**3GPP TSG- Meeting #**

Electronic Meeting, 1st Nov. – 12th Nov., 2021

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

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| ***Title:*** | Big CR to TS 38.133: Rel-16 WIs RRM maintenance Part 3 (Rel-17) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | MCC, Ericsson | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RRM\_enh, NR\_unlic | | | | |  | ***Date:*** | | | 2021-11-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This big CRs merge the mutiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.  **R4-2118106**   * The event A3 is not applicable for inter-RAT scenario because it is for NR neighbouring cell. * The IE *si-RequestForHO* is used for E-UTRAN. According to TS 38.331, *si-RequestForHO* should be replaced by *useAutonomousGaps*.  |  | | --- | | *ReportCGI-EUTRA field descriptions* | | ***useAutonomousGaps***  Indicates whether or not the UE is allowed to use autonomous gaps in acquiring system information from the E-UTRAN neighbour cell. When the field is included, the UE applies the corresponding value for T321. |  * For Table A.6.6.7.2.1-3, the Es/Noc, Es/Iot, SS\_RSRP and SSB\_RP are ambiguous during T2 and T3.   **R4-2118108**   * The ACK should be sent in the “UL” slot. * Add “the beginning of” to make the requirement clear as R15 performance part.   **R4-2118110**   * According to TS 38.133, the reference for UE capability is [14] 3GPP TS 38.306: "NR; User Equipment (UE) radio access capabilities". * According to TS 38.306, *bwp-SwitchingMultiDormancyCCs-r16*  is used for switching between non-dormant and dormant BWPs.   **R4-2118679**  There are Rel-16 test cases that currently violate the agreements concerning testability of combinations of E-UTRA/FR1 and FR2 carriers.  **R4-2118858**  Resubmission of endorsed CR R4-2114099, which is not implemented in TS 38.133 16.9.0  In the existing requirements for SCell deactivation delay, the deactivation triggered by MAC CE and sCellEactivationTimer is considered together without distinction. However, THarq is not needed for the timer-based SCell deactivation procedure.  **R4-2118946**  Behavior of how unavailable SMTC samples needs to be clarified when DRX is configured.  **R4-2118951**  Missing CCA parameter for TCs with DRX.  **R4-2118953**  Missing CCA parameter for TCs with DRX and changes from the endorsed R4-2115281 that were not implemented in the last 38.133 version.  **R4-2119238**  According to existing test requirements in section A.6.6.7.2 for CGI reading of inter-RAT E-UTRAN cell, UE shall transmit 60/120 ACK/NACK during CGI reading. We think 60 ACK/NACK for 15kHz may be just copied and pasted from LTE specification, and 120 NACK for 30kHz just because the SCS is doubled. However, this is not aligned with core requirements defined in clause 8.2.2.2.15.  There are some editorial errors in the test requirements.  **R4-2119341**  In CGI reading requirements, the time for SIB1 reading is defined based on periodicity with which the SIB1 is actually transmitted by the NR target cell. For SSB and RMSI CORESET multiplexing pattern 2 and 3, this periodicity can be same as SSB periodicity, e.g. 20ms.  However, UE does not know the SSB periodicity of the tartget cells before obtaining the SIB1 of the target cell, so for CGI reading it can only attempt to decode SIB1 of target cell based on SMTC periodicity, which may be larger than SSB periodicity, e.g. 40ms.  This means the current delay requirements cannot be met by a correct UE.  **R4-2119448**  To update CCA model for test cases in DRX. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The summary of change in each endorsed draft CR is copied below.  **R4-2118106**   * In the test purpose and environment, change triggering event from A3 to B2 * In Table A.6.6.7.2.1-2 and the test purpose and environment, replace *si-RequestForHO* by *useAutonomousGaps*. * In Table A.6.6.7.2.1-2, remove the field “A3-offset” * In Table A.6.6.7.2.1-3, add a new column for T3 and add b2-Threshold2EUTRA = -109dB/15Hz for event B2 (LTE neighboring cell)   **R4-2118108**   * Change from “During T1, the UE shall start to send the ACK for SCell in the DL slot right after slot (*i+TBWPswitchDelay+k1*).” to “During T1, the UE shall start to send the ACK for SCell from the first UL slot that occurs after the beginning of DL slot (*i+TBWPswitchDelay+k1*).” * Change from slot (*j+TBWPswitchDelay+k11*) to slot (*j+TBWPswitchDelay+k1*)   **R4-2118110**   * In 8.6.2A.1 and 8.6.3A.1, change the reference from [13] to [TS 38.306, 14] * In 8.6.2A.1, [*dormancy-SwitchingMultiCCs-r16*] is replaced by *bwp-SwitchingMultiDormancyCCs-r16.*   **R4-2118679**  The following modifications are made:   * A.3.13A.2 Principle of Testing in EN-DC   + Added 3 Rel-16 TC to the list of test cases the UE does not have to pass. * A.3.13A.3 Principle of Testing in SA   + Added 1 Rel-16 TC to the list of test cases the UE does not have to pass. * A.5.5.2.8 E-UTRAN – NR FR2 interruptions at NR SRS carrier based switching   + Interruption test case A.5.5.2.8 is modified to only test interruption requirements in NR FR2 PSCell * A.5.5.3.7 Direct SCell activation at SCell addition of known SCell in FR2   + Direct SCell activation test case A.5.5.3.7 is modified to only test CQI reporting for NR FR2 SCell in NR FR2 PSCell. * A.5.5.6.3.1 E-UTRAN – NR FR2 PSCell SCell dormancy switch of single FR2 SCell inside active time   + BWP switching test case A.5.5.6.3.1 is updated to remove interruption requirements pertaining to EUTRA PCell. * A.5.5.6.4.1 E-UTRAN – NR FR2 PSCell SCell dormancy switch of single FR2 SCell inside active time   + BWP switching test case A.5.5.6.4.1 is updated to remove interruption requirements pertaining to EUTRA PCell.   **R4-2118858**  Define the deactivation requirements for timer-based and MAC CE based seperately which has been corrected in clause 8.3.3  **R4-2118946**  On the NR-U performance part, the CCA models with DRX were discussed and one feasible option was presented where the number of unavailable samples are incremented only once per DRX cycle. In order to use that approach in the RRM performance requirements, the RRM core requirements need to be updated in a consistent manner.  **R4-2118951**  Inclusion of LCCA and WCCA parameters which are CCA model parameters that avoid the UE to reach Lmax during the test.  **R4-2118953**  Changes from the endorsed CR R4-2115281 that were not implemented in the last meeting.  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.  **R4-2119238**  Update the number of ACK/NACK UE shall transmit during CGI reading in thest A.6.6.7.2.  Correct the editorial errors in the test requirements.  **R4-2119341**  Clarify that for SSB and RMSI CORESET multiplexing pattern 2 and 3, TRMSI-scheduling is the maximum between the actual scheduled periodicity and the SMTC periodicity.  **R4-2119448**  The DL CCA model is updated when test is conducted in DRX. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  **R4-2118106**  Incorrect test configuration.  **R4-2118108**  Incorrect test cell configuration.  **R4-2118110**  Incorrect test cell configuration.  **R4-2118679**  Certain test cases will have testability problems and test outcome may not be conclusive.  **R4-2118858**  The requirements are not correct.  **R4-2118946**  Mismatch between RRM core requirements and CCA model for RRM performance requirements  **R4-2118951**  Devices under test could reach Lmax causing behavior that is not covered on the RRM performance requirement description.  **R4-2118953**  Devices under test could reach Lmax causing behavior that is not covered on the RRM performance requirement description.  **R4-2119238**  The number of ACK/NACK UE shall transmit during CGI reading in thest A.6.6.7.2 would still be incorrect.  **R4-2119341**  CGI reading delay requirements cannot be met by a correct UE  **R4-2119448**  The CCA models may not be suitable for test cases in DRX. RRM tests using DRX may not be properly conducted. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | **R4-2118106**  A.6.6.7.2  **R4-2118108**  A.4.5.6.1.1.2, A.4.5.6.1.2.2, A.4.5.6.3.1.2, A.5.5.6.1.1.2, A.5.5.6.1.2.2, A.5.5.6.3.1.2, A.5.5.6.4.2.2, A.10.3.5.2.1.2 and A.10.3.5.2.2.2  **R4-2118110**  8.6.2A.1 and 8.6.3A.1  **R4-2118679**  A.3.13A.2, A.3.13A.3, A.5.5.2.8, A.5.5.3.7, A.5.5.6.3, A.5.5.6.4  **R4-2118858**  8.3A.3  **R4-2118946**  8.1A.2.2, 8.1A.2.3, 8.5A.5, 9.2A.5, 9.2A.6, 9.3A.4, 9.3A.5, 9.5A.4  **R4-2118951**  A.10.3.4.2, A.11.4.4.2  **R4-2118953**  A.10.4.2, A.11.5.2, A.13.3.2  **R4-2119238**  A.6.6.7.2  **R4-2119341**  9.11.2  **R4-2119448**  A.3.26.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 modified section 1>**

#### 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 DRX cycle length, when configured with DRX.  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. | | | |

8.1A.2.3 Measurement Restrictions for SSB based RLM

The UE is required to be capable of measuring SSB for RLM without measurement gaps. The UE is required to perform the SSB measurements with measurement restrictions as described in the following clauses.

