Table A.3.7A.2.1-1. Three sub-tests (Test 1, Test 2 and Test 3) are provided different Noc on Cells 2 and 3.

Table A.10.5.3.2.2-1: SS-SINR Inter frequency SS-SINR supported test configurations

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

Table A.10.5.3.2.2-2: SS-SINR Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 1 | | | Test 2 | | | | Test 3 | | | |
|  | | |  | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 | | Cell 2 | | Cell 3 | |
| SSB ARFCN | | |  | freq1 | freq2 | | freq1 | | freq2 | | freq1 | | freq2 | |
| DL CCA model | | Config 1,2 |  | As specified in clause A.3.26.2.1 | | | | | | | | | | |
| UL CCA model | | Config 1,2 |  | As specified in clause A.3.26.2.2 | | | | | | | | | | |
| UL CCA probability | | PCCA\_UL |  | 1.0 | | - | | 1.0 | | - | | 1.0 | | - |
| DL CCA probability for semi-static channel access Note 7, 8 | | PCCA\_DL |  | 0.9375 | | - | | 0.9375 | | - | | 0.9375 | | - |
| DL CCA probability for  dynamic channel access Note 8, 9 | | PCCA\_DL\_1 |  | 0.75 | | - | | 0.75 | | - | | 0.75 | | - |
|  | | PCCA\_DL\_2 |  | 0.75 | | - | | 0.75 | | - | | 0.75 | | - |
| Duplex mode | | Config 1,2 |  | TDD | | | | | | | | | | |
| TDD configuration | | Config 1,2 |  | TDDConf.1.1 CCA | | | | | | | | | | |
| Downlink initial BWP configuration | | |  | DLBWP.0.1 | | | | | | | | | | |
| Downlink dedicated BWP configuration | | |  | DLBWP.1.1 | | | | | | | | | | |
| Uplink initial BWP configuration | | |  | ULBWP.0.1 | | | | | | | | | | |
| Uplink dedicated BWP configuration | | |  | ULBWP.1.1 | | | | | | | | | | |
| DRX Cycle configuration | | | ms | Not Applicable | | | | | | | | | | |
| Gap pattern ID | |  |  | 0 | - | | 0 | | - | | 0 | | - | |
| TRS configuration | | Config 1,2 |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | |  | | TRS.1.2 TDD | |  | |
| PDSCH Reference measurement channel | | Config 1,2 |  | SR.1.1 CCA |  | | SR.1.1 CCA | |  | | SR.1.1 CCA | |  | |
| RMSI CORESET Reference Channel | | Config 1,2 |  | CR.1.1 CCA |  | | CR.1.1 CCA | |  | | CR.1.1 CCA | |  | |
| Dedicated CORESET Reference Channel | | Config 1,2 |  | CCR.1.1 CCA |  | | CCR.1.1 CCA | |  | | CCR.1.1 CCA | |  | |
| OCNG Patterns | | |  | OP.1 | | | | | | | | | | |
| SS-RSSI-Measurement | | |  | Not Applicable | | | | | | | | | | |
| Time offset with Cell 2 | | Config 1,2 | μs | - | | 3 | | - | | 3 | | - | | 3 |
| DBT Window configuration | | Config 1,2 |  | DBT.1 | | | | | | | | | | |
| SSB configuration | | Config 1,2 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | | | | |
| SMTC configuration | | Config 1,2 |  | SMTC.1 | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 30 | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | 0 | | 0 | | 0 | | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of PBCH to PBCH DMRS | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of PDCCH DMRS to SSS | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of PDSCH DMRS to SSS | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of PDSCH to PDSCH | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |  |  |  | |  | |  | |  | |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |  |  |  | |  | |  | |  | |  | |
| Note2 |  | NR\_CCA\_FR1\_I | dBm/15kHz | -88 | | | -108.5 | | | | -115.5 | | | |
|  |  | NR\_CCA\_FR1\_J |  |  | | |  | | | | -116 | | | |
| Note2 | Config 1,2 | NR\_CCA\_FR1\_I | dBm/SCS | -85 | | | -105.5 | | | | -112.5 | | | |
|  |  | NR\_CCA\_FR1\_J |  |  | | |  | | | | -113 | | | |
|  | | | dB | -1.75 | | | 20 | | | | -4.0 | | | |
|  | | | dB | -1.75 | | | 20 | | | | -4.0 | | | |
| SS-RSRPNote3 | Config 1,2 | NR\_CCA\_FR1\_I |  | -86.75 | | | -85.5 | | | | -116.5 | | | |
|  |  | NR\_CCA\_FR1\_J |  |  | | |  | | | | -116 | | | |
| SS-SINR Note3 | | NR\_CCA\_FR1\_I | dB | -1.75 | | | 20 | | | | -4.0 | | | |
|  | | NR\_CCA\_FR1\_J |  |  | | |  | | | |  | | | |
| IoNote3 | Config 1,2 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.73 | | | -54.41 | | | | -80 | | | |
|  |  | NR\_CCA\_FR1\_J |  |  | | |  | | | | -79.5 | | | |
| Propagation condition | | | - | AWGN | | | | | | | | | | |
| Antenna configuration | | | - | 1x2 | | | | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in Clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | | |

##### A.10.5.3.2.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.32.1.1 and 10.1.32.1.2.

#### A.10.5.3.3 Intra-frequency measurement accuracy on SCC

##### A.10.5.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.

##### A.10.5.3.3.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.10.5.3.3.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.10.5.3.3.2-2. The configuration of cell 1 (E-UTRA PCell) is specified in clause A.3.7A.2.1. In all test cases, Cell 2 is the PSCell with CCA, Cell 3 is the SCell with CCA, and Cell 4 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 2, 3 and 4.

Table A.10.5.3.3.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

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

Table A.10.5.3.3.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 2 / Cell 3 | | Cell 4 | Cell 2 / Cell 3 | | | Cell 4 |
| SSB ARFCN | | | |  | freq1 for Cell 2  freq2 for Cell 3 | | freq2 | freq1 for Cell 2  freq2 for Cell 3 | | | freq2 |
| DL CCA model | | | Config 1,2 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1,2 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | | 0.75 | - | |
| Duplex mode | | | Config 1,2 |  | TDD | | | | | | |
| TDD configuration | | | Config 1,2 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS Configuration | | | Config 1,2 |  | TRS.1.2 TDD | |  | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1,2 |  | SR.1.1 CCA | |  | SR1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1,2 |  | CR.1.1 CCA | |  | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1,2 |  | CCR.1.1 CCA | |  | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| Time offset with Cell 2 | | | Config 1,2 | μs | 3 (for Cell 3) | | 3 | | 3 (for Cell 3) | | 3 |
| DBT Window Configuration | | | Config 1,2 |  | DBT.1 | | | | | | |
| SSB configuration | | | Config 1,2 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1,2 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | 0 | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1,2 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | | 2.66 | -4 | | | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | | -87.34 | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  |  | | |  |
| IoNote3 | | Config 1,2 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in Clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

##### A.10.5.3.3.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

------------------------------------------------- Unchanged sections omitted --------------------------------------------------------

### A.11.6.2 SS-RSRQ

#### A.11.6.2.1 Intra-frequency measurement accuracy

##### A.11.6.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.29.1.1.

##### A.11.6.2.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.11.6.2.1.2-1. The absolute accuracy of SS-RSRQ intra-frequency measurement is tested by using the parameters in Table A.11.6.2.1.2-2. In all test cases, Cell 1 is the PCell with CCA and Cell 2 is the target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1 and 2.

Table A.11.6.2.1.2-1: SS-RSRQ Intra frequency SS-RSRQ supported test configurations

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

Table A.11.6.2.1.2-2: SS-RSRQ Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | | Test 2 | | | | Test 3 | | |
|  | | | |  | Cell 1 | | | Cell 2 | | Cell 1 | | Cell 2 | | Cell 1 | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | | | | | freq1 | | | | freq1 | | |
| DL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | |
| UL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | | 1.0 | | - | | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | | 0.9375 | | - | | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | | 0.75 | | - | | 0.75 | | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | | 0.75 | | - | | 0.75 | | - | |
| Duplex mode | | | Config 1 |  | TDD | | | | | | | | | | | |
| TDD configuration | | | Config 1 |  | TDDConf.1.1 CCA | | | | | | | | | | | |
| BWchannel | | | Config 1 | MHz | 40: NRB,c = 106 | | | | | | | | | | | |
| Gap Pattern ID | | |  |  | 0 | | | | | | | | | | | |
| BWP configuration | | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | | | | | |
|  | | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | | | | | |
|  | | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | | | | | |
|  | | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | | | | | |
| PDSCH Reference measurement channel | | | Config 1 |  | SR1.1 CCA | |  | | | SR1.1 CCA | |  | | SR1.1 CCA | |  |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 CCA | |  | | | CR.1.1 CCA | |  | | CR.1.1 CCA | |  |
| Control Channel RMC | | | Config 1 |  | CCR.1.1 CCA | |  | | | CCR.1.1 CCA | |  | | CCR.1.1 CCA | |  |
| TRS Configuration | | | Config 1 |  | TRS.1.2 TDD | |  | | | TRS.1.2 TDD | |  | | TRS.1.2 TDD | |  |
| OCNG Patterns | | | |  | OP. 1 | | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | | |
| Time offset with Cell 1 | | | Config 1 | μs | - | 3 | | | - | | 3 | | - | | 3 | |
| DBT Window configuration | | | Config 1 |  | DBT.1 | | | | | | | | | | | |
| SSB configuration | | | Config 1 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | | | | | |
| SMTC configuration | | | Config 1 |  | SMTC.1 | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1 | kHz | 30 kHz | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | | | 0 | | 0 | | 0 | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  | | |  | |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  | | |  | |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -91 | | | | | - | | | | -110 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | | |  | | | | -109.5 | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -88 | | | | | - | | | | -107 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | | |  | | | | -106.5 | | |
|  | | | | dB | -1.76 | | | | | -4.7 | | | | -5.46 | | -5.46 |
|  | | | | dB | 3 | | 3 | | | -2.9 | | -2.9 | | -4 | | -4 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I |  | -85 | | -85 | | | - | | - | | -111 | | -111 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | | |  | |  | | -110.5 | | -110.5 |
| SS-RSRQ Note3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | | -14.77 | | | -16.76 | | -16.76 | | -17.34 | | -17.34 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  | | |  | |  | |  | |  |
| IoNote3 | | Config 1 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -50 | | | | | - | | | | -73.4 | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | | |  | | | | -72.9 | | |
| Propagation condition | | | | - | AWGN | | AWGN | | | AWGN | | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | | 1x2 | | | 1x2 | | 1x2 | | 1x2 | | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | | | | |

##### A.11.6.2.1.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.29.1.1.

#### A.11.6.2.2 Inter-frequency measurement accuracy

##### A.11.6.2.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.30.1.1 and 10.1.30.1.2.

##### A.11.6.2.2.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.11.6.2.2.2-1. Both absolute accuracy and relative accuracy requirements of SS-RSRQ inter-frequency measurement are tested by using test parameters in Table A.11.6.2.2.2-2. In all test cases, Cell 1 is the PCell with CCA and Cell 2 is target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1 and 2.

Table A.11.6.2.2.2-1: SS-RSRQ Inter frequency SS-RSRQ supported test configurations

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

Table A.11.6.2.2.2-2: SS-RSRQ Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | Test 2 | | | | | Test 3 | | |
|  | | | |  | Cell 1 | | Cell 2 | | Cell 1 | | | Cell 2 | | Cell 1 | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | freq2 | | | freq1 | | | freq2 | | freq1 | | freq2 |
| DL CCA model | | Config 1 | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | |
| UL CCA model | | Config 1 | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | |
| UL CCA probability | | PCCA\_UL | |  | 1.0 | | | - | | 1.0 | - | | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | PCCA\_DL | |  | 0.9375 | | | - | | 0.9375 | - | | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | PCCA\_DL\_1 | |  | 0.75 | | | - | | 0.75 | - | | 0.75 | | - | |
|  | | PCCA\_DL\_2 | |  | 0.75 | | | - | | 0.75 | - | | 0.75 | | - | |
| Duplex mode | | Config 1 | |  | TDD | | | | | | | | | | | |
| TDD configuration | | Config 1 | |  | TDDConf.1.1 CCA | | | | | | | | | | | |
| BWchannel | | Config 1 | | MHz | 40: NRB,c = 106 | | | | | | | | | | | |
| Gap pattern ID | | Config 1 | |  | 0 | | | | | | | | | | | |
| BWP BW | | Config 1 | |  | 40: NRB,c = 106 | | | | | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | | | | | |
| PDSCH Reference measurement channel | | Config 1 | |  | SR.1.1 CCA |  | | | SR.1.1 CCA | | |  | | SR.1.1 CCA | |  |
| RMSI CORESET Reference Channel | | Config 1 | |  | CR.1.1 CCA |  | | | CR.1.1 CCA | | |  | | CR.1.1 CCA | |  |
| Dedicated CORESET Reference Channel | | Config 1 | |  | CCR.1.1 CCA |  | | | CCR.1.1 CCA | | |  | | CCR.1.1 CCA | |  |
| TRS Configuration | | Config 1 | |  | TRS.1.2 TDD |  | | | TRS.1.2 TDD | | |  | | TRS.1.2 TDD | |  |
| OCNG Patterns | | | |  | OCNG pattern 1 | | | | | | | | | | | |
| Time offset with Cell 1 | | Config 1 | | μs | - | | | 3 | | - | | 3 | - | | | 3 |
| DBT Window configuration | | Config 1 | |  | DBT.1 | | | | | | | | | | | |
| SSB configuration | | Config 1 | |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | | | | | |
| SMTC configuration | | Config 1 | |  | SMTC.1 | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | | kHz | 30 kHz | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | | | 0 | | | 0 | | 0 | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | | |  | | |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | | |  | | |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -86.27 | | | | -113 | | | | | -112 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -111.5 | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -83.27 | | | | -110 | | | | | -109 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -108.5 | | |
|  | | | | dB | -1.75 | | | | -1.75 | | | | | 3 | | -1.75 |
|  | | | | dB | -1.75 | | | | -1.75 | | | | | 3 | | -1.75 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I |  | -85.02 | -85.02 | | | -111.75 | | | -111.75 | | -106 | | -110.75 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | | |  | | |  | | -105.5 | | -110-.25 |
| SS-RSRQNote3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | -14.77 | | | -40.59 | | | -40.59 | | 12.56 | | 14.76 |
|  | | | NR\_CCA\_FR1\_J |  |  |  | | |  | | |  | |  | |  |
| IoNote3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -50 | | | | -76.73 | | | | | -73.19 | | -75.73 |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -72.69 | | -75.23 |
| Propagation condition | | | | - | AWGN | AWGN | | | AWGN | | | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | | | 1x2 | | | 1x2 | | 1x2 | | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | | | | |

##### A.11.6.2.2.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.30.1.1 and 10.1.30.1.2.

#### A.11.6.2.3 Intra-frequency measurement accuracy on SCC

##### A.11.6.2.3.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.29.1.1.

##### A.11.6.2.3.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.11.6.2.3.2-1. The absolute accuracy of SS-RSRQ intra-frequency measurement is tested by using the parameters in Table A.11.6.2.3.2-2. In all test cases, Cell 1 is the PCell with CCA, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1, 2, and 3.