**<End of modified section 1>**

**<Start of modified section 2>**

### 8.3A.3 SCell Deactivation Delay Requirement for Activated SCell

The requirements in this clause shall apply for the UE configured with one downlink SCell operating with CCA in EN-DC or in standalone NR carrier aggregation.

Upon receiving SCell deactivation command in slot *n*, the UE shall accomplish the deactivation actions for the SCell being deactivated no later than in slot *n+*(THARQ +3ms)/*NR\_slot\_length*. The starting point of an interruption window on spCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+, where NR slot length is with respect to the numerology used in the SCell being deactivated.

Upon expiry of the *sCellDeactivationTimer* in slot *n*, the UE shall accomplish the deactivation actions for the SCell being deactivated no later than in slot *n +*. The starting point of an interruption window on spCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1 and not occur after slot n+1+, where NR slot length is with respect to the numerology used in the SCell being deactivated.The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

The requirements in this section do not apply when *sCellDeactivationTimer* [2] is not configured and when SCell deactivation delay exceeds 1280 ms.

**<End of modified section 2>**

**<Start of modified section 3>**

### 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 is not required to determine the availability of SSB occasions more frequent than once per DRX cycle length, when configured with DRX.  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 modified section 3>**

**<Start of modified section 4>**

#### 8.6.2A.1 Simultaneous DCI based BWP switch delay on multiple CCs

The delay requirements for simultaneous DCI based BWP switch on multiple CCs in this clause apply only if the timing difference among the first symbol of slot carrying DCI for all CCs is received within the MRTD for inter-band CA as defined in clause 7.6.4.

For DCI-based BWP switch on multiple CCs, after the UE receives BWP switching request, UE shall be able to receive PDSCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWPs on the serving cells on which BWP switch on the first DL or UL slot occurs right after a time duration of TMultipleBWPswitchDelay which starts from the beginning of DL slot n, where slot n is slot which UE receives the earliest BWP switching request among CCs on which UE is performing simultaneous DCI-based BWP switching.

The UE is not required to transmit UL signals or receive DL signals until the first DL or UL slot occurs right after a time duration of TMultipleBWPswitchDelay which starts from the beginning of DL slot n except DCI triggering BWP switch on the cell where DCI-based BWP switch occurs. The UE is not required to follow the requirements defined in this clause when performing a DCI-based BWP switch between the BWPs in disjoint channel bandwidths or in partially overlapping channel bandwidths on any serving cell.

UE shall finish BWP switch within the time duration TMultipleBWPswitchDelay + Y, which is defined as:

TMultipleBWPswitchDelay = TBWPswitchDelay + D\*(N-1)

Where:

- TBWPswitchDelay is the BWP switching delay on single CC defined in Table 8.6.2-1 depending on UE capability *bwp-SwitchingDelay* [2]. TBWPswitchDelay shall be based on the smallest SCS among SCS of all involved CCs before and after BWP switch. If the BWP switch on multiple CCs results in the change of the SCS on any CC among involved CCs, TBWPswitchDelay should be based on the smallest SCS among all SCS values of all involved CCs.

- D is the incremental delay for each additional CC involved in simultaneous BWP switch and depends on UE capability *bwp-SwitchingMultiCCs-r16* [TS 38.306, 14] for switching between non-dormant BWPs, and *bwp-SwitchingMultiDormancyCCs-r16* for switching between non-dormant and dormant BWPs.

- For UE which is capable of per-FR gap, and no BWP switch involves SCS change, N is the number of CCs in same FR; For UE which is not capable of per-FR gap, or the BWP switches on any CC involves SCS changing, N is the number of CCs undergoing simultaneous BWP switch.

* Y=0, ­if the serving cell where UE receives DCI for BWP switch is same as the serving cell on which BWP switch occurs for each involved serving cell.

Y equals to the length of one slot at smaller SCS of scheduling cell, scheduled cells before and scheduled cells after active BWP change,

* - ­if the serving cell where UE receives DCI for BWP switch is different from the serving cell on which BWP switch occurs for any involved serving cell .

Provided the UE does not have the required TCI-state information to receive PDCCH and PDSCH in the new BWP, the UE shall use old TCI-states before the BWP switch until a new MAC CE updating the required TCI-state information for PDCCH and PDSCH is received after the BWP switch.

If UE has the information on the required TCI-state information to receive PDCCH and PDSCH in the new BWP,

- UE shall be able to receive PDCCH and PDSCH with old TCI-states before the delay as specified in Clause 8.10 in the new BWP.

- UE shall be able to receive PDCCH and PDSCH with new TCI-states after the delay as specified in Clause 8.10 in the new BWP.

If the BWP switch is triggered on multiple CCs simultaneously within or outside DRX active time, and one of the two BWPs on each CC in a BWP switching is a dormant BWP [TS 38.321, 7], UE shall be able to complete active BWP switching within the time duration of

- TDormantMultipleBWPswitchDelay = TMultipleBWPswitchDelay+X, provided that the dormancy indication is received in any of the first 3 OFDM symbols of a slot in the serving cell where DCI for dormancy indication is received, or

- TDormantMultipleBWPswitchDelay = TMultipleBWPswitchDelay +X+Z, provided that the dormancy indication is received after the first 3 OFDM symbols of a slot in the serving cell where DCI for dormancy indication is received, where

- TMultipleBWPswitchDelay is defined above corresponding to the smallest value among the SCS of the serving cell where UE receives dormancy indication and the SCSs of the dormant BWP and the active BWP immediately before or after switching the BWP of the serving cell where BWP switching occurs;

- X equals to the length of 1 slot corresponding to the smallest value among the SCS of the serving cell where UE receives dormancy indication and the SCSs of the dormant BWP and the active BWP immediately before or after switching the BWP of the serving cell where BWP switching occurs.

- Z equals to the length of 1 slot corresponding to the SCS of the serving cell where DCI for dormancy indication is received.

The number of CCs, N, on which the UE can simultaneously switch BWPs while still meeting the requirements, if any, related to allocations on downlink, uplink, or transmission of HARQ-ACK, depends on the UE reported capabilities related to BWP switching, the network configuration and the BWP switch method.

**<End of modified section 4>**

**<Start of modified section 5>**

#### 8.6.3A.1 Simultaneous RRC based BWP switch delay on multiple CCs

Requirements in this clause apply only if RRC based BWP switching on multiple CCs for NR-CA is triggered by a single RRC command.

For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWPs, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWPs on the serving cells on which BWP switch occurs on the first DL or UL slot right after a time duration of slots which begins from the beginning of DL slot n, where

DL slot n is the last slot containing the RRC command, and

are defined in clause 8.6.3, and

for UE which is capable of type 1 BWP switching delay depending on UE capability *bwp-SwitchingDelay* [2]. for UE which is capable of type 2 BWP switching delay depending on UE capability *bwp-SwitchingDelay* [2], where D is the incremental delay for each additional CC involved in simultaneous BWP switch and depends on UE capability [TS 38.306, 14].

N is the number of CCs within the NR-CA configured for performing simultaneous BWP switch.

The UE is not required to transmit UL signals or receive DL signals during the time defined by on the cells where RRC-based BWP switch occurs.

**<End of modified section 5>**

**<Start of modified section 6>**

### 9.2A.5 Intra-frequency measurements without measurement gaps

9.2A.5.1 Intra-frequency cell identification

The UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index\_CCA if UE is not indicated to report SSB based RRM measurement result with the associated SSB index(*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE is indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index\_CCA. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within Tidentify\_intra\_without\_index\_CCA.

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

Tidentify\_intra\_with\_index CCA = (TPSS/SSS\_sync\_intra\_CCA + T SSB\_measurement\_period\_intra\_CCA + TSSB\_time\_index\_intra\_CCA) ms

Where:

TPSS/SSS\_sync\_intra\_CCA: it is the time period used in PSS/SSS detection given in table 9.2A.5.1-1, 9.2A.5.1-3 (deactivated Scell) .

TSSB\_time\_index\_intra\_CCA: it is the time period used to acquire the index of the SSB being measured given in table 9.2A.5.1-2 or 9.2A.5.1-4 (deactivated SCell).

T SSB\_measurement\_period\_intra\_CCA: equal to a measurement period of SSB based measurement given in table 9.2A.5.2-1, 9.2A.5.2-2 (deactivated Scell). CSSFintra: it is a carrier specific scaling factor and is determined

- according to CSSFoutside\_gap,i in clause 9.1.5.1 for measurement conducted outside measurement gaps, i.e. when intra-frequency SMTC is fully non overlapping or partially overlapping with measurement gaps, or according to CSSFwithin\_gap,i in clause 9.1.5.2 for measurement conducted within measurement gaps, i.e. when intra-frequency SMTC is fully overlapping with measurement gaps.

When intra-frequency SMTC is fully non overlapping with measurement gaps or intra-frequency SMTC is fully overlapping with MGs, Kp=1

When intra-frequency SMTC is partially overlapping with measurent gaps, Kp = 1/(1- (SMTC period /MGRP)), where SMTC period < MGRP.

If SCG DRX is in use, intra-frequency cell identification requirements specified in Table 9.2A.5.1-1, Table 9.2A.5.1-2, Table 9.2A.5.1-3, and Table 9.2A.5.1-4 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

The requirements apply provided 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 defined in clause 9.2A.4.3.

Table 9.2A.5.1-1: Time period for PSS/SSS detection

|  |  |
| --- | --- |
| Condition | TPSS/SSS\_sync\_intra\_CCA |
| No DRX | max( 600ms, ceil((5+LPSS/SSS) x Kp) x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320ms | max( 600ms, ceil(1.5x (5+LPSS/SSS) x Kp) x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | ceil((5+LPSS/SSS) x Kp) x DRX cycle x CSSFintra |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified  NOTE 2: When DRX is not configured, LPSS/SSS is the number of SMTC occasions not available at the UE during TPSS/SSS\_sync\_intra\_CCA for PSS/SSS detection, where LPSS/SSS< LPSS/SSS,max. When DRX is configured, LPSS/SSS is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TPSS/SSS\_sync\_intra\_CCA for PSS/SSS detection, where LPSS/SSS< LPSS/SSS,max. When configured with DRX, the UE is not required to determine the availability of SMTC occasions more frequent than once per DRX cycle. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 3: LPSS/SSS,max =7 for Max(DRX cycle,SMTC period)≤40ms where DRX cycle is 0 for non-DRX, LPSS/SSS,max =5 for 40ms<Max(DRX cycle,SMTC period)≤320ms, LPSS/SSS,max = 3 for DRX cycle>320ms.  NOTE 4: Upon exceeding LPSS/SSS,max, the UE is not required to meet the requirements for PSS/SSS detection. | |

Table 9.2A.5.1-2: Time period for time index detection

|  |  |
| --- | --- |
| Condition | TSSB\_time\_index\_intra\_CCA |
| No DRX | max(120ms, ceil((3+Lind) x Kp )x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320ms | max(120ms, ceil (1.5 x (3+Lind) x Kp) x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | Ceil((3+Lind) x Kp) x DRX cycle x CSSFintra |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified  NOTE 2: When DRX is not configured, Lind is the number of SMTC occasions not available at the UE during TSSB\_time\_index\_intra\_CCA for index detection, where Lind ≤ Lind,max. When DRX is configured, Lind is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TSSB\_time\_index\_intra\_CCA for index detection, where Lind ≤ Lind,max. When configured with DRX, the UE is not required to determine the availability of SMTC occasions more frequent than once per DRX cycle. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 3: Lind,max = 5 for Max(DRX cycle,SMTC period)≤40ms where DRX cycle is 0 for non-DRX, Lind,max = 3 for 40ms<Max(DRX cycle,SMTC period)≤320ms, Lind,max =2 for DRX cycle>320ms.  NOTE 4: Upon exceeding Lind,max over the period of time TSSB\_time\_index\_intra\_CCA, the UE has to restart the time index detection procedure. | |

Table 9.2A.5.1-3: Time period for PSS/SSS detection, deactivated SCell

|  |  |
| --- | --- |
| Condition | TPSS/SSS\_sync\_intra\_CCA |
| No DRX | (5 + LPSS/SSS,deact) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320ms | (5 + LPSS/SSS, deact) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle>320ms | (5 + LPSS/SSS, deact) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, LPSS/SSS, deact is the number of SMTC occasions not available at the UE during TPSS/SSS\_sync\_intra\_CCA for PSS/SSS detection, where LPSS/SSS, deact< LPSS/SSS, deact,max. When DRX is configured, LPSS/SSS, deact is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TPSS/SSS\_sync\_intra\_CCA for PSS/SSS detection, where LPSS/SSS, deact< LPSS/SSS, deact,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 cycles, the UE is not required to determine the availability of SMTC occasions more frequent than once per measurement cycle. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 2: LPSS/SSS, deact,max, = 7 for Max(DRX cycle, measCycleSCell)≤40ms where DRX cycle is 0 for non-DRX, LPSS/SSS, deact,max = 5 for 40ms<Max(DRX cycle, measCycleSCell)≤320ms, LPSS/SSS, deact,max = 3 for DRX cycle>320ms.  NOTE 3: Upon exceeding LPSS/SSS, deact,max,, the UE is not required to meet the requirements for PSS/SSS detection. | |

Table 9.2A.5.1-4: Time period for time index detection, deactivated SCell

|  |  |
| --- | --- |
| Condition | TSSB\_time\_index\_intra\_CCA |
| No DRX | (3+Lind,deact) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320ms | (3+Lind,deact) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle>320ms | (3+Lind,deact) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, Lind,deact is the number of SMTC occasions not available at the UE during TSSB\_time\_index\_intra\_CCA for index detection, where Lind,deact < Lind,deact,max. When DRX is configured, Lind,deact is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TSSB\_time\_index\_intra\_CCA for index detection, where Lind,deact < Lind,deact,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 cycles, the UE is not required to determine the availability of SMTC occasions more frequent than once per measurement cycle. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 2: Lind,deact,max, = 5 for Max(DRX cycle, measCycleSCell)≤40ms where DRX cycle is 0 for non-DRX, Lind,deact,max = 3 for 40ms<Max(DRX cycle, measCycleSCell)≤320ms, Lind,deact,max = 2 for DRX cycle>320ms.  NOTE 3: Upon exceeding Lind,deact,max over the period of time TSSB\_time\_index\_intra\_CCA,the UE has to restart the time index detection procedure. | |

#### 9.2A.5.2 Measurement period

The measurement period for intra-frequency measurements without gaps is as shown in table 9.2A.5.2-1, 9.2A.5.2-2 (deactivated SCell).

If SCG DRX is in use, intra-frequency measurement period requirements specified in Table 9.2A.5.2-1, Table 9.2A.5.2-2 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

The requirements apply provided 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 defined in clause 9.2A.4.3.

When the time period of unsuccessful measurement attempts due to exceeding the maximum number of unavailable at the UE SMTC occasions of an already identified cell exceeds the maximum time requirement for the cell to remain known defined in clause 9.2A.4.3, UE shall stop the measurement attempts on this SSB and perform the detection procedure again like for any other SSB.