Table A.11.6.2.3.2-1: SS-RSRQ Intra frequency SS-RSRQ supported test configurations

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

Table A.11.6.2.3.2-2: SS-RSRQ Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | Test 2 | | | | Test 3 | | |
|  | | | |  | Cell 1 / Cell 2 | | Cell 3 | | Cell 1 / Cell 2 | | Cell 3 | | Cell 1 / Cell 2 | | Cell 3 |
| SSB ARFCN | | | |  | freq1 for Cell 1  freq2 for Cell 2 | | freq2 | | freq1 for Cell 1  freq2 for Cell 2 | | freq2 | | freq1 for Cell 1  freq2 for Cell 2 | | freq2 |
| DL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.1 | | | | | | | | | | |
| UL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.2 | | | | | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | 1.0 | | - | | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | 0.9375 | | - | | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | 0.75 | | - | | 0.75 | | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | 0.75 | | - | | 0.75 | | - | |
| Duplex mode | | | Config 1 |  | TDD | | | | | | | | | | |
| TDD configuration | | | Config 1 |  | TDDConf.1.1 CCA | | | | | | | | | | |
| BWchannel | | | Config 1 | MHz | 40: NRB,c = 106 | | | | | | | | | | |
| Gap Pattern ID | | |  |  | 0 | | | | | | | | | | |
| BWP configuration | | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | | | | |
|  | | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | | | | |
|  | | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | | | | |
|  | | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | | | | |
| PDSCH Reference measurement channel | | | Config 1 |  | SR1.1 CCA | |  | | SR1.1 CCA | |  | | SR1.1 CCA | |  |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 CCA | |  | | CR.1.1 CCA | |  | | CR.1.1 CCA | |  |
| Control Channel RMC | | | Config 1 |  | CCR.1.1 CCA | |  | | CCR.1.1 CCA | |  | | CCR.1.1 CCA | |  |
| TRS Configuration | | | Config 1 |  | TRS.1.2 TDD | |  | | TRS.1.2 TDD | |  | | TRS.1.2 TDD | |  |
| OCNG Patterns | | | |  | OP. 1 | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | |
| Time offset with Cell 1 | | | Config 1 | μs | 3 (for Cell 2) | 3 | | 3 (for Cell 2) | | 3 | | 3 (for Cell 2) | | 3 | |
| DBT Window configuration | | | Config 1 |  | DBT.1 | | | | | | | | | | |
| SSB configuration | | | Config 1 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | | | | |
| SMTC configuration | | | Config 1 |  | SMTC.1 | | | | | | | | | | |
| CSI-RS for tracking | | | Config 1 |  | TRS.1.2 TDD | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1 | kHz | 30 kHz | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | | 0 | | 0 | | 0 | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  | |  | |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  | |  | |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -91 | | | | - | | | | -110 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | -109.5 | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -88 | | | | - | | | | -107 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | -106.5 | | |
|  | | | | dB | -1.76 | | | | -4.7 | | | | -5.46 | | -5.46 |
|  | | | | dB | 3 | | 3 | | -2.9 | | -2.9 | | -4 | | -4 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I |  | -85 | | -85 | | - | | - | | -111 | | -111 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | |  | |  | | -110.5 | | -110.5 |
| SS-RSRQ Note3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | | -14.77 | | -16.76 | | -16.76 | | -17.34 | | -17.34 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  | |  | |  | |  | |  |
| IoNote3 | | Config 1 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -50 | | | | - | | | | -73.4 | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | |  | | | | -72.9 | | |
| Propagation condition | | | | - | AWGN | | AWGN | | AWGN | | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | | 1x2 | | 1x2 | | 1x2 | | 1x2 | | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | | | |

##### A.11.6.2.3.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.29.1.1.

#### A.11.6.2.4 Inter-frequency measurement accuracy

##### A.11.6.2.4.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.30.1.1 and 10.1.30.1.2.

##### A.11.6.2.4.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.11.6.2.4.2-1. Both absolute accuracy and relative accuracy requirements of SS-RSRQ inter-frequency measurement are tested by using test parameters in Table A.11.6.2.4.2-2 and A.11.6.2.4.2-3. In all test cases, Cell 1 is the PCell and Cell 2 is target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1 and 2.

Table A.11.6.2.4.2-1: SS-RSRQ Inter frequency SS-RSRQ supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.11.6.2.4.2-2: SS-RSRQ Inter frequency test parameters

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | **Cell 2** | **Cell 2** | **Cell 2** |
| SSB ARFCN | | | |  | freq2 | freq2 | freq2 |
| DL CCA model | | Config 1, 2, 3 | |  | As specified in clause A.3.26.2.1 | | |
| UL CCA model | | Config 1, 2, 3 | |  | As specified in clause A.3.26.2.2 | | |
| UL CCA probability | | PCCA\_UL | |  | 1.0 | | |
| DL CCA probability for semi-static channel access Note 7, 8 | | PCCA\_DL | |  | 0.9375 | | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | PCCA\_DL\_1 | |  | 0.75 | | |
|  | | PCCA\_DL\_2 | |  | 0.75 | | |
| Duplex mode | | Config 1, 2, 3 | |  | TDD | | |
| TDD configuration | | Config 1, 2, 3 | |  | TDDConf.1.1 CCA | | |
| BWchannel | | Config 1, 2, 3 | | MHz | 40: NRB,c = 106 | | |
| Gap pattern ID | | Config 1, 2, 3 | |  | 0 | | |
| BWP BW | | Config 1, 2, 3 | |  | 40: NRB,c = 106 | | |
| DRX Cycle | | | | ms | Not Applicable | | |
| OCNG Patterns | | | |  | OCNG pattern 1 | | |
| Time offset with Cell 1 | | Config 1, 2, 3 | | μs | 3 | | |
| DBT Window configuration | | Config 1, 2, 3 | |  | DBT.1 | | |
| SSB configuration | | Config 1, 2, 3 | |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | |
| SMTC configuration | | Config 1, 2, 3 | |  | SMTC.1 | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1, 2, 3 | | kHz | 30 kHz | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -86.27 | -113 | -112 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | -111.5 |
| Note2 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -83.27 | -110 | -109 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | -108.5 |
|  | | | | dB | -1.75 | -1.75 | -1.75 |
|  | | | | dB | -1.75 |  | -1.75 |
| SS-RSRPNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I |  | -85.02 | -111.75 | -110.75 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | -110-.25 |
| SS-RSRQNote3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | -40.59 | 14.76 |
|  | | | NR\_CCA\_FR1\_J |  |  |  |  |
| IoNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -50 | -76.73 | -75.73 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | -75.23 |
| Propagation condition | | | | - | AWGN | AWGN | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | |

Table A.11.6.2.4.2-3: SS-RSRQ Intra frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | **Cell 1** | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | |  |  | 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 |  |
| Gap Pattern ID | | |  |  |  | 0 |  |
| BWP configuration | | | Initial DL BWP |  |  | DLBWP.0.1 |  |
|  | | | Dedicated DL BWP |  |  | DLBWP.1.1 |  |
|  | | | Initial UL BWP |  |  | ULBWP.0.1 |  |
|  | | | Dedicated UL BWP |  |  | ULBWP.1.1 |  |
| DRX Cycle | | | | ms |  | Not Applicable |  |
| PDSCH Reference measurement channel | | | Config 1 |  |  | SR.1.1 FDD |  |
|  | | | Config 2 |  |  | SR.1.1 TDD |  |
|  | | | Config 3 |  |  | SR2.1 TDD |  |
| RMSI CORESET Reference Channel | | | Config 1 |  |  | CR.1.1 FDD |  |
|  | | | Config 2 |  |  | CR.1.1 TDD |  |
|  | | | Config 3 |  |  | CR.2.1 TDD |  |
| Control Channel RMC | | | Config 1 |  |  | CCR.1.1 FDD |  |
|  | | | Config 2 |  |  | CCR.1.1 TDD |  |
|  | | | Config 3 |  |  | CCR.2.1 TDD |  |
| TRS Configuration | | | Config 1 |  |  | TRS.1.1 FDD |  |
|  | | | Config 2 |  |  | TRS.1.1 TDD |  |
|  | | | Config 3 |  |  | TRS.1.2 TDD |  |
| OCNG Patterns | | | |  |  | OP. 1 |  |
| SS-RSSI-Measurement | | | |  |  | Not Applicable |  |
| SMTC configuration | | | Config 1 |  |  | SMTC.2 |  |
|  | | | Config 2,3 |  |  | SMTC.1 |  |
| SSB configuration | | | Config 1,2 |  |  | SSB.1 FR1 |  |
|  | | | Config 3 |  |  | SSB.2 FR1 |  |
| CSI-RS for tracking | | | Config 1 |  |  | TRS.1.1 FDD |  |
| Config 2 |  | TRS.1.1 TDD |  |
| Config 3 |  | TRS.1.2 TDD |  |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz |  | 15 kHz |  |
|  | | | Config 3 |  |  | 30 kHz |  |
| 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) | | | |  |  |  |  |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/15kHz | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -91 | - | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -88 | - | -111 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -110.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -110 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -109.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -109 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -108.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -108 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -107.5 |
|  | | | | dB | -1.76 | -4.7 | -5.46 |
|  | | | | dB | 3 | -2.9 | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -82 | -103.9 | -118 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -117.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -117 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -116.5 |
|  |  | | NR\_FDD\_FR1\_E,  NR\_TDD\_FR1\_E |  |  |  | -116 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -115.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -115 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -114.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -85 | - | -115 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -114.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -114 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -113.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -111.5 |
| SS-RSRQ Note3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dB | -14.77 | -16.76 | -17.34 |
|  | | | 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 |  |  |  |  |
| IoNote3 | | Config 1,2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -50 | -70 | -83.5 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -83 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -82.5 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -82 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -81.5 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -81 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -80.5 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -80 |
|  | | Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -50 | - | -77.4 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -76.9 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -76.4 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -75.9 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -75.4 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -74.9 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -74.4 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -73.9 |
| Propagation condition | | | | - | AWGN | AWGN | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | | |

##### A.11.6.2.4.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.30.1.1 and 10.1.30.1.2.

### A.11.6.3 SS-SINR

#### A.11.6.3.1 Intra-frequency measurement accuracy

##### A.11.6.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.1.

##### A.11.6.3.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.11.6.3.1.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.11.6.3.1.2-2. In all test cases, Cell 1 is the PCell with CCA and Cell 2 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 1 and 2.

Table A.11.6.3.1.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

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

Table A.11.6.3.1.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 1 | Cell 2 | | Cell 1 | | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | | | freq1 | | | |
| DL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | | - | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | | - | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | | - | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | | - | | 0.75 | - | |
| Duplex mode | | | Config 1 |  | TDD | | | | | | |
| TDD configuration | | | Config 1 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS configuration | | | Config 1 |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1 |  | SR.1.1 CCA |  | | SR.1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 CCA |  | | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 CCA |  | | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| DBT Window configuration | | | Config 1 |  | DBT.1 | | | | | | |
| Time offset with Cell 1 | | | Config 1 | s | - | | 3 | | - | 3 | |
| SSB configuration | | | Config 1 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | | 0 | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  | |  | | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  | |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  | |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | 2.66 | | -4 | | | -4 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | -87.34 | | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  | | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | -3.19 | | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  |  | |  | | |  |
| IoNote3 | | Config 1 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

##### A.11.6.3.1.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

#### A.11.6.3.2 Inter-frequency measurement accuracy

##### A.11.6.3.2.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.32.1.1 and 10.1.32.1.2.

##### A.11.6.3.2.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.11.6.3.2.2-1. Both absolute accuracy and relative accuracy requirements of SS-SINR inter-frequency measurement are tested by using test parameters in Table A.11.6.3.2.2-2. In all test cases, Cell 1 is the PCell with CCA and Cell 2 is target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1 and 2.

Table A.11.6.3.2.2-1: SS-SINR Inter frequency SS-SINR supported test configurations

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

Table A.11.6.3.2.2-2: SS-SINR Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | | Test 2 | | | | | Test 3 | | |
|  | | | |  | Cell 1 | | Cell 2 | | Cell 1 | | | Cell 2 | | Cell 1 | | Cell 2 |
| SSB ARFCN | | | |  | freq1 | | freq2 | | freq1 | | | freq2 | | freq1 | | freq2 |
| DL CCA model | | Config 1 | |  | As specified in clause A.3.26.2.1 | | | | | | | | | | | |
| UL CCA model | | Config 1 | |  | As specified in clause A.3.26.2.2 | | | | | | | | | | | |
| UL CCA probability | | PCCA\_UL | |  | 1.0 | | | - | | 1.0 | - | | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | PCCA\_DL | |  | 0.9375 | | | - | | 0.9375 | - | | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | PCCA\_DL\_1 | |  | 0.75 | | | - | | 0.75 | - | | 0.75 | | - | |
|  | | PCCA\_DL\_2 | |  | 0.75 | | | - | | 0.75 | - | | 0.75 | | - | |
| Duplex mode | | Config 1 | |  | TDD | | | | | | | | | | | |
| TDD configuration | | Config 1 | |  | TDDConf.1.1 CCA | | | | | | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | | | | | | |
| Gap pattern ID | | | |  | 0 | - | | | 0 | | | - | | 0 | | - |
| TRS configuration | | Config 1 | |  | TRS.1.2 TDD |  | | | TRS.1.2 TDD | | |  | | TRS.1.2 TDD | |  |
| PDSCH Reference measurement channel | | Config 1 | |  | SR.1.1 CCA |  | | | SR.1.1 CCA | | |  | | SR.1.1 CCA | |  |
| RMSI CORESET Reference Channel | | Config 1 | |  | CR.1.1 CCA |  | | | CR.1.1 CCA | | |  | | CR.1.1 CCA | |  |
| Dedicated CORESET Reference Channel | | Config 1 | |  | CCR.1.1 CCA |  | | | CCR.1.1 CCA | | |  | | CCR.1.1 CCA | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | | | | | |
| Time offset with Cell 1 | | Config 1 | | μs | - | 3 | | | - | | | 3 | | - | | 3 |
| DBT Window configuration | | Config 1 | |  | DBT.1 | | | | | | | | | | | |
| SSB configuration | | Config 1 | |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | | | | | |
| SMTC configuration | | Config 1 | |  | SMTC.1 | | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | | kHz | 30 | | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | | 0 | | | 0 | | 0 | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  | |  | | |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  | |  | | |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -88 | | | | -108.5 | | | | | -115.5 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -115 | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -85 | | | | -105.5 | | | | | -112.5 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -112 | | |
|  | | | | dB | -1.75 | | -1.75 | | 20 | | | 20 | | -4.0 | | -4.0 |
|  | | | | dB | -1.75 | | | | 20 | | | | | -4.0 | | |
| SS-RSRP Note3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -86.75 | | | | -85.5 | | | | | -116.5 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -116 | | |
| SS-SINRNote3 | | | NR\_CCA\_FR1\_I | dB | -1.75 | | | | 20 | | | | | -4.0 | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | |  | | |
| IoNote3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.73 | | | | -54.41 | | | | | -80 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | |  | | | | | -79.5 | | |
| Propagation condition | | | | - | AWGN | | | | | | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | | | | |

##### A.11.6.3.2.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.32.1.1 and 10.1.32.1.2.

#### A.11.6.3.3 Intra-frequency measurement accuracy on SCC

##### A.11.6.3.3.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.1.

##### A.11.6.3.3.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.11.6.3.3.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.11.6.3.3.2-2. In all test cases, Cell 1 is the PCell with CCA, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 1, 2, and 3.