Table 9.2A.5.2-1: Measurement period for intra-frequency measurements without gaps

|  |  |
| --- | --- |
| Condition | T SSB\_measurement\_period\_intra\_CCA |
| No DRX | max(200ms, ceil((5+Lmeas) x Kp) x SMTC period)Note 1 x CSSFintra |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x (5+Lmeas) x Kp) x max(SMTC period,DRX cycle)) x CSSFintra |
| DRX cycle>320ms | ceil((5+Lmeas) x Kp ) x DRX cycle x CSSFintra |
| NOTE 1: If different SMTC periodicities are configured for different cells, the SMTC period in the requirement is the one used by the cell being identified  NOTE 2: When DRX is not configured, Lmeas is the number of SMTC occasions not available at the UE during T SSB\_measurement\_period\_intra\_CCA for measurement, 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\_intra\_CCA for measurement, 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. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 3: Lmeas,max = 7 for Max(DRX cycle,SMTC period)≤40ms where DRX cycle is 0 for non-DRX, Lmeas,max = 5 for 40ms<Max(DRX cycle,SMTC period)≤320ms, Lmeas,max = 3 for DRX cycle>320ms.  NOTE 4: Upon exceeding Lmeas,max over the period of time T SSB\_measurement\_period\_intra\_CCA, the UE has to restart the measurement procedure. | |

Table 9.2A.5.2-2: Measurement period for intra-frequency measurements without gaps (deactivated SCell)

|  |  |
| --- | --- |
| Condition | T SSB\_measurement\_period\_intra\_CCA |
| No DRX | (5+Lmeas,deact) x measCycleSCell x CSSFintra |
| DRX cycle≤ 320ms | (5+Lmeas, deact) x max(measCycleSCell, 1.5xDRX cycle) x CSSFintra |
| DRX cycle>320ms | (5+Lmeas, deact) x max(measCycleSCell, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, Lmeas,deact is the number of SMTC occasions not available at the UE during T SSB\_measurement\_period\_intra\_CCA for measurement, where Lmeas,deact <Lmeas, ,deact ,max. When DRX is configured, Lmeas,deact is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during T SSB\_measurement\_period\_intra\_CCA for measurement, where Lmeas,deact <Lmeas, ,deact ,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 cycles, the UE is not required to determine the availability of SMTC occasions more frequent than once per measurement cycle. FFS: The UE is not required to determine the availability of SMTC occasions more frequent than what is required by CSSFintra.  NOTE 2: Lmeas, ,deact ,max, = 7 for Max(DRX cycle, measCycleSCell)≤40ms where DRX cycle is 0 for non-DRX, Lmeas, ,deact ,max = 5 for 40ms<Max(DRX cycle, measCycleSCell)≤320ms, Lmeas, ,deact ,max = 3 for DRX cycle>320ms.  NOTE 3: Upon exceeding Lmeas,deact,max over the period of time T SSB\_measurement\_period\_intra\_CCA, the UE has to restart the measurement procedure. | |

**<End of modified section 6>**

**<Start of modified section 7>**

### 9.2A.6 Intra-frequency measurements with measurement gaps

#### 9.2A.6.1 Intra-frequency cell identification

The UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_without\_index\_CCA if UE is not indicated to report SSB based RRM measurement result with the associated SSB index (*reportQuantityRsIndexes* or *maxNrofRSIndexesToReport* is not configured), or the UE has been indicated that the neighbour cell is synchronous with the serving cell (*deriveSSB-IndexFromCell* is enabled). Otherwise UE shall be able to identify a new detectable intra frequency cell within Tidentify\_intra\_with\_index\_CCA. The UE shall be able to identify a new detectable intra frequency SS block of an already detected cell within Tidentify\_intra\_without\_index CCA.

Tidentify\_intra\_without\_index CCA = TPSS/SSS\_sync\_intra\_CCA + T SSB\_measurement\_period\_intra\_CCA ms

Tidentify\_intra\_with\_index\_CCA = TPSS/SSS\_sync\_intra\_CCA + T SSB\_measurement\_period\_intra\_CCA + TSSB\_time\_index\_intra\_CCA

Where:

TPSS/SSS\_sync\_intra\_CCA: it is the time period used in PSS/SSS detection given in table 9.2A.6.1-1.

TSSB\_time\_index\_intra\_CCA: it is the time period used to acquire the index of the SSB being measured given in table 9.2A.6.1-2.

T SSB\_measurement\_period\_intra\_CCA: equal to a measurement period of SSB based measurement given in table 9.2A.6.2-1 or 9.2A.6.1-3. CSSFintra: 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.

If SCG DRX is in use, intra-frequency cell identification requirements specified in Table 9.2A.6.1-1 and Table 9.2A.6.1-2 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

The requirements apply provided 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 defined in clause 9.2A.4.3.

Table 9.2A.6.1-1: Time period for PSS/SSS detection

|  |  |
| --- | --- |
| Condition | TPSS/SSS\_sync\_intra\_CCA |
| No DRX | max(600ms, (5+LPSS/SSS,gaps) x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(600ms, ceil(1.5x (5+LPSS/SSS,gaps)) x max(DRX cycle, MGRP, SMTC period)) x CSSFintra |
| DRX cycle>320ms | (5+LPSS/SSS,gaps) x (MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, LPSS/SSS,gaps is the number of SMTC occasions not available at the UE during TPSS/SSS\_sync\_intra\_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\_intra\_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 CSSFintra.  NOTE 2: LPSS/SSS,gaps,max, =7 for Max(DRX cycle, SMTC period, MGRP)≤40ms where DRX cycle is 0 for non-DRX, LPSS/SSS,gaps,max =5 for 40ms<Max(DRX cycle, SMTC period, MGRP)≤320ms, LPSS/SSS,gaps,max =3 for DRX cycle>320ms.  NOTE 3: Upon exceeding LPSS/SSS,gaps,max, the UE is not required to meet the requirements for PSS/SSS detection. | |

Table 9.2A.6.1-2: Time period for time index detection

|  |  |
| --- | --- |
| Condition | TSSB\_time\_index\_intra\_CCA |
| No DRX | max(120ms, (3+Lind,gaps) x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(120ms, ceil(1.5x (3+Lind,gaps)) x max(MGRP, SMTC period,DRX cycle) x CSSFintra) |
| DRX cycle>320ms | (3+Lind,gaps) x (MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, Lind,gaps is the number of SMTC occasions not available at the UE during TSSB\_time\_index\_intra\_CCA forindex detection 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\_intra\_CCA forindex detection 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 CSSFintra.  NOTE 2: Lind,gaps,max, = 5 for Max(DRX cycle, SMTC period, MGRP)≤40ms where DRX cycle is 0 for non-DRX, Lind,gaps,max = 3 for 40ms<Max(DRX cycle, SMTC period, MGRP)≤320ms, Lind,gaps,max = 2 for DRX cycle>320ms.  NOTE 3: Upon exceeding Lind,gaps,max over the TSSB\_time\_index\_intra\_CCA period of time, the UE has to restart the time index detection procedure. | |

#### 9.2A.6.2 Intra-frequency Measurement Period

The measurement period for intra-frequency measurements with gaps is as shown in table 9.2A.6.2-1.

If SCG DRX is in use, intra-frequency measurement period requirements specified in Table 9.2A.6.2-1 shall depend on the SCG DRX cycle. Otherwise, the requirements for when DRX is not in use shall apply.

The requirements apply provided 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 defined in clause 9.2A.4.3.

When the time period of unsuccessful measurement attempts due to exceeding the maximum number of unavailable at the UE SMTC occasions of an already identified cell exceeds the maximum time requirement for the cell to remain known defined in clause 9.2A.4.3, UE shall stop the measurement attempts on this SSB and perform the detection procedure again like for any other SSB.