Table A.11.6.3.3.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

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

Table A.11.6.3.3.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 1 / Cell 2 | | Cell 3 | Cell 1 / Cell 2 | | | Cell 3 |
| SSB ARFCN | | | |  | freq1 for Cell 1  freq2 for Cell 2 | | freq2 | freq1 for Cell 1  freq2 for Cell 2 | | | freq2 |
| DL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | | 0.75 | - | |
| Duplex mode | | | Config 1 |  | TDD | | | | | | |
| TDD configuration | | | Config 1 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS configuration | | | Config 1 |  | TRS.1.2 TDD | |  | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1 |  | SR.1.1 CCA | |  | SR.1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1 |  | CR.1.1 CCA | |  | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1 |  | CCR.1.1 CCA | |  | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| DBT Window configuration | | | Config 1 |  | DBT.1 | | | | | | |
| Time offset with Cell 1 | | | Config 1 | s | 3 (for Cell 2) | | 3 | | 3 (for Cell 2) | | 3 |
| SSB configuration | | | Config 1 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | 0 | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | | 2.66 | -4 | | | -4 |
| SS-RSRPNote3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | | -87.34 | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  |  | | |  |
| IoNote3 | | Config 1 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

##### A.11.6.3.3.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

#### A.11.6.3.4 Inter-frequency measurement accuracy

##### A.11.6.3.4.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clauses 10.1.32.1.1 and 10.1.32.1.2.

##### A.11.6.3.4.2 Test Parameters

In this test case the two cells (i.e., Cell 1 and Cell 2) are on different carrier frequencies and measurement gaps are provided. Supported test configurations are shown in Table A.11.6.3.4.2-1. Both absolute accuracy and relative accuracy requirements of SS-SINR inter-frequency measurement are tested by using test parameters in Table A.11.6.3.4.2-2 and Table A.11.6.3.4.2-3. In all test cases, Cell 1 is the PCell and Cell 2 is target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1 and 2.

Table A.11.6.3.4.2-1: SS-SINR Inter frequency SS-SINR supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.11.6.3.4.2-2: SS-SINR Inter frequency test parameters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | | **Cell 2** | **Cell 2** | **Cell 2** |
| SSB ARFCN | | | |  | | freq2 | freq2 | freq2 |
| DL CCA model | | Config 1 | |  | | As specified in clause A.3.26.2.1 | | |
| UL CCA model | | Config 1 | |  | | As specified in clause A.3.26.2.2 | | |
| UL CCA probability | | PCCA\_UL | |  | | 1.0 | | |
| DL CCA probability for semi-static channel access Note 7, 8 | | PCCA\_DL | |  | | 0.9375 | | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | PCCA\_DL\_1 | |  | | 0.75 | | |
|  | | PCCA\_DL\_2 | |  | | 0.75 | | |
| Duplex mode | | Config 1 | |  | | TDD | | |
| TDD configuration | | Config 1 | |  | | TDDConf.1.1 CCA | | |
| Downlink initial BWP configuration | | | |  | | DLBWP.0.1 | | |
| Downlink dedicated BWP configuration | | | |  | | DLBWP.1.1 | | |
| Uplink initial BWP configuration | | | |  | | ULBWP.0.1 | | |
| Uplink dedicated BWP configuration | | | |  | | ULBWP.1.1 | | |
| DRX Cycle configuration | | | | ms | | Not Applicable | | |
| Gap pattern ID | | | |  | | - | | |
| OCNG Patterns | | | |  | | OP.1 | | |
| SS-RSSI-Measurement | | | |  | | Not Applicable | | |
| Time offset with Cell 1 | | Config 1 | | μs | | 3 | | |
| DBT Window configuration | | Config 1 | |  | | DBT.1 | | |
| SSB configuration | | Config 1 | |  | | SSB.1 CCA for semi-static channel access SSB.2 CCA for dynamic channel access | | |
| SMTC configuration | | Config 1 | |  | | SMTC.1 | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | | kHz | | 30 | | |
| EPRE ratio of PSS to SSS | | | | dB | | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  | |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  | |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  | |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  | |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  | |  |  |  |
| EPRE ratio of PDSCH to PDSCH | | | |  | |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  | |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  | |  |  |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | | -88 | -108.5 | -115.5 |
|  |  | | NR\_CCA\_FR1\_J |  | |  |  | -115 |
| Note2 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | | -85 | -105.5 | -112.5 |
|  |  | | NR\_CCA\_FR1\_J |  | |  |  | -112 |
|  | | | | dB | | -1.75 | 20 | -4.0 |
|  | | | | dB | | -1.75 | 20 | -4.0 |
| SS-RSRP Note3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/SCS | | -86.75 | -85.5 | -116.5 |
|  |  | | NR\_CCA\_FR1\_J |  | |  |  | -116 |
| SS-SINRNote3 | | | NR\_CCA\_FR1\_I | dB |  | -1.75 | 20 | -4.0 |
|  | | | NR\_CCA\_FR1\_J |  |  |  |  |  |
| IoNote3 | Config 1 | | NR\_CCA\_FR1\_I | dBm/  38.16MHz | | -51.73 | -54.41 | -80 |
|  |  | | NR\_CCA\_FR1\_J |  | |  |  | -79.5 |
| Propagation condition | | | | - | | AWGN | | |
| Antenna configuration | | | | - | | 1x2 | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | |

Table A.6.7.3.4.2-3: SS-SINR Inter frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | **Cell 1** | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | |  | freq1 | freq1 | freq1 |
| Duplex mode | | Config 1 | |  |  | FDD |  |
|  | | Config 2,3 | |  |  | TDD |  |
| TDD configuration | | Config 1 | |  |  | Not Applicable |  |
|  | | Config 2 | |  |  | TDDConf.1.1 |  |
|  | | Config 3 | |  |  | TDDConf.2.1 |  |
| Downlink initial BWP configuration | | | |  |  | DLBWP.0.1 |  |
| Downlink dedicated BWP configuration | | | |  |  | DLBWP.1.1 |  |
| Uplink initial BWP configuration | | | |  |  | ULBWP.0.1 |  |
| Uplink dedicated BWP configuration | | | |  |  | ULBWP.1.1 |  |
| DRX Cycle configuration | | | | ms |  | Not Applicable |  |
| Gap pattern ID | | | |  |  | 0 |  |
| TRS configuration | | Config 1 | |  |  | TRS.1.1 FDD |  |
| Config 2 | |  |  | TRS.1.1 TDD |  |
| Config 3 | |  |  | TRS.1.2 TDD |  |
| PDSCH Reference measurement channel | | Config 1 | |  |  | SR.1.1 FDD |  |
|  | | Config 2 | |  |  | SR.1.1 TDD |  |
|  | | Config 3 | |  |  | SR2.1 TDD |  |
| RMSI CORESET Reference Channel | | Config 1 | |  |  | CR.1.1 FDD |  |
|  | | Config 2 | |  |  | CR.1.1 TDD |  |
|  | | Config 3 | |  |  | CR2.1 TDD |  |
| Dedicated CORESET Reference Channel | | Config 1 | |  |  | CCR.1.1 FDD |  |
|  | | Config 2 | |  |  | CCR.1.1 TDD |  |
|  | | Config 3 | |  |  | CCR2.1 TDD |  |
| OCNG Patterns | | | |  |  | OP.1 |  |
| SS-RSSI-Measurement | | | |  |  | Not Applicable |  |
| SMTC configuration | | Config 1 | |  |  | SMTC pattern 2 |  |
|  | | Config 2,3 | |  |  | SMTC pattern 1 |  |
| SSB configuration | | Config 1,2 | |  |  | SSB.1 FR1 |  |
|  | | Config 3 | |  |  | SSB.2 FR1 |  |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | | kHz |  | 15 |  |
|  | | Config 3 | |  |  | 30 |  |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  |  |
| EPRE ratio of OCNG DMRS to 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 | dBm/15kHz | -88 | -108.5 | -119.5 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -119 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -118.5 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -118 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -117.5 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -117 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -116.5 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -116 |
| Note2 | Config 1,2 | | | dBm/SCS | -88 | -108.5 | Same as Noc for 15kHz |
|  | Config 3 | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 |  | -85 | -105.5 | -116.5 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -116 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -115.5 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -115 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -114.5 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -114 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -114.5 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -113 |
|  | | | | dB | -1.75 | 20 | -4.0 |
|  | | | | dB | -1.75 | 20 | -4.0 |
| SS-RSRP Note3 | Config 1,2 | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -89.75 | -88.5 | -123.5 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -123 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -122.5 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -122 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -121.5 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -121 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -120.5 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -120 |
|  | Config 3 | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 |  | -86.75 | -85.5 | -120.5 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -120 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -119.5 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -119 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -118.5 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -118 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -117.5 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -117 |
| SS-SINRNote3 | | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 | dB | -1.75 | 20 | -4.0 |
|  | | | 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 |  |  |  |  |
| IoNote3 | Config 1,2 | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -57.83 | -60.5 | -90.09 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -89.59 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -89.09 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -88.59 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -88.09 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -87.59 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -87.09 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -86.59 |
|  | Config 3 | | NR\_FDD\_FR1\_A  NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -51.73 | -54.41 | -84 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -83.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -83 |
|  |  | | NR\_FDD\_FR1\_D  NR\_TDD\_FR1\_D |  |  |  | -82.5 |
|  |  | | NR\_FDD\_FR1\_E  NR\_TDD\_FR1\_E |  |  |  | -82 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -81.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -81 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -80.5 |
| Propagation condition | | | | - |  | AWGN |  |
| Antenna configuration | | | | - |  | 1x2 |  |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | | |

##### A.11.6.3.4.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.32.1.1 and 10.1.32.1.2.

------------------------------------------------- Unchanged sections omitted --------------------------------------------------------

### A.13.4.2 SS-RSRQ

#### A.13.4.2.1 Intra-frequency measurement accuracy on SCC

##### A.13.4.2.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-RSRQ measurement accuracy is within the specified limits. This test will verify the requirements in Clause 10.1.29.1.1.

##### A.13.4.2.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.13.4.2.1.2-1. The absolute accuracy of SS-RSRQ intra-frequency measurement is tested by using the parameters in Table A.13.4.2.1.2-2 and Table A.13.4.2.1.2-3. In all test cases, Cell 1 is the PCell, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Three sub-tests (Test 1, Test 2, and Test 3) are provided different Noc on Cells 1, 2, and 3.

Table A.13.4.2.1.2-1: SS-RSRQ Intra frequency SS-RSRQ supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.13.4.2.1.2-2: SS-RSRQ Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | Test 2 | | | Test 3 | | |
|  | | | |  | Cell 2 | Cell 3 | Cell 2 | Cell 3 | | Cell 2 | | Cell 3 |
| SSB ARFCN | | | |  | freq2 | freq2 | freq2 | freq2 | | freq2 | | freq2 |
| DL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.1 | | | | | | | |
| UL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.2 | | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | 1.0 | - | 1.0 | | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | 0.9375 | - | 0.9375 | | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | 0.75 | - | 0.75 | | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | 0.75 | - | 0.75 | | - | |
| Duplex mode | | | Config 1, 2, 3 |  | TDD | | | | | | | |
| TDD configuration | | | Config 1, 2, 3 |  | TDDConf.1.1 CCA | | | | | | | |
| BWchannel | | | Config 1, 2, 3 | MHz | 40: NRB,c = 106 | | | | | | | |
| Gap Pattern ID | | |  |  | 0 | | | | | | | |
| BWP configuration | | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | |
|  | | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | |
|  | | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | |
|  | | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | |
| DRX Cycle | | | | ms | Not Applicable | | | | | | | |
| PDSCH Reference measurement channel | | | Config 1, 2, 3 |  | SR1.1 CCA |  | SR1.1 CCA |  | | SR1.1 CCA | |  |
| RMSI CORESET Reference Channel | | | Config 1, 2, 3 |  | CR.1.1 CCA |  | CR.1.1 CCA |  | | CR.1.1 CCA | |  |
| Control Channel RMC | | | Config 1, 2, 3 |  | CCR.1.1 CCA |  | CCR.1.1 CCA |  | | CCR.1.1 CCA | |  |
| TRS Configuration | | | Config 1, 2, 3 |  | TRS.1.2 TDD |  | TRS.1.2 TDD |  | | TRS.1.2 TDD | |  |
| OCNG Patterns | | | |  | OP. 1 | | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | | |
| Time offset with Cell 1 | | | Config 1, 2, 3 | μs | 3 | 3 | 3 | 3 | 3 | | 3 | |
| DBT Window configuration | | | Config 1, 2, 3 |  | DBT.1 | | | | | | | |
| SSB configuration | | | Config 1, 2, 3 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | | |
| SMTC configuration | | | Config 1, 2, 3 |  | SMTC.1 | | | | | | | |
| CSI-RS for tracking | | | Config 1, 2, 3 |  | TRS.1.2 TDD | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2, 3 | kHz | 30 kHz | | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | 0 | 0 | 0 | | 0 | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  |  |  |  | |  | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  |  |  |  | |  | |  |
| Note2 |  | | NR\_CCA\_FR1\_I | dBm/15kHz | -91 | | - | | | -110 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | | | -109.5 | | |
| Note2 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I |  | -88 | | - | | | -107 | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | | | -106.5 | | |
|  | | | | dB | -1.76 | | -4.7 | | | -5.46 | | -5.46 |
|  | | | | dB | 3 | 3 | -2.9 | -2.9 | | -4 | | -4 |
| SS-RSRPNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I |  | -85 | -85 | - | - | | -111 | | -111 |
|  |  | | NR\_CCA\_FR1\_J |  |  |  |  |  | | -110.5 | | -110.5 |
| SS-RSRQ Note3 | | | NR\_CCA\_FR1\_I | dB | -14.77 | -14.77 | -16.76 | -16.76 | | -17.34 | | -17.34 |
|  | | | NR\_CCA\_FR1\_J |  |  |  |  |  | |  | |  |
| IoNote3 | | Config 1, 2, 3 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -50 | | - | | | -73.4 | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | |  | | | -72.9 | | |
| Propagation condition | | | | - | AWGN | AWGN | AWGN | AWGN | | AWGN | | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | 1x2 | 1x2 | | 1x2 | | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | |

Table A.13.4.2.1.2-3: SS-RSRQ Intra frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Test 1** | **Test 2** | **Test 3** |
|  | | | |  | **Cell 1** | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | |  |  | 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 |  |
| Gap Pattern ID | | |  |  |  | 0 |  |
| BWP configuration | | | Initial DL BWP |  |  | DLBWP.0.1 |  |
|  | | | Dedicated DL BWP |  |  | DLBWP.1.1 |  |
|  | | | Initial UL BWP |  |  | ULBWP.0.1 |  |
|  | | | Dedicated UL BWP |  |  | ULBWP.1.1 |  |
| DRX Cycle | | | | ms |  | Not Applicable |  |
| PDSCH Reference measurement channel | | | Config 1 |  |  | SR.1.1 FDD |  |
|  | | | Config 2 |  |  | SR.1.1 TDD |  |
|  | | | Config 3 |  |  | SR2.1 TDD |  |
| RMSI CORESET Reference Channel | | | Config 1 |  |  | CR.1.1 FDD |  |
|  | | | Config 2 |  |  | CR.1.1 TDD |  |
|  | | | Config 3 |  |  | CR.2.1 TDD |  |
| Control Channel RMC | | | Config 1 |  |  | CCR.1.1 FDD |  |
|  | | | Config 2 |  |  | CCR.1.1 TDD |  |
|  | | | Config 3 |  |  | CCR.2.1 TDD |  |
| TRS Configuration | | | Config 1 |  |  | TRS.1.1 FDD |  |
|  | | | Config 2 |  |  | TRS.1.1 TDD |  |
|  | | | Config 3 |  |  | TRS.1.2 TDD |  |
| OCNG Patterns | | | |  |  | OP. 1 |  |
| SS-RSSI-Measurement | | | |  |  | Not Applicable |  |
| SMTC configuration | | | Config 1 |  |  | SMTC.2 |  |
|  | | | Config 2,3 |  |  | SMTC.1 |  |
| SSB configuration | | | Config 1,2 |  |  | SSB.1 FR1 |  |
|  | | | Config 3 |  |  | SSB.2 FR1 |  |
| CSI-RS for tracking | | | Config 1 |  |  | TRS.1.1 FDD |  |
| Config 2 |  | TRS.1.1 TDD |  |
| Config 3 |  | TRS.1.2 TDD |  |
| PDSCH/PDCCH subcarrier spacing | | | Config 1,2 | kHz |  | 15 kHz |  |
|  | | | Config 3 |  |  | 30 kHz |  |
| 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) | | | |  |  |  |  |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/15kHz | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -91 | - | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
| Noc Note2 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -85 | -101 | -114 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -113.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -111.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -111 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -110.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -88 | - | -111 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -110.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -110 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -109.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -109 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -108.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -108 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -107.5 |
|  | | | | dB | -1.76 | -4.7 | -5.46 |
|  | | | | dB | 3 | -2.9 | -4 |
| SS-RSRPNote3 | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -82 | -103.9 | -118 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -117.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -117 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -116.5 |
|  |  | | NR\_FDD\_FR1\_E,  NR\_TDD\_FR1\_E |  |  |  | -116 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -115.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -115 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -114.5 |
|  | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -85 | - | -115 |
|  |  | | NR\_FDD\_FR1\_B |  |  |  | -114.5 |
|  |  | | NR\_TDD\_FR1\_C |  |  |  | -114 |
|  |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -113.5 |
|  |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -113 |
|  |  | | NR\_FDD\_FR1\_F |  |  |  | -112.5 |
|  |  | | NR\_FDD\_FR1\_G |  |  |  | -112 |
|  |  | | NR\_FDD\_FR1\_H |  |  |  | -111.5 |
| SS-RSRQ Note3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dB | -14.77 | -16.76 | -17.34 |
|  | | | 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 |  |  |  |  |
| IoNote3 | | Config 1,2 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -50 | -70 | -83.5 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -83 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -82.5 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -82 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -81.5 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -81 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -80.5 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -80 |
|  | | Config 3 | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -50 | - | -77.4 |
|  | |  | NR\_FDD\_FR1\_B |  |  |  | -76.9 |
|  | |  | NR\_TDD\_FR1\_C |  |  |  | -76.4 |
|  | |  | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  |  | -75.9 |
|  | |  | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  |  | -75.4 |
|  | |  | NR\_FDD\_FR1\_F |  |  |  | -74.9 |
|  | |  | NR\_FDD\_FR1\_G |  |  |  | -74.4 |
|  | |  | NR\_FDD\_FR1\_H |  |  |  | -73.9 |
| Propagation condition | | | | - | AWGN | AWGN | AWGN |
| Antenna configuration | | | |  | 1x2 | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRQ, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRQ, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | | |

##### A.13.4.2.1.3 Test Requirements

The SS-RSRQ measurement accuracy shall fulfil the requirements in clause 10.1.29.1.1.

### A.13.4.3 SS-SINR

#### A.13.4.3.1 Intra-frequency measurement accuracy on SCC

##### A.13.4.3.1.1 Test Purpose and Environment

The purpose of this test is to verify that the SS-SINR measurement accuracy is within the specified limits. This test will verify the requirements in clause 10.1.31.1.1.

##### A.13.4.3.1.2 Test Parameters

In this test case all cells are on the same carrier frequency. Supported test configuration are shown in Table A.13.4.3.1.2-1. The absolute accuracy of SS-SINR intra-frequency measurement is tested by using the parameters in Table A.13.4.3.1.2-2 and Table A.13.4.3.1.2-3. In all test cases, Cell 1 is the PCell, Cell 2 is the SCell with CCA, and Cell 3 is the target cell with CCA. Two sub-tests (Test 1 and Test 2) are provided different Noc on Cells 1, 2, and 3.

Table A.13.4.3.1.2-1: SS-SINR Intra frequency SS-SINR supported test configurations

|  |  |
| --- | --- |
| Config | Description |
| 1 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | Without CCA: NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  With CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | Without CCA: NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  With CCA: 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.13.4.3.1.2-2: SS-SINR Intra frequency test parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | Unit | Test 1 | | | Test 2 | | | |
|  | | | |  | Cell 2 | | Cell 3 | Cell 2 | | | Cell 3 |
| SSB ARFCN | | | |  | freq2 | | freq2 | freq2 | | | freq2 |
| DL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.1 | | | | | | |
| UL CCA model | | | Config 1, 2, 3 |  | As specified in clause A.3.26.2.2 | | | | | | |
| UL CCA probability | | | PCCA\_UL |  | 1.0 | - | | | 1.0 | - | |
| DL CCA probability for semi-static channel access Note 7, 8 | | | PCCA\_DL |  | 0.9375 | - | | | 0.9375 | - | |
| DL CCA probability for  dynamic channel access Note 8, 9 | | | PCCA\_DL\_1 |  | 0.75 | - | | | 0.75 | - | |
|  | | | PCCA\_DL\_2 |  | 0.75 | - | | | 0.75 | - | |
| Duplex mode | | | Config 1, 2, 3 |  | TDD | | | | | | |
| TDD configuration | | | Config 1, 2, 3 |  | TDDConf.1.1 CCA | | | | | | |
| Downlink initial BWP configuration | | | |  | DLBWP.0.1 | | | | | | |
| Downlink dedicated BWP configuration | | | |  | DLBWP.1.1 | | | | | | |
| Uplink initial BWP configuration | | | |  | ULBWP.0.1 | | | | | | |
| Uplink dedicated BWP configuration | | | |  | ULBWP.1.1 | | | | | | |
| DRX Cycle configuration | | | | ms | Not Applicable | | | | | | |
| TRS configuration | | | Config 1, 2, 3 |  | TRS.1.2 TDD | |  | TRS.1.2 TDD | | |  |
| PDSCH Reference measurement channel | | | Config 1, 2, 3 |  | SR.1.1 CCA | |  | SR.1.1 CCA | | |  |
| RMSI CORESET Reference Channel | | | Config 1, 2, 3 |  | CR.1.1 CCA | |  | CR.1.1 CCA | | |  |
| Dedicated CORESET Reference Channel | | | Config 1, 2, 3 |  | CCR.1.1 CCA | |  | CCR.1.1 CCA | | |  |
| OCNG Patterns | | | |  | OP.1 | | | | | | |
| SS-RSSI-Measurement | | | |  | Not Applicable | | | | | | |
| DBT Window configuration | | | Config 1, 2, 3 |  | DBT.1 | | | | | | |
| Time offset with Cell 1 | | | Config 1, 2, 3 | s | 3 (for Cell 2) | | 3 | | 3 (for Cell 2) | | 3 |
| SSB configuration | | | Config 1, 2, 3 |  | SSB.1 CCA for semi-static channel access  SSB.2 CCA for dynamic channel access | | | | | | |
| SMTC configuration | | | Config 1, 2, 3 |  | SMTC.1 | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2, 3 | kHz | 30 | | | | | | |
| EPRE ratio of PSS to SSS | | | | dB | 0 | | 0 | 0 | | | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PBCH to PBCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH DMRS to SSS | | | |  |  | |  |  | | |  |
| EPRE ratio of PDSCH to PDSCH | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | |  |  | |  |  | | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | |  |  | |  |  | | |  |
| Note2 | | | NR\_CCA\_FR1\_I | dBm/15kHz | -93 | | | -112 | | | |
|  | | | NR\_CCA\_FR1\_J |  |  | | | -111.5 | | | |
| Note2 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -90 | | | -109 | | | |
|  |  | | NR\_CCA\_FR1\_J |  |  | | | -108.5 | | | |
|  | | | | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | | dB | 4.54 | | 2.66 | -4 | | | -4 |
| SS-RSRPNote3 | Config 1, 2, 3 | | NR\_CCA\_FR1\_I | dBm/SCS | -85.46 | | -87.34 | -113 | | | -113 |
|  |  | | NR\_CCA\_FR1\_J |  |  | |  | -112.5 | | | -112.5 |
| SS-SINR Note3 | | | NR\_CCA\_FR1\_I | dB | 0 | | -3.19 | -5.46 | | | -5.46 |
|  | | | NR\_CCA\_FR1\_J |  |  | |  |  | | |  |
| IoNote3 | | Config 1, 2, 3 | NR\_CCA\_FR1\_I | dBm/  38.16MHz | -51.41 | | | -75.41 | | | |
|  | |  | NR\_CCA\_FR1\_J |  |  | | | -74.91 | | | |
| Propagation condition | | | | - | AWGN | | | | | | |
| Antenna configuration | | | | - | 1x2 | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configuration.  Note 7: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 8: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 9: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | |

A.13.4.3.1.2-3: SS-SINR Intra frequency test parameters for NR PCell

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | | **Unit** | **Test 1** | **Test 2** |
|  | | | | |  | **Cell 1** | **Cell 1** |
| SSB ARFCN | | | | |  | freq1 | freq1 |
| Duplex mode | | | | Config 1 |  | FDD | FDD |
|  | | | | Config 2,3 |  | TDD | TDD |
| TDD configuration | | | | Config 1 |  | Not Applicable | Not Applicable |
|  | | | | Config 2 |  | TDDConf.1.1 | TDDConf.1.1 |
|  | | | | Config 3 |  | TDDConf.2.1 | TDDConf.2.1 |
| 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 | | | | | ms | Not Applicable | Not Applicable |
| TRS configuration | | | | Config 1 |  | TRS.1.1 FDD | TRS.1.1 FDD |
| Config 2 |  | TRS.1.1 TDD | TRS.1.1 TDD |
| Config 3 |  | TRS.1.2 TDD | TRS.1.2 TDD |
| PDSCH Reference measurement channel | | | | Config 1 |  | SR.1.1 FDD | SR.1.1 FDD |
|  | | | | Config 2 |  | SR.1.1 TDD | SR.1.1 TDD |
|  | | | | Config 3 |  | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET Reference Channel | | | | Config 1 |  | CR.1.1 FDD | CR.1.1 FDD |
|  | | | | Config 2 |  | CR.1.1 TDD | CR.1.1 TDD |
|  | | | | Config 3 |  | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | | | | Config 1 |  | CCR.1.1 FDD | CCR.1.1 FDD |
|  | | | | Config 2 |  | CCR.1.1 TDD | CCR.1.1 TDD |
|  | | | | Config 3 |  | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Patterns | | | | |  | OP.1 | OP.1 |
| SS-RSSI-Measurement | | | | |  | Not Applicable | Not Applicable |
| SMTC configuration | | | Config 1  Config 2,3 | |  | SMTC.2 | SMTC.2 |
|  | SMTC.1 | SMTC.1 |
| SSB configuration | | | | Config 1,2 |  | SSB.1 FR1 | SSB.1 FR1 |
|  | | | | Config 3 |  | SSB.2 FR1 | SSB.2 FR1 |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1,2 | kHz | 15 | 15 |
|  | | | | Config 3 |  | 30 | 30 |
| EPRE ratio of PSS to SSS | | | | | dB | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS | | | | |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS | | | | |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS | | | | |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS | | | | |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS | | | | |  |  |  |
| EPRE ratio of PDSCH to PDSCH | | | | |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | | | |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | | | |  |  |  |
| Note2 | | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/15kHz | -93 | -116 |
|  | | | | NR\_FDD\_FR1\_B |  |  | -115.5 |
|  | | | | NR\_TDD\_FR1\_C |  |  | -115 |
|  | | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -114.5 |
|  | | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -114 |
|  | | | | NR\_FDD\_FR1\_F |  |  | -113.5 |
|  | | | | NR\_FDD\_FR1\_G |  |  | -113 |
|  | | | | NR\_FDD\_FR1\_H |  |  | -112.5 |
| Note2 | Config 1,2 | | | | dBm/SCS | -93 | Same as Noc for 15 kHz |
|  | Config 3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -90 | -113 |
|  |  | | | NR\_FDD\_FR1\_B |  |  | -112.5 |
|  |  | | | NR\_TDD\_FR1\_C |  |  | -112 |
|  |  | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -111.5 |
|  |  | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -111 |
|  |  | | | NR\_FDD\_FR1\_F |  |  | -110.5 |
|  |  | | | NR\_FDD\_FR1\_G |  |  | -110 |
|  |  | | | NR\_FDD\_FR1\_H |  |  | -109.5 |
|  | | | | | dB | 0 | -5.46 |
|  | | | | | dB | 4.54 | -4 |
| SS-RSRPNote3 | Config 1,2 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/SCS | -88.46 | -120 |
|  |  | | | NR\_FDD\_FR1\_B |  |  | -119.5 |
|  |  | | | NR\_TDD\_FR1\_C |  |  | -119 |
|  |  | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -118.5 |
|  |  | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -118 |
|  |  | | | NR\_FDD\_FR1\_F |  |  | -117.5 |
|  |  | | | NR\_FDD\_FR1\_G |  |  | -117 |
|  |  | | | NR\_FDD\_FR1\_H |  |  | -116.5 |
|  | Config 3 | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 |  | -85.46 | -117 |
|  |  | | | NR\_FDD\_FR1\_B |  |  | -116.5 |
|  |  | | | NR\_TDD\_FR1\_C |  |  | -116 |
|  |  | | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -115.5 |
|  |  | | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -115 |
|  |  | | | NR\_FDD\_FR1\_F |  |  | -114.5 |
|  |  | | | NR\_FDD\_FR1\_G |  |  | -114 |
|  |  | | | NR\_FDD\_FR1\_H |  |  | -113.5 |
| SS-SINR Note3 | | | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dB | 0 | -5.46 |
|  | | | | 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 |  |  |  |
| IoNote3 | | Config 1,2 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  9.36MHz | -57.5 | -85.51 |
|  | |  | | NR\_FDD\_FR1\_B |  |  | -85.01 |
|  | |  | | NR\_TDD\_FR1\_C |  |  | -84.51 |
|  | |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -84.01 |
|  | |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -83.51 |
|  | |  | | NR\_FDD\_FR1\_F |  |  | -83.01 |
|  | |  | | NR\_FDD\_FR1\_G |  |  | -82.51 |
|  | |  | | NR\_FDD\_FR1\_H |  |  | -82.01 |
|  | | Config 3 | | NR\_FDD\_FR1\_A, NR\_TDD\_FR1\_A NOTE 6 | dBm/  38.16MHz | -51.41 | -79.41 |
|  | |  | | NR\_FDD\_FR1\_B |  |  | -78.91 |
|  | |  | | NR\_TDD\_FR1\_C |  |  | -78.41 |
|  | |  | | NR\_FDD\_FR1\_D, NR\_TDD\_FR1\_D |  |  | -77.91 |
|  | |  | | NR\_FDD\_FR1\_E, NR\_TDD\_FR1\_E |  |  | -77.41 |
|  | |  | | NR\_FDD\_FR1\_F |  |  | -76.91 |
|  | |  | | NR\_FDD\_FR1\_G |  |  | -76.41 |
|  | |  | | NR\_FDD\_FR1\_H |  |  | -75.91 |
| Propagation condition | | | | | - | AWGN | AWGN |
| Antenna configuration | | | | | - | 1x2 | 1x2 |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-SINR, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-SINR, SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 5: NR operating band groups are as defined in clause 3.5.2.  Note 6: The test configuration excludes support for band n51 and it is not required to run this test on band n51 in this release of the specification. | | | | | | | |

##### A.13.4.3.1.3 Test Requirements

The SS-SINR measurement accuracy shall fulfil the requirements in clause 10.1.31.1.1.

<End of change 23>

---End of NR-U related changes---

---Start of eMIMO related changes---

<Start of change 24>

### 9.8.3 Measurement Reporting Requirements

The UE shall send L1-SINR reports only for report configurations configured for the active BWP.

The UE shall report the L1-SINR value as a 7-bit value in the range [-23, 40] dB with 0.5dB step size if *nrofReportedRS* is configured to one. If *nrofReportedRS* is configured to be larger than one, or if *groupBasedBeamReporting* is enabled, the UE shall use differential L1-SINR based reporting. The differential L1-SINR is quantized to a 4-bit value with 1dB step size. The mapping between the reported L1-SINR value and the measured quantity is described in 10.1.16.

#### 9.8.3.1 Periodic Reporting

The UE shall transmit the periodic L1-SINR reporting on PUCCH over the air interface according to the periodicity defined in clause 5.2.1.4 in TS 38.214 [26].

#### 9.8.3.2 Semi-Persistent Reporting

The UE shall only send semi-persistent L1-SINR measurement reports on PUSCH, if a DCI for triggering report has been received.

The UE shall only send semi-persistent L1-SINR measurement reports on PUCCH, if an activation command as described in clause 6.1.3.16 in TS38.321 [7] has been received.

The UE shall transmit the semi-persistent L1-SINR reporting on PUSCH or PUCCH over the air interface according to the periodicity defined in clause 5.2.1.4 in TS 38.214 [26].

9.8.3.3 Aperiodic Reporting

Reported L1-SINR measurements contained in aperiodic triggered, aperiodic triggered periodic and aperiodic triggered semi-persistent L1-SINR reports shall meet the requirements in clauses 10.1.27 for FR1 and 10.1.28 for FR2, respectively.

The UE shall only send aperiodic L1-SINR measurement reports, if a DCI for triggering report has been received.

After the UE receives CSI request in DCI, the UE shall transmit the aperiodic L1-SINR reporting on PUSCH over the air interface at the time specified according to clause 5.2.1.4 in TS 38.214 [26].

<End of change 24>

<Start of change 25>

A.4.5.5.5 EN-DC Beam Failure Detection and Link Recovery Test for FR1 SCell configured with CSI-RS-based BFD and SSB-based LR in non-DRX mode

A.4.5.5.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving SCell and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.4.5.5.5.1-1, A.4.5.5.5.1-2, and A.4.5.5.5.1-3 below. There are three cells, cell 1 is the E-UTRAN PCell, cell 2 is the PSCell and cell 3 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.5.5.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.4.5.5.5.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1, cell 2 and cell3. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 2 ms. In the test, DRX configuration is not enabled.

**Table A.4.5.5.5.1-1: Supported test configurations for FR1 PCell and SCell**

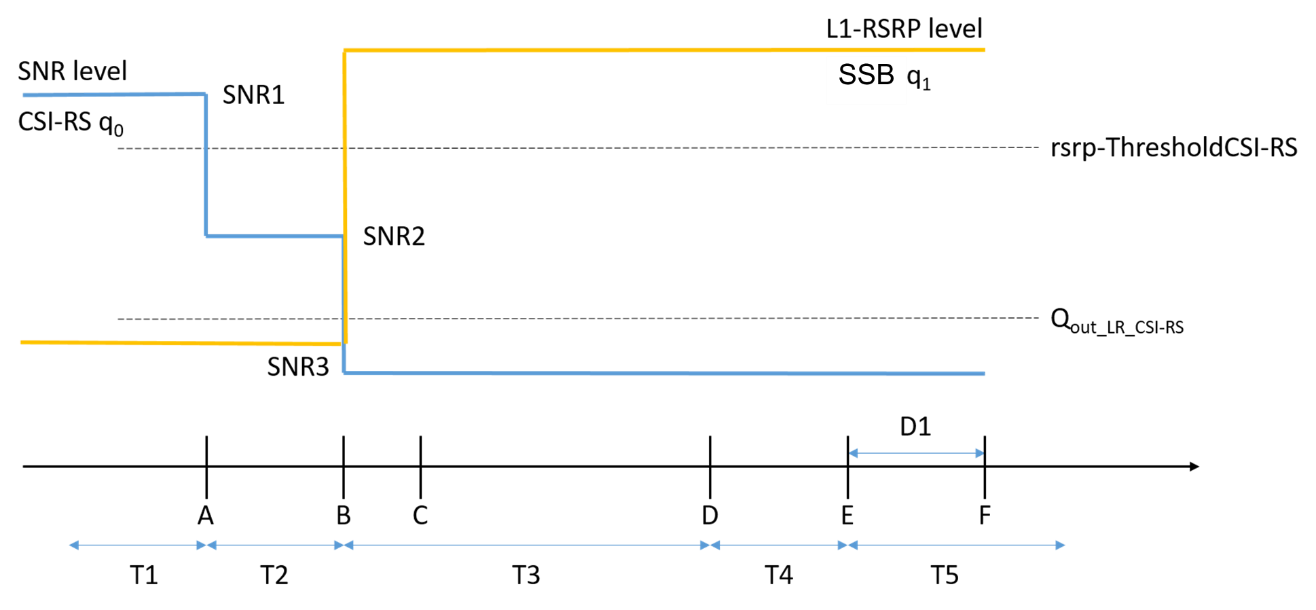
|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB 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.4.5.5.5.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** | **Comment** |
|  | | |  | **Test 1** |  |
| Active PCell | | |  | Cell 1 |  |
| RF Channel Number | | |  | 1 |  |
| Active PSCell | | |  | Cell 2 |  |
| RF Channel Number | | |  | 2 |  |
| Active SCell | | |  | Cell 3 |  |
| RF Channel Number | | |  | 3 |  |
| 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 | A.3.1.2 |
| Reference Channel | | Config 2, 5 |  | CR.1.1 TDD |  |
|  | | Config 3, 6 |  | CR.2.1 TDD |  |
| SSB Configuration | | Config 1, 4 |  | SSB.1 FR1 | A.3.10 |
|  | | Config 2, 5 |  | SSB.1 FR1 |  |
|  | | Config 3, 6 |  | SSB.2 FR1 |  |
| SMTC | | Config 1, 2, 4, 5 |  | SMTC.1 | A.3.11 |
| 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 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | |  | 0 |  |
| OCNG parameters | | |  | OP.1 | A.3.2.1 |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure | | DCI format |  | 1-0 |  |
| detection transmission parameters | | Number of Control OFDM symbols |  | 2 |  |
|  | | Aggregation level | CCE | 8 |  |
|  | | 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. |  |
| schedulingRequestID-BFR-SCell-r16 | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp- | Config 1, 2, 4, 5 | | dBm/SCS | -98 | Threshold used |
| ThresholdBFR | Config 3, 6 | | kHz | -95 | for Qin\_LR\_SSB |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | | |  | pbfd4 | see TS 38.321 [7], clause 5.17 |
| CSI-RS | | Config 1, 4 |  | CSI-RS.1.2 FDD | A.3.14 |
| configuration for q0 | | Config 2, 5 |  | CSI-RS.1.2 TDD |  |
| and q1 | | Config 3, 6 |  | CSI-RS.2.2 TDD |  |
| CSI-RS | | Config 1, 4 |  | CSI-RS.1.1 FDD | A.3.14 |
| configuration for | | Config 2, 5 |  | CSI-RS.1.1 TDD |  |
| CSI reporting | | Config 3, 6 |  | CSI-RS.2.1 TDD |  |
| TRS configuration | | Config 1, 4 |  | TRS.1.1 FDD |  |
|  | | Config 2, 5 |  | TRS.1.1 TDD |  |
|  | | Config 3, 6 |  | TRS.1.2 TDD |  |
| csi-RS-Index | | Config 1, 4 |  | CSI-RS.1.2 FDD | A.3.14 |
| assigned as RLM | | Config 2, 5 |  | CSI-RS.1.2 TDD |  |
| RS | | Config 3, 6 |  | CSI-RS.2.2 TDD |  |
| T310 Timer | | | ms | 1000 |  |
| N310 | | |  | 2 |  |
| T1 | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 0.18 |  |
| T3 | | | s | 0.14 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 0.17 |  |
| D1 | | | s | 0.13 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

**Table A.4.5.5.5.1-3: Cell specific test parameters for FR1 PSCell and SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** | **Test 1 Cell3** | | | | |
|  | |  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  |  | | | | |
| 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 | 0 | | | | |
| 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\_CSI-RS of set q0 | Config 1, 4 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
|  | Config 2, 5 |  | 5 | 5 | -3 | -12 | -12 | -12 |
|  | Config 3, 6 |  | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1, 4 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
|  | Config 2, 5 |  | -10 | -10 | -10 | 10 | 10 | 10 |
|  | Config 3, 6 |  | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1, 4 | dBm/SCS kHz | -108 | -108 | -108 | -88 | -88 | -88 |
|  | Config 2, 5 |  | -108 | -108 | -108 | -88 | -88 | -88 |
|  | Config 3, 6 |  | -105 | -105 | -105 | -85 | -85 | -85 |
|  | Config 1, 4 | dBm/15 kHz | -98 | -98 | | | | |
|  | Config 2, 5 |  | -98 | -98 | | | | |
|  | Config 3, 6 |  | -98 | -98 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause [A.3.6]. | | | | | | | | |

****

**Figure A.4.5.5.5.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing for SCell in non-DRX mode**

A.4.5.5.5.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 2.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 2 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 2.

During T3 the UE shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

A.4.5.5.6 EN-DC Beam Failure Detection and Link Recovery Test for FR1 SCell configured with CSI-RS-based BFD and SSB-based LR in DRX mode

A.4.5.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS based beam failure in the set q0 configured for a serving SCell and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.4.5.5.6.1-1, A.4.5.5.6.1-2, and A.4.5.5.6.1-3below. There are three cells, cell 1 is the E-UTRAN PCell, cell 2 is the PSCell and cell 3 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.4.5.5.6.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.4.5.5.6.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1, cell 2 and cell 3. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled in SCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.4.5.5.6.1-1: Supported test configurations for FR1 PCell and SCell**

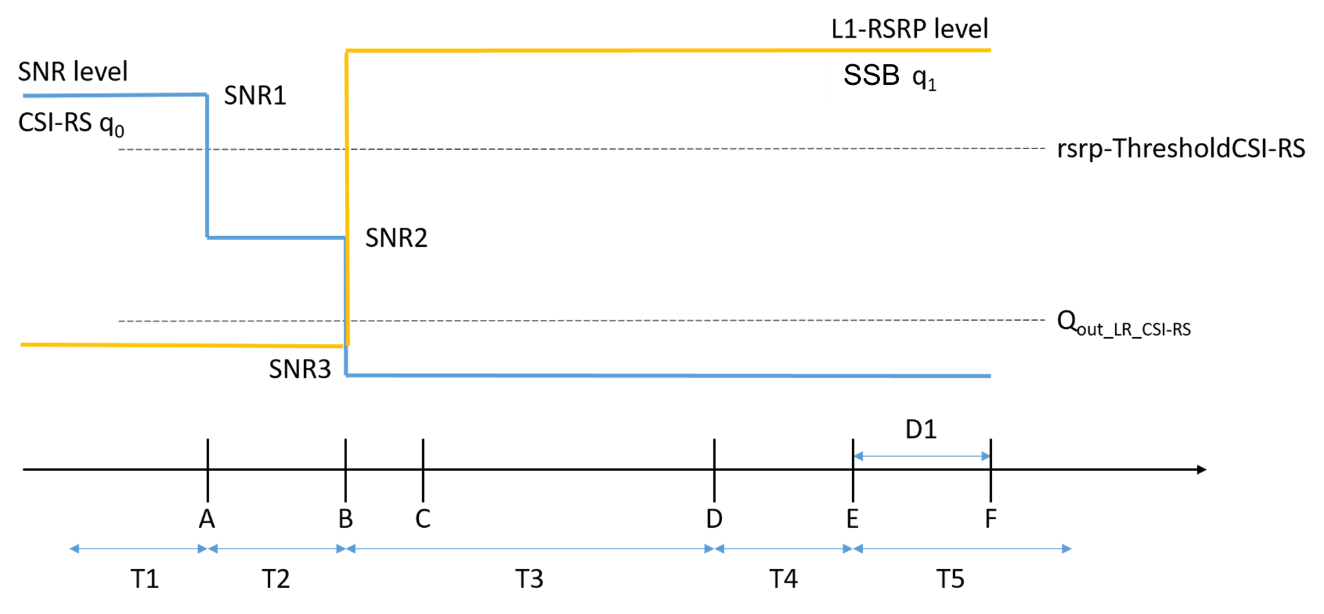
|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | LTE FDD, NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD, NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD, NR 15 kHz SSB 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.4.5.5.6.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Value** | **Comment** |
|  | | | |  | **Test 1** |  |
| Active PCell | | | |  | Cell 1 |  |
| RF Channel Number | | | |  | 1 |  |
| Active PSCell | | | |  | Cell 2 |  |
| RF Channel Number | | | |  | 2 |  |
| Active SCell | | | |  | Cell 3 |  |
| RF Channel Number | | | |  | 3 |  |
| 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 | A.3.1.2 |
| Channel | | | Config 2, 5 |  | CR.1.1 TDD |  |
|  | | | Config 3, 6 |  | CR.2.1 TDD |  |
| SSB Configuration | | | Config 1, 4 |  | SSB.1 FR1 | A.3.10 |
|  | | | Config 2, 5 |  | SSB.1 FR1 |  |
|  | | | Config 3, 6 |  | SSB.2 FR1 |  |
| SMTC Configuration | | | Config 1, 2, 4, 5 |  | SMTC.1 | A.3.11 |
|  | | | Config 3, 6 |  | SMTC.1 |  |
| PDSCH/PDCCH subcarrier spacing | | | Config 1, 2, 4, 5 |  | 15 KHz |  |
|  | | | 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 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | | |  | 0 |  |
| OCNG parameters | | | |  | OP.1 | A.3.2.1 |
| CP length | | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |  |
| Beam failure detection | | | DCI format |  | 1-0 |  |
| transmission parameters | | | Number of Control OFDM symbols |  | 2 |  |
|  | | | Aggregation level | CCE | 8 |  |
|  | | | 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 | | | |  | DRX.7 | A.3.3.7 |
| Gap pattern ID | | | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | Config 1, 2, 4, 5 | | | dBm/SCS kHz | -98 | Threshold used |
|  | Config 3, 6 | | |  | -95 | for Qin\_LR\_SSB |
| powerControlOffsetSS | | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | |  | n1 | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | | | |  | pbfd4 | see TS 38.321 [7], clause 5.17 |
| CSI-RS configuration for q0 and q1 | | Config 1, 4 | |  | CSI-RS.1.2 FDD | A.3.14 |
|  | | Config 2, 5 | |  | CSI-RS.1.2 TDD |  |
|  | | Config 3, 6 | |  | CSI-RS.2.2 TDD |  |
| CSI-RS configuration for CSI reporting | | Config 1, 4 | |  | CSI-RS.1.1 FDD | A.3.14 |
|  | | Config 2, 5 | |  | CSI-RS.1.1 TDD |  |
|  | | Config 3, 6 | |  | CSI-RS.2.1 TDD |  |
| TRS configuration | | Config 1, 4 | |  | TRS.1.1 FDD |  |
|  | | Config 2, 5 | |  | TRS.1.1 TDD |  |
|  | | Config 3, 6 | |  | TRS.1.2 TDD |  |
| csi-RS-Index assigned as RLM RS | | Config 1, 4 | |  | CSI-RS.1.2 FDD | A.3.14 |
|  | | Config 2, 5 | |  | CSI-RS.1.2 TDD |  |
|  | | Config 3, 6 | |  | CSI-RS.2.2 TDD |  |
| T310 Timer | | | | ms | 1000 |  |
| N310 | | | |  | 2 |  |
| T1 | | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | s | 8.37 |  |
| T3 | | | | s | 6.44 |  |
| T4 | | | | s | 0 |  |
| T5 | | | | s | 1.97 |  |
| D1 | | | | s | 1.93 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | | |

**Table A.4.5.5.6.1-3: Cell specific test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** | **Test 1 Cell3** | | | | |
|  | |  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  |  | | | | |
| 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 | 0 | | | | |
| 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\_CSI-RS of set q0 | Config 1, 4 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
|  | Config 2, 5 |  | 5 | 5 | -3 | -12 | -12 | -12 |
|  | Config 3, 6 |  | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1, 4 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
|  | Config 2, 5 |  | -10 | -10 | -10 | 10 | 10 | 10 |
|  | Config 3, 6 |  | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1, 4 | dBm/SCS kHz | -108 | -108 | -108 | -88 | -88 | -88 |
|  | Config 2, 5 |  | -108 | -108 | -108 | -88 | -88 | -88 |
|  | Config 3, 6 |  | -105 | -105 | -105 | -85 | -85 | -85 |
|  | Config 1, 4 | dBm/ 15 kHz | -98 | -98 | | | | |
|  | Config 2, 5 |  | -98 | -98 | | | | |
|  | Config 3, 6 |  | -98 | -98 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6. | | | | | | | | |

****

**Figure A.4.5.5.6.1-1: SNR and L1-RSRP variation for beam failure detection and LR testing for SCell in DRX mode**

A.4.5.5.6.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 2.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 2 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 2.