Table 9.2A.6.2-1: Measurement period for intra-frequency measurements with gaps

|  |  |
| --- | --- |
| Condition | T SSB\_measurement\_period\_intra\_CCA |
| No DRX | max(200ms, (5+Lmeas,gaps) x max(MGRP, SMTC period)) x CSSFintra |
| DRX cycle≤ 320ms | max(200ms, ceil(1.5x (5+Lmeas,gaps)) x max(MGRP, SMTC period,DRX cycle))x CSSFintra |
| DRX cycle>320ms | (5+Lmeas,gaps) x (MGRP, DRX cycle) x CSSFintra |
| NOTE 1: When DRX is not configured, Lmeas,gaps is the number of SMTC occasions not available at the UE during TSSB\_time\_index\_intra\_CCA for measurement where Lmeas,gaps < Lmeas,gaps,max. When DRX is configured, Lmeas,gaps is the number of DRX cycles in which at least one SMTC occasion is not available at the UE during TSSB\_time\_index\_intra\_CCA for measurement where Lmeas,gaps < Lmeas,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 CSSFintra.  NOTE 2: Lmeas,gaps,max = 7 for Max(DRX cycle, SMTC period, MGRP)≤40ms where DRX cycle is 0 for non-DRX, Lmeas,gaps,max = 5 for 40ms<Max(DRX cycle, SMTC period, MGRP)≤320ms, Lmeas,gaps,max = 3 for DRX cycle>320ms.  NOTE 3: Upon exceeding Lmeas,gaps,max over the T SSB\_measurement\_period\_intra\_CCAperiod of time, the UE has to restart the measurement procedure. | |

**<End of modified section 7>**

**<Start of modified section 8>**

### 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 = 12 for max(DRX cycle, SMTC period, MGRP) ≤ 40 ms LPSS/SSS,gaps = 8 for 40 ms < max(DRX cycle, SMTC period, MGRP) ≤ 320 ms, and LPSS/SSS,gaps = 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 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 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.

When the time period of unsuccessful measurement attemps due to exceeding the maximum number of unavailable at the UE SMTC occasions of an already identified cell exceeds the maximum time requirement for the cell to remain known defined in clause 9.3A.6.3, the UE shall stop the measurement attempts on this SSB and perform the detection procedure again, like for any other SSB.

**<End of modified section 8>**

**<Start of modified section 9>**

### 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.  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 modified section 9>**

**<Start of modified section 10>**

### 9.11.2 CGI identification of an NR cell with autonomous gaps

The UE shall identify and report the CGI of a known NR target cell when requested by the network for the purpose of reportCGI. Only one cell is provided to the UE with *cellForWhichToReportCGI* for identifying the CGI.The UE may make autonomous gaps in both downlink reception and uplink transmission for receiving MIB and SIB1 message according to clause 5.5.3 of TS 38.331 [2]. Note that a UE is not required to use autonomous gap if *useAutonomousGaps* is set to false. If autonomous gaps are used for measurement with the purpose of reportCGI, regardless of whether DRX is used or not, or whether SCell(s) are configured or not, the UE shall be able to identify a new CGI of NR cell within:

Tidentify\_CGI = (TMIB + T SIB1) ms

Where:

TMIB is the time period used to acquire MIB message. TMIB = 6 \* TSMTC ms for target cell carrier frequency on FR1 and TMIB = 25 \* TSMTC ms for target cell carrier frequency on FR2.

TSIB1 is the time period used to acquire SIB1 message. TSIB1 = 6 \* TRMSI-scheduling ms.

Where TSMTC is the SMTC periodicity configured for the target cell measurement, and TRMSI-scheduling is

* the periodicity with which the SIB1 is actually transmitted by the NR target cell when SSB and RMSI CORESET multiplexing pattern is 1
* the maximum between the periodicity with which the SIB1 is actually transmitted by the NR target cell and TSMTC when SSB and RMSI CORESET multiplexing pattern is 2 or 3.

The requirement for identifying the CGI of an NR cell within Tidentify\_CGI is applicable when no DRX is used as well as when any of the DRX cycles specified in TS 38.331 [2] is used.

Within the time Tidentify\_CGI, over which the UE identifies the CGI of an NR cell, the UE shall fulfil interruption requirements specified in,

- Clause 8.2.1.2.16 for NR serving cells and Clause 7.32.2.15 in TS36.133 [15] for E-UTRA serving cells if the UE is configured with EN-DC operation mode,

- Clause 8.2.2.2.14 if the UE is configured with SA operation mode,

- Clause 8.2.3.2.14 for NR serving cells and Clause 7.36.2.14 in TS36.133 [15] for E-UTRA serving cells if the UE is configured with NE-DC operation mode,

- Clause 8.2.4.2.11 if the UE is configured with NR-DC operation mode.

In the requirement a cell is known if,

- During the last 5 seconds for FR1 or 3 seconds for FR2 before the reception of the report CGI command:

- The UE has sent a valid L3-RSRP measurement report with SSB index for the target cell and

- During MIB decoding at least reported SSBs remains detectable according to the cell identification conditions specified in clauses 9.2 or 9.3 of TS 38.133, and

- During SIB1 decoding the SSB used for MIB decoding remains detectable according to the cell identification conditions specified in clauses 9.2 or 9.3 of TS 38.133, and

- During MIB decoding, the SSB for MIB decoding remains detectable with SNR ≥-3dB

- During SIB1 decoding, the PDSCH for SIB1 decoding remains detectable with SNR ≥-3dB

**<End of modified section 10>**

**<Start of modified section 11>**

A.3.26.2.1 DL CCA model

The same DL CCA model is applicable regardless of whether DRX cycle is used or not with the following differences:

* The counter, *l*CCA, is used to monitor the number of unavailable DBT samples withing an evaluation window, WCCA\_DL. DBT samples outside of the evaluation window WCCA\_DL are discarded.
* If DRX cycle is not used then prior to each DBT window, the test equipment shall determine whether the DL CCA attempt is successful (i.e., the corresponding signals have to be transmitted), based on probability PCCA\_DL of successful DL CCA configured in the corresponding test case. If DRX cycle is not used, then the DL CCA model shall increment the counter *l*CCA for every unavailable DBT sample due to DL CCA failure.
* If DRX cycle is used, then the DL CCA model shall increment the counter, *l*CCA, once per DRX cycle for a DRX cycle if the first DBT sample in that DRX cycle is unavailable due to DL CCA failure. DL CCA failures in a DRX cycle are determined as follows:
* The test system *in the first DBT window of each DRX cycle* determines whether the DL CCA attempt is successful or not using the principle as follows:
  + If the DL CCA is successful then the test system shall transmit in all DBT windows within that DRX cycle.
  + If the DL CCA is not successful then the test system shall not transmit in any of the DBT windows within that DRX cycle. In this case *l*CCA is increased by 1.
* The parameters, LCCA\_DL, LCCA\_UL,WCCA\_DL and WCCA\_UL can be used as in non-DRX tests.

If the CCA attempt is successful for a transmission, then the test equipment shall transmit also other remaining transmissions, according to the configuration, within the same DBT window.

If the CCA attempt is not successful for a transmission within the DBT window, the test equipment shall determine whether the CCA attempt is successful for the next configured transmission, based on probability PCCA\_DL.

The probability can be different in different time intervals Ti during a test case. One probability value (per cell) applies at any time point during a test; one or more probability values can be configured in the entire test, one value PCCA\_DL per time interval Ti where i≥1, and the multiple time intervals (when i>1) do not overlap (e.g., PCCA\_DL=1.0 in T1 and PCCA\_DL=0.75 in T2).*.*

For semi-static channel access configuration, a single value PCCA\_DL is used to configure the probability of CCA success in different time intervals Ti during a test realization. An additional limit LCCA\_DL is used to determine the maximum number of unavailable DBT samples within an evaluation window WCCA\_DL. If the number of unavailable DBT samples on the last WCCA\_DL DBT samples is larger or equal to LCCA\_DL, the CCA attempt is considered successful for transmission.

For dynamic channel access configuration, the parameters PCCA\_DL\_1 and PCCA\_DL\_2 are used to configure the probability of CCA success on the first and second SSB candidate positions, respectively, in different time intervals Ti during a test realization. An additional limit LCCA\_DL is used to determine the maximum number of unavailable DBT samples within an evaluation window WCCA\_DL. If the number of unavailable DBT samples on the last WCCA\_DL DBT samples is larger or equal to LCCA\_DL, the CCA attempt is considered successful for transmission.

For semi-static channel access configuration or for dynamic channel access configuration where one candidate SSB position is modeled, prior to each discovery burst transmission window within a time interval Ti of the test, the test equipment shall:

1 - Generate a uniform random variable *p1* from the range [0, 1] for the first candidate position.

2 - Transmit the discovery burst based on *p1* in the first candidate position. If *p1* ≤ PCCA\_DL, the discovery burst is transmitted at the first candidate SSB location; else if *l*CCA is larger than or equal to LCCA\_DL, the discovery burst is transmitted at the first candidate SSB location, otherwise the discovery burst is muted. If DRX cycle is used, then the decision whether the discover burst is muted or not is repeated for the rest of the DRX cycle.

For dynamic channel access configuration where two candidate SSB positions are modelled, prior to each discovery burst transmission window within a time interval Ti of the test, the test equipment shall:

1 - Generate a uniform random variable *p1* from the range [0, 1] for the first candidate position.

2 - Transmit the discovery burst based on *p1* in the first candidate position: if *p1* ≤ PCCA\_DL1, the discovery burst is transmitted at first candidate SSB location, else the test equipment shall:

a - Generate a uniform random variable *p2* from the range [0, 1] for the second candidate SSB position.

b - Transmit the discovery burst based on *p2* in the second candidate position. If *p2* ≤ PCCA\_DL2, the discovery burst is transmitted at the second candidate SSB location; else if *l*CCA is larger than or equal to LCCA\_DL,the discovery burst is transmitted at the second candidate SSB location, otherwise the discovery burst is muted. If DRX cycle is used, then the decision whether the discover burst is muted or not is repeated for the rest of the DRX cycle.

The above steps are repeated for each discovery burst transmission window in each time interval Ti of the test. The limit LCCA\_DL and windowWCCA\_DL is a configuration parameter for each test case.

In many test cases, the requirement under a test depends on the number of configured SSB transmissions which are not available during the test due to CCA failure, so the test equipment shall track how many such signal occasions are not transmitted in DL during the test period.

**<End of modified section 11>**

**<Start of modified section 12>**

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

### A.3.13A.1 Introduction

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

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

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

- UE does not have to pass the test case

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

|  |  |
| --- | --- |
| Clause | Test case slogan |
| A.5.5.2.7 | E-UTRAN – NR FR2 interruptions at E-UTRA SRS carrier based switching |
| A.5.5.3.2 | SCell Activation and deactivation of known SCell in FR1 for 160ms SCell measurement cycle |
| A.5.5.3.5 | SCell Activation and deactivation of SCell in FR2 |
| A.5.5.3.6 | Multiple SCell Activation and deactivation of one unknown SCell and one known SCell in FR2 |
| A.5.5.6.4.2 | E-UTRAN – NR FR1 PSCell SCell dormancy switch of two FR2 SCells outside active time |

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

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

- UE does not have to pass the test case

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

|  |  |
| --- | --- |
| Clause | Test case slogan |
| A.7.5.3.2 | SCell Activation and deactivation for FR1+FR2 inter-band with target SCell in FR2 |
| A.7.5.6.1.2 | NR FR1- NR FR2 DL active BWP switch of PCell with non-DRX in SA |
| A.7.5.6.4.2 | NR FR1 PCell SCell dormancy switch of two FR2 SCells outside active time |
| A.7.6.2.5 | SA event triggered reporting tests for FR2 without SSB time index detection when DRX is not used (PCell in FR1) |
| A.7.6.2.6 | SA event triggered reporting tests for FR2 without SSB time index detection when DRX is used (PCell in FR1) |
| A.7.6.2.7 | SA event triggered reporting tests for FR2 with SSB time index detection when DRX is not used (PCell in FR1) |
| A.7.6.2.8 | SA event triggered reporting tests for FR2 with SSB time index detection when DRX is used (PCell in FR1) |

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

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

- UE does not have to pass the test case.

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

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

**<End of modified section 12>**

**<Start of modified section 13>**

###### A.4.5.6.3.1.2 Test Requirements

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

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

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

Depending on UE capability, UE shall finish BWP switch within the time duration *TMultipleBWPswitchDelay* defined in 8.6.2A.1.

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

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

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

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

The interruption of PCell shall not be longer than the interruption duration specified for active BWP switch in TS36.133 Clause 7.32.2.7.

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

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

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK in the DL slot right after DL slot (*i+ TMultipleBWPswitchDelay* +*k1*), (*j+ TMultipleBWPswitchDelay* +*k1*), then the UE shall use the next available uplink resource for reporting the corresponding ACK.

**<End of modified section 13>**

**<Start of modified section 14>**

#### A.5.5.2.8 E-UTRAN – NR FR2 interruptions at NR SRS carrier based switching

##### A.5.5.2.8.1 Test Purpose and Environment

The purpose of the test is to verify interruptions at NR SRS carrier based switching requirements defined in TS38.133 clause 8.2.1.2.12 and TS36.133 clause 7.32.2.13. The general test parameters are given in Table A.5.5.2.8.1-2, and NR cell specific test parameters are given in Table A.5.5.2.8.1-3. And the E-UTRAN cell specific test parameters can refer to Table A.3.7.2.2-1.

In the test there are three cells: Cell1, Cell2 and Cell3. Cell1 is LTE PCell, Cell2 is NR FR2 PSCell and Cell3 is NR FR2 SCell. Cell3 is not configured with PUCCH/PUSCH transmission. The test consists of two time periods, with duration of T1 and T2, respectively. During T1 and T2, Cell1, Cell2 and Cell3 are continuously scheduled in DL. Prior to the start of the time duration T1, Cell1 shall be configured as LTE PCell, Cell2 shall be configured as NR PSCell and Cell3 shall be configured as NR SCell.

At the beginning of T2, TE shall trigger aperiodic SRS transmission on Cell3.

Table A.5.5.2.8.1-1: Interruption at transitions between active and non-active during DRX supported test configurations

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

Table A.5.5.2.8.1-2: General test parameters for E-UTRAN – NR FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2 | One is E-UTRAN RF channel and the other is NR RF channel |
| Active PCell |  | Cell1 | PCell on E-UTRAN RF channel number 1. |
| Configured PSCell |  | Cell2 | PSCell on NR RF channel number 2. |
| Configured SCell |  | Cell3 | SCell on NR RF channel number 3. |
| CP length |  | Normal | Applicable to cell1 and cell 2 |
| DRX |  | OFF |  |
| Measurement gap pattern Id |  | OFF |  |
| T1 | s | 5 |  |
| T2 | s | 0.1 |  |

Table A.5.5.2.8.1-3: NR cell specific test parameters for E-UTRAN – NR FR2 interruptions at transitions between active and non-active during DRX in asynchronous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Cell 2 | Cell 3 |
| Frequency Range | |  | FR2 | |
| Duplex mode | Config 1,2 |  | TDD | |
| TDD configuration | Config 1,2 |  | TDDConf.3.1 | |
| BWchannel | Config 1,2 | MHz | 100: NRB,c = 66 | |
| Downlink initial BWP Configuration | Config 1,2 |  | DLBWP.0.1 | |
| Downlink dedicated BWP Configuration | Config 1,2 |  | DLBWP.1.1 | |
| Uplink initial BWP configuration | Config 1,2 |  | ULBWP.0.1 | |
| Uplink dedicated BWP configuration | Config 1,2 |  | ULBWP.1.1 | |
| TRS configuration | Config 1,2 |  | TRS.2.1 TDD | |
| SRS configuration | Config 1,2 |  | SRS.3 TDD | |
| TCI state | Config 1,2 |  | TCI.State.0 | |
| PDSCH Reference measurement channel | Config 1,2 |  | SR.3.1 TDD | |
| RMSI CORESET Reference Channel | Config 1,2 |  | CR.3.1 TDD | |
| RMC CORESET Reference Channel | Config 1,2 |  | CCR.3.1 TDD | |
| OCNG Patterns | |  | OP.1 | |
| SSB Configuration | |  | SSB.1 FR2 | |
| SMTC Configuration | Config 1,2 |  | SMTC.1 | |
| EPRE ratio of PSS to SSS | | dB | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  |  | |
| EPRE ratio of PBCH to PBCH DMRS | |  |  | |
| EPRE ratio of PDCCH DMRS to SSS | |  |  | |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |  | |
| EPRE ratio of PDSCH DMRS to SSS | |  |  | |
| EPRE ratio of PDSCH to PDSCH | |  |  | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |  | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |  | |
| Ês/Noc | | dB | 17 | |
| Propagation Condition | |  | AWGN | |
| Time offset to cell1 Note 2 | | μs | 33 | |
| 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: Receive time difference of signals received between subframe timing boundary of E-UTRA PCell and slot timing boundary of PSCell including time alignment error between the two cells | | | | |

Table A.5.5.2.8.1-3A: OTA related test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1 | |
|  |  | T1 | T2 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | |
| Assumption for UE beamsNote 6 |  | Fine | |
| Note1 | dBm/15kHzNote4 | -112 | |
| Note1 | dBm/SCSNote3 | -103 | |
|  | dB | 4 | |
| SS-RSRPNote2 | dBm/SCS Note4 | -99 | |
|  | dB | 4 | |
| IoNote2 | dBm/95.04 MHz Note4 | -68.5 | |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | |

Table A.5.5.2.8.1-4: Void

##### A.5.5.2.8.3 Test Requirements

In T2 UE shall transmit SRS on Cell3 as requested. During T2 interruption on Cell2 due to SRS carrier based switching from Cell2 to Cell3 shall not exceed the requirements defined in TS38.133 clause 8.2.1.2.12.