During T3 the UE shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 25>

<Start of change 26>

A.5.5.5.6 EN-DC Beam Failure Detection and Link Recovery Test for FR2 SCell configured with CSI-RS-based BFD and LR in non-DRX mode

A.5.5.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for an active SCell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell with *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR2 SCell requirements in clause 8.5.

The test parameters are given in Tables A.5.5.5.6.1-1, A.5.5.5.6.1-2 and A.5.5.5.6.1-3. There are three cells, cell 1 is the E-UTRAN PCell, cell 2 is the PSCell, and cell 3 is the SCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.5.5.5.6.1-1 shows the variation of the downlink SNR of the active SCell and the SNR of the CSI-RS in set q0 in the active SCell to emulate CSI-RS based beam failure. Figure A.5.5.5.6.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1, cell 2, and cell 3. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 2 ms. In the test, DRX configuration is not enabled.

**Table A.5.5.5.6.1-1: Supported test configurations for FR2 PSCell and SCell**

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

**Table A.5.5.5.6.1-2: General test parameters for FR2 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
|  | |  | **Test 1** |  |
| Active E-UTRA PCell | |  | Cell 1 |  |
| E-UTRA RF Channel Number | |  | 1 |  |
| Active PSCell | |  | Cell 2 |  |
| RF Channel Number | |  | 2 |  |
| Active SCell | |  | Cell 3 |  |
| RF Channel Number | |  | 3 |  |
| Duplex mode | Config 1 |  | TDD |  |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |  |
| CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | A.3.1.2 |
| SSB Configuration | Config 1 |  | SSB.3 FR2 | A.3.10 |
| SMTC Configuration | Config 1 |  | SMTC.3 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1 |  | 120 KHz |  |
| PRACH Configuration | Config 1 |  | Table A.3.8.3.1-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | |  | 0 |  |
| TRS configuration | |  | TRS.2.1 TDD |  |
| TCI configuration | |  | CSI-RS.Config.0 |  |
| OCNG parameters | |  | OP.1 | A.3.2.1 |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |  |
| Beam failure | DCI format |  | 1-0 |  |
| detection transmission parameters | Number of Control OFDM symbols |  | 2 |  |
|  | Aggregation level | CCE | 8 |  |
|  | 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. |  |
| schedulingRequestID-BFR-SCell-r16 | |  | Configured |  |
| Periodicity of PUCCH for SR configuration for BFR on SCell | | slots | 40 | 5ms |
| Offset of PUCCH for SR configuration for BFR on SCell | | slots | 5 |  |
| PUCCH parameters for SR configuration for BFR on SCell | |  | Table 8.3.3.1.2-1 in [13] |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 in activated SCell | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | dBm/SCS kHz | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | |  | n1 | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | |  | pbfd4 | see TS 38.321 [7], clause 5.17 |
| CSI-RS configuration for q0 and q1 | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| CSI-RS configuration for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD | A.3.14.2 |
| csi-RS-Index assigned as RLM RS | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| T310 Timer | | ms | 1000 |  |
| N310 | |  | 2 |  |
| T1 | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | s | 1.17 |  |
| T3 | | s | 0.9 |  |
| T4 | | s | 0 |  |
| T5 | | s | 0.31 |  |
| D1 | | s | 0.27 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

**Table A.5.5.5.6.1-3: Cell specific test parameters for FR2 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** | **Test 1 Cell3** | | | | |
|  | |  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| AoA setup | |  | Setup 1 defined in A.3.15 | Setup 1 defined in A.3.15 | | | | |
| Assumption for UE beamsNote 10 | |  | Rough | Rough | | | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  |  | | | | |
| 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 | 0 | | | | |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | 0.2 | 0.2 | 0.2 | 20.2 | 20.2 | 20.2 |
| CSI-RS\_RP of set q1 | Config 1 | dBm/SCS  kHz | -104.5 | -104.5 | -104.5 | -84.5 | -84.5 | -84.5 |
| Noc | Config 1 | dBm/120kHz | -104.7 | -104.7 | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | TDL-A 30ns 75Hz | | | | |
| 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.5.5.5.6.1-1.  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 modified as specified in clause 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 | | | | | | | | |

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**Figure A.5.5.5.6.1-1: SNR and L1-RSRP variation for CSI-RS based beam failure detection and link recovery testing for SCell in non-DRX mode**

A.5.5.5.6.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 in A.5.5.5.6.1 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 2.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 2 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 2.

During T3 the UE shall detect beam failure and initial link recovery. During T4 and T5 the UE measures and evaluates beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 260+10 ms after the start of T5, the UE shall transmit PUCCH with LRR, followed by BFR MAC CE containing a beam associated with the candidate beam set q1. The UE shall not transmit PUCCH with an LRR with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

A.5.5.5.7 EN-DC Beam Failure Detection and Link Recovery Test for FR2 SCell configured with CSI-RS-based BFD and LR in DRX mode

A.5.5.5.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for an active SCell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell with *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR2 SCell requirements in clause 8.5.

The test parameters are given in Tables A.5.5.5.7.1-1, A.5.5.5.7.1-2 and A.5.5.5.7.1-3. There are three cells, cell 1 is the E-UTRAN PCell, cell 2 is the PSCell, and cell 3 is the SCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.5.5.5.7.1-1 shows the variation of the downlink SNR of the active SCell and the SNR of the CSI-RS in set q0 in the active SCell to emulate CSI-RS based beam failure. Figure A.5.5.5.7.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. Prior to the start of the time duration T1, the UE shall be fully synchronized to cell 1, cell 2, and cell 3. The UE shall be configured for periodic CSI reporting with a reporting periodicity of 2 ms. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.5.5.5.7.1-1: Supported test configurations for FR2 PSCell and SCell**

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

**Table A.5.5.5.7.1-2: General test parameters for FR2 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
|  | |  | **Test 1** |  |
| Active E-UTRA PCell | |  | Cell 1 |  |
| E-UTRA RF Channel Number | |  | 1 |  |
| Active PSCell | |  | Cell 2 |  |
| RF Channel Number | |  | 2 |  |
| Active SCell | |  | Cell 3 |  |
| RF Channel Number | |  | 3 |  |
| Duplex mode | Config 1 |  | TDD |  |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |  |
| CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | A.3.1.2 |
| SSB Configuration | Config 1 |  | SSB.3 FR2 | A.3.10 |
| SMTC Configuration | Config 1 |  | SMTC.3 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1 |  | 120 KHz |  |
| PRACH Configuration | Config 1 |  | Table A.3.8.3.1-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | |  | 0 |  |
| TRS configuration | |  | TRS.2.1 TDD |  |
| TCI configuration | |  | CSI-RS.Config.0 |  |
| OCNG parameters | |  | OP.1 | A.3.2.1 |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |  |
| Beam failure | DCI format |  | 1-0 |  |
| detection transmission parameters | Number of Control OFDM symbols |  | 2 |  |
|  | Aggregation level | CCE | 8 |  |
|  | 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 | |  | DRX.3 | A.3.3.3 |
| Gap pattern ID | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | |  | Configured |  |
| Periodicity of PUCCH for SR configuration for BFR on SCell | | slots | 40 | 5ms |
| Offset of PUCCH for SR configuration for BFR on SCell | | slots | 5 |  |
| PUCCH parameters for SR configuration for BFR on SCell | |  | Table 8.3.3.1.2-1 in [13] |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 in activated SCell | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | dBm/SCS kHz | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | |  | n1 | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | |  | pbfd4 | see TS 38.321 [7], clause 5.17 |
| CSI-RS configuration for q0 and q1 | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| CSI-RS configuration for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD | A.3.14.2 |
| csi-RS-Index assigned as RLM RS | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| T310 Timer | | ms | 1000 |  |
| N310 | |  | 2 |  |
| T1 | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | s | 5.43 |  |
| T3 | | s | 5.16 |  |
| T4 | | s | 0 |  |
| T5 | | s | 0.31 |  |
| D1 | | s | 0.27 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

**Table A.5.5.5.7.1-3: Cell specific test parameters for FR2 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell2** | **Test 1 Cell3** | | | | |
|  | |  |  | **T1** | **T2** | **T3** | **T4** | **T5** |
| AoA setup | |  | Setup 1 defined in A.3.155 | Setup 1 defined in A.3.155 | | | | |
| Assumption for UE beamsNote 10 | |  | Rough | Rough | | | | |
| EPRE ratio of PDCCH DMRS to SSS | | dB |  |  | | | | |
| 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 | 0 | | | | |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | 0.2 | 0.2 | 0.2 | 20.2 | 20.2 | 20.2 |
| CSI-RS\_RP of set q1 | Config 1 | dBm/  SCS  kHz | -104.5 | -104.5 | -104.5 | -84.5 | -84.5 | -84.5 |
| Noc | Config 1 | dBm/120  kHz | -104.7 | -104.7 | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | TDL-A 30ns 75Hz | | | | |
| 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 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: Void  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 and SNR3 respectively in figure A.5.5.5.7.1-1.  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 modified as specified in clause 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 | | | | | | | | |

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**Figure A.5.5.5.7.1-1: SNR and L1-RSRP variation for CSI-RS-based beam failure detection and link recovery testing for SCell in DRX mode**

A.5.5.5.7.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 in A.5.5.5.7.1 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 2.

During the period from time point A to time point B the UE shall transmit uplink signal in Cell 1 in all uplink slots configured for CSI transmission according to the configured periodic CSI reporting for Cell 2.

During T3 the UE shall detect beam failure and initial link recovery. During T4 and T5 the UE measures and evaluates beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 260+10 ms after the start of T5, the UE shall transmit PUCCH with LRR, followed by BFR MAC CE containing a beam associated with the candidate beam set q1. The UE shall not transmit PUCCH with an LRR with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 26>

<Start of change 27>

A.6.5.5.5 Beam Failure Detection and Link Recovery Test for FR1 SCell configured with CSI-RS-based BFD and SSB-based LR in non-DRX mode

A.6.5.5.5.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.6.5.5.5.1-1, A.6.5.5.5.1-2, and below. There are two cells, cell 1 is the PCell and cell 2 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.5.5.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.6.5.5.5.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 [2] ms. In the test, DRX configuration is not enabled.

**Table A.6.5.5.5.1-1: Supported test configurations for FR1 PCell and SCell**

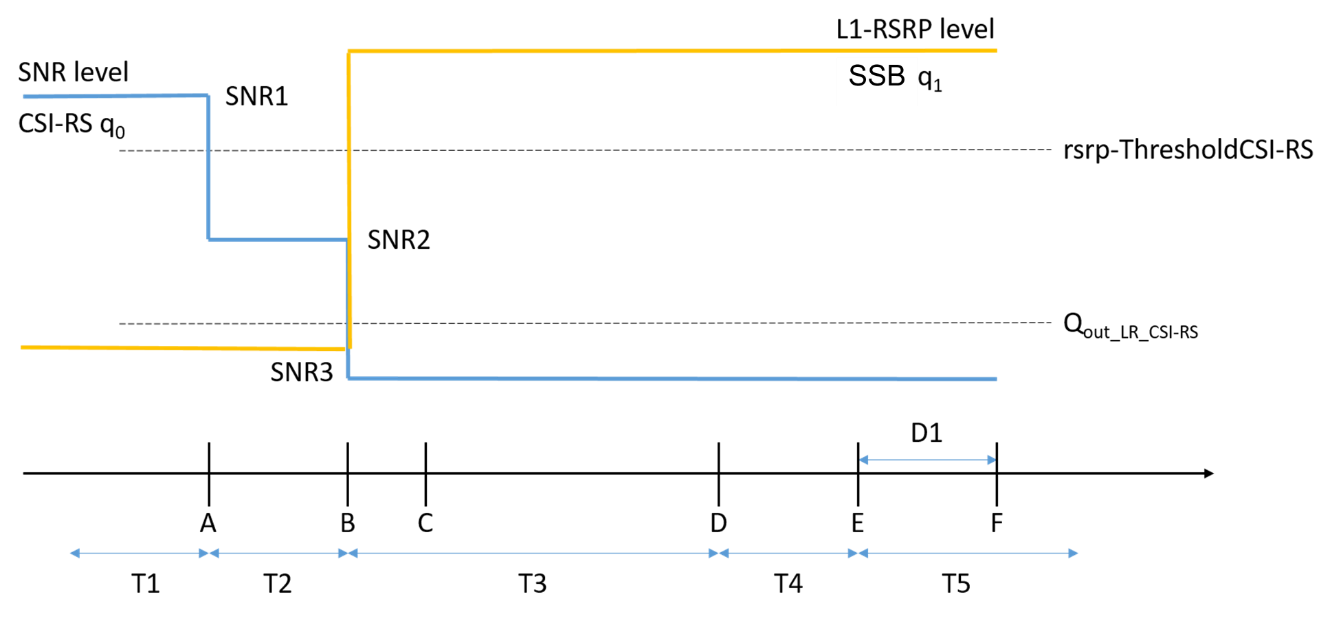
|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | TDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 3 | TDD duplex mode, 30 kHz SSB SCS, 40 MHz bandwidth |
| Note: The UE is only required to pass in one of the supported test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

**Table A.6.5.5.5.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | | **Unit** | **Value** | **Comment** |
| **Test 1** |
| Active PCell | | | |  | Cell 1 |  |
| RF Channel Number | | | |  | 1 |  |
| Active SCell | | | |  | Cell 2 |  |
| RF Channel Number | | | |  | 2 |  |
| Duplex mode | Config 1 | | |  | FDD |  |
| Config 2, 3 | | | TDD |  |
| TDD Configuration | Config 1 | | |  | Not Applicable |  |
| Config 2 | | | TDDConf.1.1 |  |
| Config 3 | | | TDDConf.2.1 |  |
| CORESET Reference Channel | Config 1 | | |  | CR.1.1 FDD | A.3.1.2 |
| Config 2 | | | CR.1.1 TDD |
| Config 3 | | | CR.2.1 TDD |
| SSB Configuration | Config 1 | | |  | SSB.1 FR1 | A.3.10 |
| Config 2 | | | SSB.1 FR1 |
| Config 3 | | | SSB.2 FR1 |
| SMTC Configuration | Config 1, 2 | | |  | SMTC.1 | A.3.11 |
| Config 3 | | | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 | | |  | 15 KHz |  |
| Config 3 | | | 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 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | | |  | 0 |  |
| OCNG parameters | | | |  | OP.1 | A.3.2.1 |
| CP length | | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | | |  | 2x2 Low |  |
| Beam failure detection 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 | 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. |  |
| schedulingRequestID-BFR-SCell-r16 | | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | Config 1, 2 | | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| Config 3 | | -95 |
| powerControlOffsetSS | | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | | | Config 1 |  | CSI-RS.1.2 FDD | A.3.14 |
| Config 2 | CSI-RS.1.2 TDD |
| Config 3 | CSI-RS.2.2 TDD |
| CSI-RS configuration for CSI reporting | | | Config 1 |  | CSI-RS.1.1 FDD | A.3.14 |
| Config 2 |  | CSI-RS.1.1 TDD |
| Config 3 |  | CSI-RS.2.1 TDD |
| TRS configuration | | | Config 1 |  | TRS.1.1 FDD |  |
| Config 2 |  | TRS.1.1 TDD |  |
| Config 3 |  | TRS.1.2 TDD |  |
| CSI-RS-Index assigned as RLM RS | | | Config 1 |  | CSI-RS.1.2 FDD | A.3.14 |
| Config 2 |  | CSI-RS.1.2 TDD |
| Config 3 |  | CSI-RS.2.2 TDD |
| T310 Timer | | | | ms | 1000 |  |
| N310 | | | |  | 2 |  |
| T1 | | | | s | 0.2 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | s | 0.18 |  |
| T3 | | | | s | 0.14 |  |
| T4 | | | | s | 0 |  |
| T5 | | | | s | 0.17 |  |
| D1 | | | | s | 0.13 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | | |

**Table A.6.5.5.5.1-3: Cell specific test parameters for FR1 SCell for CSI-RS-based beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell1** | **Test 1 Cell2** | | | | |
|  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| 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 |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| Config 2 |  | 5 | 5 | -3 | -12 | -12 | -12 |
| Config 3 |  | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| Config 2 |  | -10 | -10 | -10 | 10 | 10 | 10 |
| Config 3 |  | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1 | dBm/ | -108 | -108 | -108 | -88 | -88 | -88 |
| Config 2 | SCS  kHz | -108 | -108 | -108 | -88 | -88 | -88 |
| Config 3 |  | -105 | -105 | -105 | -85 | -85 | -85 |
|  | Config 1 | dBm/ | -98 | -98 | | | | |
| Config 2 | 15kHz | -98 | -98 | | | | |
| Config 3 |  | -98 | -98 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6. | | | | | | | | |

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**Figure A.6.5.5.5.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing in for SCell non-DRX mode**

A.6.5.5.5.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

A.6.5.5.6 Beam Failure Detection and Link Recovery Test for FR1 SCell configured with CSI-RS-based BFD and SSB-based LR in DRX mode

A.6.5.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for a serving cell and that the UE performs correct SSB-based link recovery based on beam candicate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP without *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the beam failure detection and link recovery for an FR1 serving cell requirements in clause 8.5.

The test parameters are given in Tables A.6.5.5.6.1-1, A.6.5.5.6.1-2, A.6.5.5.6.1-3, and A.6.5.5.6.1-4 below. There are two cells, cell 1 is the PCell and cell 2 is the SCell, in the test. UE is not provided by *schedulingRequestID-BFR-SCell-r16*, i.e., no configuration for PUCCH transmission resources, and UE shall perform the random access procedure to recover the beam failure. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.6.5.5.6.1-1 shows the SNR of the CSI-RS in set q0 in the active SCell to emulate beam failure. Figure A.6.5.5.6.1-1 additionally shows the variation of the downlink L1-RSRP of the SSB in set q1 of the candidate beam used for link recovery. 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 2 ms. In the test, DRX configuration is enabled in SCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.6.5.5.6.1-1: Supported test configurations for FR1 PCell and SCell**

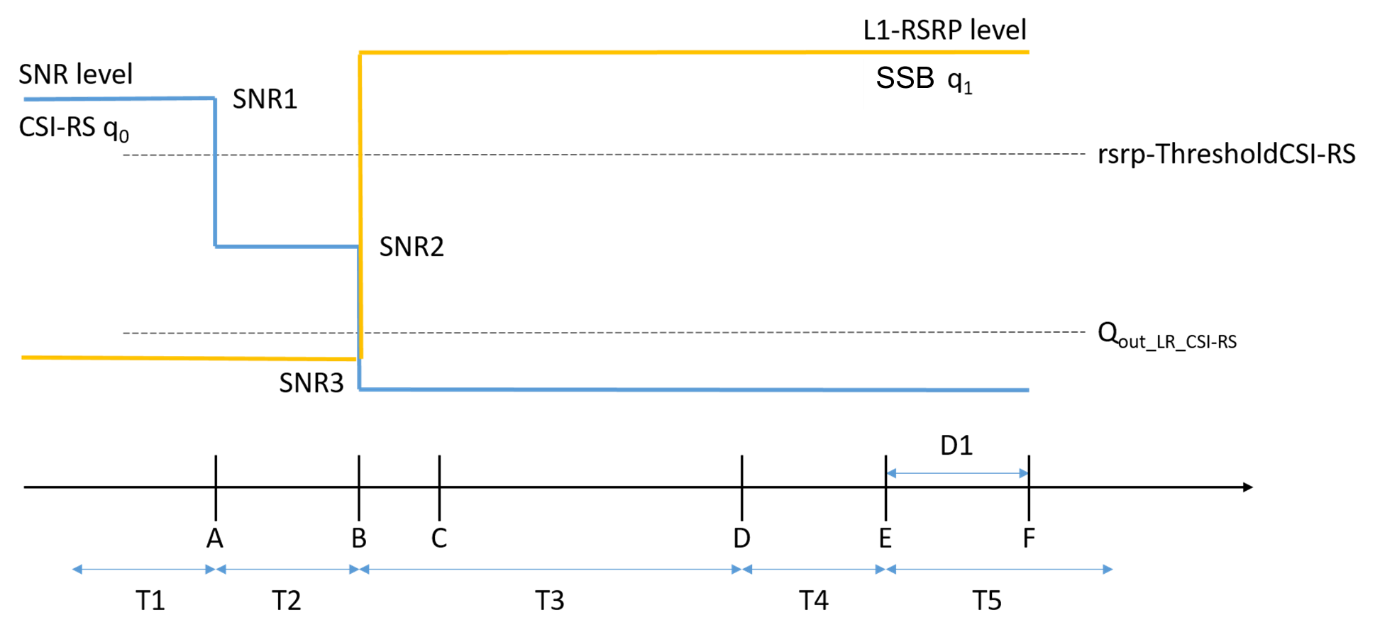
|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | FDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 2 | TDD duplex mode, 15 kHz SSB SCS, 10 MHz bandwidth |
| 3 | TDD duplex mode, 30 kHz SSB SCS, 40 MHz bandwidth |
| Note: The UE is only required to pass in one of the supported test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

**Table A.6.5.5.6.1-2: General test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** | **Comment** |
| **Test 1** |
| Active PCell | | |  | Cell 1 |  |
| RF Channel Number | | |  | 1 |  |
| Active SCell | | |  | Cell 2 |  |
| RF Channel Number | | |  | 2 |  |
| Duplex mode | Config 1 | |  | FDD |  |
| Config 2, 3 | | TDD |  |
| TDD Configuration | Config 1 | |  | Not Applicable |  |
| Config 2 | | TDDConf.1.1 |  |
| Config 3 | | TDDConf..21 |  |
| CORESET Reference Channel | Config 1 | |  | CR.1.1 FDD | A.3.1.2 |
| Config 2 | | CR.1.1 TDD |
| Config 3 | | CR.2.1 TDD |
| SSB Configuration | Config 1 | |  | SSB.1 FR1 | A.3.10 |
| Config 2 | | SSB.1 FR1 |
| Config 3 | |  | SSB.2 FR1 |
| SMTC Configuration | Config 1, 2 | |  | SMTC.1 | A.3.11 |
| Config 3 | | SMTC.1 |
| PDSCH/PDCCH subcarrier spacing | Config 1, 2 | |  | 15 KHz |  |
| Config 3 | | 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 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | | |  | 0 |  |
| OCNG parameters | | |  | OP.1 | A.3.2.1 |
| CP length | | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | | |  | 2x2 Low |  |
| Beam failure detection 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 | 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 | | |  | DRX.7 | A.3.3.7 |
| Gap pattern ID | | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | | |  | absent | When the field is absent, the random access procedure will be triggered for SCell BFR |
| SSB Index assigned as CBD RS (q1) in activated SCell | | |  | 0 |  |
| rlmInSyncOutOfSyncThreshold | | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | Config 1, 2 | dBm/SCS kHz | -98 | Threshold used for Qin\_LR\_SSB |
| Config 3 | -95 |
| powerControlOffsetSS | | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | Config 1 | |  | CSI-RS.1.2 FDD | A.3.14  .1 |
| Config 2 | | CSI-RS.1.2 TDD |
| Config 3 | | CSI-RS.2.2 TDD |
| CSI-RS configuration for CSI reporting | Config 1 | |  | CSI-RS.1.1 FDD | A.3.14.1 |
| Config 2 | | CSI-RS.1.1 TDD |
| Config 3 | | CSI-RS.2.1 TDD |
| TRS configuration | Config 1 | |  | TRS.1.1 FDD |  |
| Config 2 | |  | TRS.1.1 TDD |  |
| Config 3 | |  | TRS.1.2 TDD |  |
| CSI-RS-Index assigned as RLM RS | Config 1 | |  | CSI-RS.1.2 FDD |  |
| Config 2 | | CSI-RS.1.2 TDD |
| Config 3 | | CSI-RS.2.2 TDD |
| T310 Timer | | | ms | 1000 |  |
| N310 | | |  | 2 |  |
| T1 | | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | s | 8.37 |  |
| T3 | | | s | 6.44 |  |
| T4 | | | s | 0 |  |
| T5 | | | s | 1.97 |  |
| D1 | | | s | 1.93 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | | |

**Table A.6.5.5.6.1-3: Cell specific test parameters for FR1 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 1** | **Test 1 Cell2** | | | | |
|  | **T1 to T5** | T1 | T2 | T3 | T4 | T5 |
| 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 |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| Config 2 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| Config 3 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| Config 2 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| Config 3 | dB | -10 | -10 | -10 | 10 | 10 | 10 |
| SSB\_RP of set q1 | Config 1 | dBm/ | -110 | -110 | -110 | -88 | -88 | -88 |
| Config 2 | SCS kHz | -110 | -110 | -110 | -88 | -88 | -88 |
| Config 3 |  | -107 | -107 | -107 | -85 | -85 | -85 |
|  | Config 1 | dBm/15 | -98 | -98 | | | | |
| Config 2 | kHz | -98 | -98 | | | | |
| Config 3 |  | -98 | -98 | | | | |
| Propagation condition | |  | TDL-C 300ns 100Hz | 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.4.5.5.1.1-1.  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 modified as specified in clause A.3.6. | | | | | | | | |

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**Figure A.6.5.5.6.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing for SCell in DRX mode**

A.6.5.5.6.2 Test Requirements

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

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the shall detect beam failure and initiat link recovery. During T4 and T5 the UE measures and evaluate beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 120+10 ms after the start of T5, the UE shall transmit preamble for UL-SCH resource application, followed by MAC-CE on the assigned uplink resources containing  a beam associated with the candidate beam set q1. The UE shall not transmit preamble earlier than time point B.

During T5, the System Simulator shall transmit a Random Access Response to UE after the System Simulator receives the preamble from UE. The UE shall transmit the msg.3 containing candidate beam set q1 for SCell BFR if UE receives the Random Access Response.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 27>

<Start of change 28>

A.6.6.8.1 L1-SINR measurement with CSI-RS based CMR and no dedicated IMR configured when DRX is used

A.6.6.8.1.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of L1-SINR measurement. This test will partly verify the L1-SINR measurement requirements in clause 9.8.4.1, with the testing configurations for NR cells in Table A.6.6.8.1.1-1.

**Table A.6.6.8.1.1-1: Applicable NR configurations for FR1 CSI-RS based L1-SINR 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.6.6.8.1.2 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.6.6.8.1.2-1 and Table A.6.6.8.1.2-2 below.

In the CSI-RS measurement configuration, UE is indicated to perform L1-SINR measurement on the CSI-RS and report aperiodically. The test consists of a single time period T1, during which the UE is triggered via DCI to report L1-SINR on aperiodic CSI-RS resources. After 80ms from the beginning of the test, the DCI trigger comes in slot n (1 Config 1,2 and 8 for Config 3) of a frame and UE provides the report back based on the reporting configuration as defined in Table A.6.6.8.1.2-1.

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

**Table A.6.6.8.1.2-1: General test parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **Value** |
| SSB GSCN | 1~3 |  | freq1 |
| Duplex mode | 1 |  | FDD |
| 2 | TDD |
| 3 | TDD |
| TDD Configuration | 1 |  | N/A |
| 2 | TDDConf.1.1 |
| 3 | TDDConf.2.1 |
| BWchannel | 1 | MHz | 10: NRB,c = 52 |
| 2 | 10: NRB,c = 52 |
| 3 | 40: NRB,c = 106 |
| PDSCH Reference measurement channel | 1 |  | SR.1.1 FDD |
| 2 | SR.1.1 TDD |
| 3 | SR.2.1 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.1.1 FDD |
| 2 | CR.1.1 TDD |
| 3 | CR.2.1 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.1.1 FDD |
| 2 | CCR.1.1 TDD |
| 3 | CCR.2.1 TDD |
| SSB configuration | 1 |  | SSB.3 FR1 |
| 2 | SSB.3 FR1 |
| 3 | SSB.4 FR1 |
| CSI-RS configuration | 1 |  | CSI-RS.1.3 FDD |
| 2 | CSI-RS.1.3TDD |
| 3 | CSI-RS.2.3TDD |
| OCNG Patterns | 1~3 |  | OP.1 |
| TRS Configuration | 1 |  | TRS.1.1 FDD |
| 2 |  | TRS.1.1 TDD |
| 3 |  | TRS.1.2 TDD |
| Initial BWP Configuration | 1~3 |  | DLBWP.0.1  ULBWP.0.1 |
| Dedicated BWP configuration | 1~3 |  | DLBWP.1.1  ULBWP.1.1 |
| SMTC configuration | 1~3 |  | SMTC.1 |
| DRX configuration | 1~3 |  | DRX.3 |
| reportConfigType | 1~3 |  | aperiodic |
| reportQuantity-r16 | 1~3 |  | cri-SINR-r16 |
| Number of reported RS | 1~3 |  | 2 |
| qcl-Info | 1~3 |  | SSB#0 for resource#0 |
| SSB#1 for resource#1 |
| reportSlotOffsetList | 1~3 | slots | 26 |
| T1 | 1~3 | s | 5 |
| EPRE ratio of PSS to SSS | 1~3 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |
| EPRE ratio of PBCH to PBCH DMRS |
| EPRE ratio of PDCCH DMRS to SSS |
| EPRE ratio of PDCCH to PDCCH DMRS |
| EPRE ratio of PDSCH DMRS to SSS |
| EPRE ratio of PDSCH to PDSCH DMRS |
| EPRE ratio of OCNG DMRS to SSSNote 1 |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |
| Propagation condition | 1~3 |  | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. | | | |

**Table A.6.6.8.1.2-2: CSI-RS specific test parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Config** | **Unit** | **CSI-RS#0** | **CSI-RS#1** |
| Note1 | 1~3 | dBm/15kHz | -94.65 | |
| Note1 | 1,2 | dBm/SSB SCS | -94.65 | |
| 3 | -91.65 | |
|  | 1~3 | dB | 0 | 3 |
| CSI-RS RSRP Note3 | 1,2 | dBm/SSB SCS | -94.65 | -91.65 |
| 3 | -91.65 | -88.65 |
| Io Note2 | 1,2 | dBm/9.36 MHz | -63.69 | -61.93 |
| 3 | dBm/38.16 MHz | -57.59 | -55.84 |
|  | 1~3 | dB | 0 | 3 |
| Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: CSI-RS RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | |

A.6.6.8.1.3 Test Requirements

After 80ms from the beginning of the test, the UE shall send L1-SINR report at slot 26 from the reception of DCI triggering the L1-SINR measurement. The L1-SINR report shall include the results for both CSI-RS#0 and CSI-RS#1 while meeting the absolute accuracy requirement in clause 10.1.27.1.1 and relative accuracy requirement in clause 10.1.27.1.2.