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

**<End of modified section 14>**

**<Start of modified section 15>**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| RF Channel Number |  | 1, 2, 3 | Two radio channels are used for this test. One for E-UTRA cell and two for NR Cell |
| Active PCell |  | Cell1 | PCell on RF channel number 1. As specified in clause A.3.7.2.2 |
| Active PSCell |  | Cell2 | PSCell on RF channel number 2. |
| Deconfigured deactivated SCell |  | Cell3 | Deconfigured deactivated secondary cell on RF channel number 3 |
| DRX |  | OFF | Continuous monitoring of PCell/PSCell |
| PRACH configuration on cell2 |  | FR2 configuration 2 | Captured in A.3.8.3.2 |
| PSCell CQI/PMI periodicity and offset configuration index |  | slot5 | CQI reporting for PSCell every uplink slot |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | Individual offset for cells on carrier frequency of cell1. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | Individual offset for cells on carrier frequency of cell2. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | Individual offset for cells on carrier frequency of cell3. |
| T1 | s | 7 | During this time the PCell/PSCell shall be known and cell3 is detected, and UE shall report a valid CQI for PCell/PSCell. |
| T2 | s | *Ndirect* | During this time the UE shall be configured with directly activated SCell1. |
| T3 | s | 1 | During this time the UE shall report a valid CQI for PCell/PSCell and SCell. |

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

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

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

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

##### A.5.5.3.7.2 Test Requirements

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

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

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

**<End of modified section 15>**

**<Start of modified section 16>**

###### A.5.5.6.1.1.2 Test Requirements

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

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

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

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

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

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

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK in the DL slot right after DL slot (*i+Y1*), (*j+Y2*), then the UE shall use the next available uplink resource for reporting the corresponding ACK.

**<End of modified section 16>**

**<Start of modified section 17>**

#### A.5.5.6.3 Simultaneous DCI-based and Timer-based Active BWP Switch on multiple CCs

##### A.5.5.6.3.1 E-UTRAN – NR PSCell FR2 and NR SCell FR2 DL active BWP switch on multiple CCs in synchronous EN-DC

###### A.5.5.6.3.1.1 Test Purpose and Environment

The purpose of this test is to verify the DL BWP switch on multiple CCs delay requirement defined in clause 8.6. Supported test configurations are shown in Table A.5.5.6.3.1.1-1.

The test scenario comprises of one E-UTRA PCell (Cell 1), and one NR PSCell (Cell 2) and one NR SCell (Cell 3) as given in Table A.5.5.6.3.1.1-2. Cell-specific parameters of E-UTRA PCell are specified in Table A.3.7.2.1-1 and Cell-specific parameters of NR PSCell and NR SCell is specified in Table A.5.5.6.3.1.1-3 below. The OTA related test parameters for FR2 is shown in Table A.5.5.6.3.1.1-4.

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

PDCCHs indicating new transmissions shall be sent continuously on PSCell (Cell 2) and SCell (Cell 3) to ensure that the UE would have ACK/NACK sending except for the time duration when BWP is switching on Cell 2 and Cell 3 and the time duration of T2.

Before the test starts,

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

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

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

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

All cells have constant signal levels throughout the test.

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

During T1,

Time period T1 starts when a DCI format 1\_1 command for PSCell DL BWP switch and a DCI format 1\_1 command for SCell DL BWP switch, sent from the test equipment to the UE simultaneously, are received at the UE side in PSCell and SCell slot # denoted *i*. The UE should switch its bandwidth part from BWP-1 to BWP-2 in PSCell and SCell.

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

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

During T2, the test equipment won’t transmit DCI format for PDSCH reception on PSCell (Cell 2) and SCell (Cell 3).

During T3,

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

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

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

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

Table A.5.5.6.3.1.1-1: DL BWP switch supported test configurations

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

Table A.5.5.6.3.1.1-2: General test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| E-UTRA RF Channel Number |  | 1 | One E-UTRA radio channel is used for this test |
| NR RF Channel Number |  | 2, 3 | Two NR radio channel is used for this test for PSCell and SCell |
| Active PCell |  | Cell 1 | PCell on RF channel number 1. |
| Active PSCell |  | Cell 2 | PSCell on RF channel number 2. |
| Active SCell |  | Cell 3 | SCell on RF channel number 3. |
| CP length |  | Normal |  |
| DRX |  | OFF | For both PCell, PSCell and SCell |
| *bwp-InactivityTimer* | ms | 200 |  |
| Cell-individual offset for cells on RF channel number 1 | dB | 0 | Individual offset for cells on PCC. |
| Cell-individual offset for cells on RF channel number 2 | dB | 0 | Individual offset for cells on PSCC. |
| Cell-individual offset for cells on RF channel number 3 | dB | 0 | Individual offset for cells on SCC. |
| Cell2 timing offset to cell1 | μs | 3 | Synchronous EN-DC |
| Cell3 timing offset to cell2 | μs | 3 | Synchronous Cells |
| T1 | s | 0.2 |  |
| T2 | s | 0.2 |  |
| T3 | s | 0.2 |  |

Table A.5.5.6.3.1.1-3: NR Cell specific test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | Cell 3 |
| Frequency Range |  | FR2 | FR2 |
| Duplex mode |  | TDD | TDD |
| TDD configuration |  | TDDConf.3.1 | TDDConf.3.1 |
| BWchannel |  | 100 MHz: NRB,c = 66 | 100 MHz: NRB,c = 66 |
| Active BWP ID |  | 1, 2 | 1, 2 |
| Initial DL BWP Configuration |  | DLBWP.0.2 Note 2 | DLBWP.0.2 Note 2 |
| Active DL BWP-1 Configuration |  | DLBWP.1.1 Note 2 | DLBWP.1.1 Note 2 |
| Active DL BWP-2 Configuration |  | DLBWP.1.3 Note 2 | DLBWP.1.3 Note 2 |
| Initial UL BWP Configuration |  | ULBWP.0.2 Note 2 | ULBWP.0.2 Note 2 |
| Active UL BWP-1 Configuration |  | ULBWP.1.1 Note 2 | ULBWP.1.1 Note 2 |
| Active UL BWP-2 Configuration |  | ULBWP.1.3 Note 2 | ULBWP.1.3 Note 2 |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | SR.3.1 TDD |
| RMSI CORESET parameters |  | CR.3.1 TDD | CR.3.1 TDD |
| Dedicated CORESET parameters |  | CCR.3.1 TDD | CCR.3.1 TDD |
| OCNG Patterns |  | OP.1 | OP.1 |
| SSB Configuration |  | SSB.1 FR2 | SSB.1 FR2 |
| SMTC Configuration |  | SMTC.1 | SMTC.1 |
| TCI State |  | TCI.State.0 | TCI.State.0 |
| TRS Configuration |  | TRS.2.1 TDD | TRS.2.1 TDD |
| Correlation Matrix and Antenna Configuration |  | 1x2 Low | 1x2 Low |
| EPRE ratio of PSS to SSS | dB | 0 | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH |  |  |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) |  |  |  |
| Propagation Condition |  | AWGN | AWGN |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: For unpaired spectrum, a DL BWP is linked with an UL BWP. DLBWP.0.2 is linked with ULBWP.0.2; DLBWP.1.1 is linked with ULBWP.1.1; DLBWP.1.3 is linked with ULBWP.1.3 defined in clause 12 of TS 38.213 [3]. | | | |

Table A.5.5.6.3.1.1-4: OTA related test parameters for DL BWP switch in synchronous EN-DC