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 28>

<Start of change 29>

A.7.5.5.6 Beam Failure Detection and Link Recovery Test for FR2 SCell configured with CSI-RS-based BFD and LR in non-DRX mode

A.7.5.5.6.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for an active SCell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell with *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when no DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR2 SCell requirements in clause 8.5.

The test parameters are given in Tables A.7.5.5.6.1-1, A.7.5.5.6.1-2 and A.7.5.5.6.1-3. There are two cells, cell 1 is the active PCell and cell 2 is the active SCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.5.5.6.1-1 shows the variation of the downlink SNR of the CSI-RS in set q0 in the active SCell to emulate CSI-RS based beam failure. Figure A.7.5.5.6.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. 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 [2] ms. In the test, DRX configuration is not enabled.

**Table A.7.5.5.6.1-1: Supported test configurations for FR2 PCell and SCell**

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

**Table A.7.5.5.6.1-2: General test parameters for FR2 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| **Test 1** |
| Active PCell | |  | Cell 1 |  |
| RF Channel Number | |  | 1 |  |
| Active SCell | |  | Cell 2 |  |
| RF Channel Number | |  | 2 |  |
| Duplex mode | Config 1 |  | TDD |  |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |  |
| CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | A.3.1.2 |
| SSB Configuration | Config 1 |  | SSB.3 FR2 | A.3.10 |
| SMTC Configuration | Config 1 |  | SMTC.3 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1 |  | 120KHz |  |
| PRACH Configuration | Config 1 |  | Table A.3.8.3.1-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | |  | 0 |  |
| TRS configuration | |  | TRS.2.1 TDD |  |
| TCI configuration | |  | CSI-RS.Config.0 |  |
| OCNG parameters | |  | OP.1 | A.3.2.1 |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |  |
| Beam failure detection 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 | 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. |  |
| schedulingRequestID-BFR-SCell-r16 | |  | Configured |  |
| Periodicity of PUCCH for SR configuration for BFR on SCell | | slots | 40 | 5ms |
| Offset of PUCCH for SR configuration for BFR on SCell | | slots | 5 |  |
| PUCCH parameters for SR configuration for BFR on SCell | |  | Table 8.3.3.1.2-1 in [13] |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 in activated SCell | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | dBm/SCS kHz | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | |  | NA | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| CSI-RS configuration for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD | A.3.14.2 |
| csi-RS-Index assigned as RLM RS | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| T310 Timer | | ms | 1000 |  |
| N310 | |  | 2 |  |
| T1 | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | s | 1.17 |  |
| T3 | | s | 0.9 |  |
| T4 | | s | 0 |  |
| T5 | | s | 0.31 |  |
| D1 | | s | 0.27 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

**Table A.7.5.5.6.1-3: Cell specific test parameters for FR2 SCell for beam failure detection and link recovery testing in non-DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell 1** | **Test 1 Cell2** | | | | |
|  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| AoA setup | |  | Setup 1 defined in A.3.15 | Setup 1 defined in A.3.15 | | | | |
| Assumptpion for UE beams Note 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 |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | 0.2 | 0.2 | 0.2 | 20.2 | 20.2 | 20.2 |
| CSI-RS\_RP of set q1 | Config 1 | dBm/SCS  kHz | -104.5 | -104.5 | -104.5 | -84.5 | -84.5 | -84.5 |
| Noc | Config 1 | dBm/  120kHz | -104.7 | -104.7 | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | TDL-A 30ns 75Hz | | | | |
| 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.5.5.6.1-1.  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 modified as specified in clause 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. | | | | | | | | |

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**Figure A.7.5.5.6.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing for SCell in non-DRX mode**

A.7.5.5.6.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 and T5 in A.7.5.5.6.1 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initial link recovery. During T4 and T5 the UE measures and evaluates beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 260+10 ms after the start of T5, the UE shall transmit PUCCH with LRR, followed by BFR MAC CE containing a beam associated with the candidate beam set q1. The UE shall not transmit PUCCH with an LRR with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

A.7.5.5.7 Beam Failure Detection and Link Recovery Test for FR2 SCell configured with CSI-RS-based BFD and LR in DRX mode

A.7.5.5.7.1 Test Purpose and Environment

The purpose of this test is to verify that the UE properly detects CSI-RS-based beam failure in the set q0 configured for an active SCell and that the UE performs correct CSI-RS-based link recovery based on beam candidate set q1. The purpose is to test the downlink monitoring for beam failure detection within the UEs active DL BWP of the SCell with *schedulingRequestID-BFR-SCell-r16* configuration, during the evaluation period, and link recovery, when DRX is used. This test will partly verify the CSI-RS based beam failure detection and link recovery for an FR2 SCell requirements in clause 8.5.

The test parameters are given in Tables A.7.5.5.7.1-1, A.7.5.5.7.1-2 and A.7.5.5.7.1-3. There are two cell, cell 1 is the active PCell and cell 2 is the active SCell, in the test. The test consists of five successive time periods, with time duration of T1, T2, T3, T4 and T5 respectively. Figure A.7.5.5.7.1-1 shows the variation of the downlink SNR of the CSI-RS in set q0 in the active SCell to emulate CSI-RS based beam failure. Figure A.7.5.5.7.1-1 additionally shows the variation of the downlink L1-RSRP of the CSI-RS in set q1 of the candidate beam used for link recovery. 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 2 ms. In the test, DRX configuration is enabled in PCell and DRX inactivity timer has already been expired, i.e. UE tries to decode PDCCH and to send periodic CQI 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.7.5.5.7.1-1: Supported test configurations for FR2 PCell and SCell**

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

**Table A.7.5.5.7.1-2: General test parameters for FR2 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| **Test 1** |
| Active PCell | |  | Cell 1 |  |
| RF Channel Number | |  | 1 |  |
| Active SCell | |  | Cell 2 |  |
| RF Channel Number | |  | 2 |  |
| Duplex mode | Config 1 |  | TDD |  |
| TDD Configuration | Config 1 |  | TDDConf.3.1 |  |
| CORESET Reference Channel | Config 1 |  | CR.3.1 TDD | A.3.1.2 |
| SSB Configuration | Config 1 |  | SSB.3 FR2 | A.3.10 |
| SMTC Configuration | Config 1 |  | SMTC.3 | A.3.11 |
| PDSCH/PDCCH subcarrier spacing | Config 1 |  | 120 KHz |  |
| PRACH Configuration | Config 1 |  | Table A.3.8.3.1-1 |  |
| csi-RS-Index assigned as beam failure detection RS in set q0 in activated SCell | |  | 0 |  |
| TRS configuration | |  | TRS.2.1 TDD |  |
| TCI configuration | |  | CSI-RS.Config.0 |  |
| OCNG parameters | |  | OP.1 | A.3.2.1 |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 2x2 Low |  |
| Beam failure detection 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 | 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 | |  | DRX.3 | A.3.3.3 |
| Gap pattern ID | |  | N.A. |  |
| schedulingRequestID-BFR-SCell-r16 | |  | Configured |  |
| Periodicity of PUCCH for SR configuration for BFR on SCell | | slots | 40 | 5ms |
| Offset of PUCCH for SR configuration for BFR on SCell | | slots | 5 |  |
| PUCCH parameters for SR configuration for BFR on SCell | |  | Table 8.3.3.1.2-1 in [13] |  |
| csi-RS-Index assigned as candidate beam detection RS in set q1 in activated SCell | |  | 1 |  |
| rlmInSyncOutOfSyncThreshold | |  | absent | When the field is absent, the UE applies the value 0. (Table 8.1.1-1). |
| rsrp-ThresholdBFR | | dBm/SCS kHz | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | |  | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | |  | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | |  | pbfd4 | see clause 5.17 of TS 38.321 [7] |
| CSI-RS configuration for q0 and q1 | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| CSI-RS configuration for CSI reporting | Config 1 |  | CSI-RS.3.1 TDD | A.3.14.2 |
| csi-RS-Index assigned as RLM RS | Config 1 |  | CSI-RS.3.2 TDD | A.3.14.2 |
| T310 Timer | | ms | 1000 |  |
| N310 | |  | 2 |  |
| T1 | | s | 1 | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | s | 5.43 |  |
| T3 | | s | 5.16 |  |
| T4 | | s | 0 |  |
| T5 | | s | 0.31 |  |
| D1 | | s | 0.27 |  |
| Note 1: UE-specific PDCCH is not transmitted after T1 starts. | | | | |

**Table A.7.5.5.7.1-3: Cell specific test parameters for FR2 SCell for beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Cell1** | **Test 1 Cell2** | | | | |
|  | **T1 to T5** | **T1** | **T2** | **T3** | **T4** | **T5** |
| AoA setup | |  | Setup 1 defined in A.3.15 | Setup 1 defined in A.3.15 | | | | |
| Assumption for UE beams Note 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 |
| 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\_CSI-RS of set q0 | Config 1 | dB | 5 | 5 | -3 | -12 | -12 | -12 |
| SNR\_CSI-RS of set q1 | Config 1 | dB | 0.2 | 0.2 | 0.2 | 20.2 | 20.2 | 20.2 |
| CSI-RS\_RP of set q1 | Config 1 | dBm/  SCS kHz | -104.5 | -104.5 | -104.5 | -84.5 | -84.5 | -84.5 |
| Noc | Config 1 | dBm/120 kHz | -104.7 | -104.7 | | | | |
| Propagation condition | |  | TDL-A 30ns 75Hz | TDL-A 30ns 75Hz | | | | |
| 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 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: Void  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 REs carrying CSI-RS.  Note 8: The SNR in time periods T1, T2, T3, T4 and T5 is denoted as SNR1, SNR2 and SNR3 respectively in figure A.7.5.5.7.1-1.  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 modified as specified in clause 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. | | | | | | | | |

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**Figure A.7.5.5.7.1-1: SNR and L1-RSRP variation for beam failure detection and link recovery testing for SCell in DRX mode**

A.7.5.5.7.2 Test Requirements

The UE behaviour during time durations T1, T2, T3, T4 in A.7.5.5.7.1 and T5 shall be as follows:

During the time duration T1 and T2, the UE shall transmit uplink signal at least in all subframes configured for CSI transmission on Cell 1.

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

During T3 the UE shall detect beam failure and initial link recovery. During T4 and T5 the UE measures and evaluates beam candidate from beam candidate set q1.

No later than time point F occurring no later than D1 = 260+10 ms after the start of T5, the UE shall transmit PUCCH with LRR, followed by BFR MAC CE containing a beam associated with the candidate beam set q1. The UE shall not transmit PUCCH with an LRR with the candidate beam set q1 earlier than time point B.

Test is concluded once the test equipment has received the initial preamble transmission from the UE. The rate of correct events observed during repeated tests shall be at least 90%.

<End of change 29>

<Start of change 30>

### A.6.5.x Pathloss reference signal switching delay

#### A.6.5.x.1 MAC-CE based pathloss reference signal switch delay

##### A.6.5.x.1.1 Test Purpose and Environment

The purpose of this test is to verify the MAC-CE based pathloss reference signal switch delay requirement defined in clause 8.14.

The supported test configurations are shown in Table A.6.5.x.1.1-1. The test scenario comprises of one cell (Cell 1) as given in Table A.6.5.x.1.1-2. Cell-specific parameters of the cell are specified in Table A.6.5.x.1.1-3 below.

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

Prior to the start of the time duration T1,

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

- UE shall be fully synchronized to SSB #0.

During T1,

- The UE shall track SSB #1 so that SSB #1 as a pathloss reference signal is known to the UE.

Time period T2 starts when the UE is configured of the power headroom reporting functionality by upper layers by the test equipment and the UE shall transmit a PHR during T2.

During T2,

- UE is configured with a *phr-ProhibitTimer* timer value for Cell 1.

- UE is configured with a *phr-Tx-PowerFactorChange* value for Cell 1.

During T3,

Time period T3 starts when a PDSCH carrying MAC-CE activation for pathloss reference signal switch, sent from the test equipment to the UE to swicth the pathloss reference signal from SSB 0 to SSB 1, is received at the UE side in Cell1’s slot # denoted *i*. The UE shall switch its pathloss reference signal to the target one and send PHR.

The UE shall be able to apply the target pathloss reference signal of the serving cell on which pathloss reference signal switch occurs no later than the slot *i* + + as defined in clause 8.14. The UE shall be able to apply old pathloss reference signals until the slot *i* + + as defined in clause 8.14.

The test equipment verifies the pathloss RS switch time by counting the slots from the time when the pathloss RS switch command is transmitted till a PHR is received during T3.

Table A.6.5.x.1.1-1: MAC-CE based pathloss reference signal 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. | |

Table A.6.5.x.1.1-2: General test parameters for MAC-CE based pathloss reference signal switch in SA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Active PCell | |  | Cell 1 |  |
| RF Channel Number | |  | 1 |  |
| Duplex mode | Config 1 |  | FDD |  |
| Config 2, 3 |  | TDD |  |
| 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 |  |
| CORESET Reference Channel | Config 1 |  | CR.1.1 FDD |  |
| Config 2 |  | CR.1.1 TDD |  |
| Config 3 |  | CR.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 |  |
| SSB index assigned as pathloss RS | |  | 0 in T1, 0 in T2, 1 in T3 |  |
| OCNG parameters | |  | OP.1 |  |
| CP length | |  | Normal |  |
| Correlation Matrix and Antenna Configuration | |  | 1x2 Low |  |
| DRX | |  | OFF |  |
| Gap pattern ID | |  | gp0 |  |
| *phr-ProhibitTimer* | | sub frame | 0 |  |
| *phr-Tx-PowerFactorChange* | | dB | 5 |  |
| *phr-PeriodicTimer* | | sub frame | infinity |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| T1 | | s | [2] |  |
| T2 | | s | [2] |  |
| T3 | | s | 0.2 |  |

Table A.6.5.x.1.1-3: NR Cell specific test parameters for MAC-CE based pathloss reference signal switch in SA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 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 |
| SSB with index 0 |  | | | dB | [7] | | |
|  | Config 1, 2, 3 | | dBm/15kHz | [-101] | | |
|  | | | dB | [7] | | |
| SS-RSRP Note 4 | | Config 1, 2 | dBm/ SCS | [-94] | | |
| Config 3 | [-91] | | |
| SSB with index 1 |  | | | dB | [-3] | | |
|  | Config 1, 2, 3 | | dBm/15kHz | [-101] | | |
|  | | | dB | [-3] | | |
| SS-RSRP Note 4 | | Config 1, 2 | dBm/ SCS | [-104] | | |
| Config 3 | [-101] | | |
| Io Note 5 | Config 1, 2 | | | dBm | -65.3/9.36MHz | | |
| Config 3 | | | -59.2/38.16MHz | | |
| 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: 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 DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 5: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters. | | | | | | | |

##### A.6.5.x.1.2 Test Requirements

During T3, the UE shall start to send the PHR for PCell no later than the slot *i* + + .

During T3, the UE shall start to send the PHR for PCell no earlier than the slot *i* + + .

Where, is the timing between pathloss reference MAC-CE activation command and acknowledgement as specified in [7], is the periodicity of the target pathloss reference signal which is SSB in this test.

During T3, UE shall send L1-RSRP report with measurement results for both SSB0 and SSB1.

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

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

Note: The UE shall be given proper uplink transmission grant during T2 and T3.

<End of change 30>

<Start of change 27>

<End of change 27>

<Start of change 28>

<End of change 28>

<Start of change 24>

---End of eMIMO related changes---