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | Cell 3 |
| Angle of arrival configuration |  | Setup 1 according to clause A.3.15.1 | Setup 1 according to clause A.3.15.1 |
| Assumption for UE beamsNote 6 |  | Fine | Fine |
| NocNote 1 | dBm/15 kHz | -112 | -112 |
| NocNote 1 | dBm/SCS | -103 | -103 |
| SS-RSRP Note 2 | dBm/120 kHz Note3 | -85 | -85 |
| Ês/Iot | dB | 18 | 18 |
| IoNote2 | dBm/95.04 MHz Note4 | -56 | -56 |
| Note 1: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for Noc to be fulfilled.  Note 2: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port.  Note 4: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zone  Note 5: As observed with 0dBi gain antenna at the centre of the quiet zone.  Note 6: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation | | | |

###### A.5.5.6.3.1.2 Test Requirements

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

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

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

Depending on UE capability *bwp-SwitchingDelay* and *bwp-SwitchingMultiCCs-r16* [2], UE shall finish BWP switch within the time duration *TMultipleBWPswitchDelay* defined in TS 38.133 caluse 8.6.2A and 8.6.2B

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

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

NOTE: During T1, T3 if there are no uplink resources for reporting the ACK in the DL slot right after DL slot (*i+Y1*), (*j+Y2*), then the UE shall use the next available uplink resource for reporting the corresponding ACK.

**<End of modified section 17>**

**<Start of modified section 18>**

#### A.5.5.6.4 SCell dormancy switch

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

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

The purpose of this test is to verify

1) the interruption due to RRM and CSI measurement during SCell dormancy on spCell is within the limits specified in clause 8.2.1.2.15.2 and 8.2.1.2.15.3 for NR victim cell, and

2) the SCell dormancy switch delay is within the requirement defined in clause 8.6.2, and the SCell dormancy switch interruption is within the limits defined in clause 8.2.1.2.15.1 for NR victim cell.

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

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

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

Before the test starts,

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

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

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

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

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

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

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

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

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

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

|  |  |
| --- | --- |
| Config | Description |
| 1 | LTE FDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE TDD, NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: A UE which fulfils the requirements in test case in clause A.5.5.6.4.2 can skip the test cases in current clause A.5.5.6.4.1.  Note 3: NR configuration is the same for PSCell and SCells. | |

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

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

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

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

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

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

###### A.5.5.6.4.1.2 Test Requirements

During T1, any interruption on PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell.

During T2, interruptions on PSCell due to CSI and RRM measurements on dormant SCell shall be within the interruption rate requirements specified in 8.2.1.2.15.1 for NR victim cell.

During T3, any interruption on PSCell due to dormancy switching of SCell shall be within the requirement specified in in clause 8.2.1.2.15.1 for NR victim cell. Monitoring of PDCCH for SCell in PSCell shall be resumed within the dormancy switching time specified in clause 8.6.2A.

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

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

**<End of modified section 18>**

**<Start of modified section 19>**

A.4.5.6.1.1.2 Test Requirements

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

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

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

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

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

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

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

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

The interruption of PCell shall not be longer than the interruption duration specified for active BWP switch in TS36.133 Clause 7.32.2.7.

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

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

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

**<End of modified section 19>**

**<Start of modified section 20>**

A.4.5.6.1.2.2 Test Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

*Editor’s note: FFS value of k1 for type 1 and type 2 UE.*

**<End of modified section 20>**

**<Start of modified section 21>**

A.5.5.6.1.2.2 Test Requirements

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

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

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

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

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

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

The interruption of PCell shall not be longer than the interruption duration specified for active BWP switch in TS36.133 Clause 7.32.2.7.

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

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

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

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

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

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

*Editor’s note: FFS value of k1 for type 1 and type 2 UE.*

**<End of modified section 21>**

**<Start of modified section 22>**

###### A.5.5.6.4.2.2 Test Requirements

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

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

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

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

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

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

**<End of modified section 22>**

**<Start of modified section 23>**

A.10.3.5.2.1.2 Test Requirements

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

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

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

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

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

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

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

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

The interruption of PCell shall not be longer than the interruption duration specified for active BWP switch in TS36.133 Clause 7.32.2.7.

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

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

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

**<End of modified section 23>**

**<Start of modified section 24>**

A.10.3.5.2.2.2 Test Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

*Editor’s note: FFS value of k1 for type 1 and type 2 UE.*

**<End of modified section 24>**

**<Start of modified section 25>**

#### A.6.6.7.2 Identification of a new CGI of inter-RAT E-UTRA cell using autonomous gaps in NR SA

##### A.6.6.7.2.1 Test Purpose and Environment

This test is to verify the requirement for identification of a new CGI of E-UTRA cell with autonomous gaps in NR SA in clause 9.4.7.

The test scenario comprises of one NR carrier and an E-UTRA carrier and two cells as given in tables A.6.6.7.2.1-1, A.6.6.7.2.1-2, A.6.6.7.2.1-3 and A.6.6.7.2.1-4. PDCCHs indicating new transmissions shall be sent continuously to ensure that the UE would have ACK/NACK sending during identifying a new CGI of E-UTRAN cell. The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE does not have any timing information of cell 2. Starting T2, cell 2 becomes detectable and the UE is expected to detect and send a measurement report.

A RRC message implying SI reading shall be sent to the UE during period T2, after the UE has reported Event B2. The RRC message shall create a measurement report configuration with purpose *reportCGI* and *useAutonomousGaps* set to TRUE. The start of T3 is the instant when the last TTI containing the RRC message implying SI reading is sent to the UE.

**Table A.6.6.7.2.1-1: Supported test configurations of inter-RAT E-UTRAN cell using autonomous gap in SA**

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

Table A.6.6.7.2.1-2: General test parameters for identification of a new CGI of inter-RAT E-UTRA cell using autonomous gaps in NR SA

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| NR RF Channel Number |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number |  | 2 | 1 LTE carrier frequency is used in the test |
| Active cell |  | Cell 1 |  |
| Neighbour cell |  | Cell 2 | Cell to be identified. |
| LTE Channel Bandwidth | MHz | 10 |  |
| LTE PDSCH/PCFICH/PDCCH/PHICH parameters |  |  | As specified in clause A.3.7.2.1 |
| CP length |  | Normal |  |
| Hysteresis | dB | 0 |  |
| Time To Trigger | s | 0 |  |
| Filter coefficient |  | 0 | L3 filtering is not used |
| DRX |  | OFF |  |
| *useAutonomousGaps* |  | TRUE | As specified in clause 5.5.3.1 in TS 38.331. |
| Time offset between cells | ms | 3 | Asynchronous cells |
| T1 | s | 5 |  |
| T2 | s | ≤10 |  |
| T3 | s | 5 |  |

**Table A.6.6.7.2.1-3: PCell specific test parameters for identification of a new CGI of inter-RAT E-UTRA cell using autonomous gaps in NR**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Configuration** | **Cell 1** | | | | |
|  | **T1** | | **T2** | **T3** | |
| RF channel number | | |  | 1, 2, 3, 4, 5, 6 | 1 | | | | |
| Duplex mode | | |  | 1, 2, 3 | FDD | | | | |
| 4, 5, 6 | TDD | | | | |
| TDD Configuration | | SCS=15 KHz |  | 2, 5 | TDDConf.1.1 | | | | |
| SCS=30 KHz |  | 3, 6 | TDDConf.2.1 | | | | |
| BWchannel | | | MHz | 1, 4 | 10: NRB,c = 52 (FDD) | | | | |
| 2, 5 | 10: NRB,c = 52 (TDD) | | | | |
| 3, 6 | 40: NRB,c = 106 (TDD) | | | | |
| PDSCH reference measurement channel | | |  | 1, 4 | SR.1.1 FDD | | | | |
| 2, 5 | SR.1.1 TDD | | | | |
| 3, 6 | SR.2.1 TDD | | | | |
| CORSET reference channel | | |  | 1, 4 | CR.1.1 FDD | | | | |
| 2, 5 | CR.1.1 TDD | | | | |
| 3, 6 | CR.2.1 TDD | | | | |
| BWP configurations | Initial DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.0.1 | | | | |
| Dedicated DL BWP | |  | 1, 2, 3, 4, 5, 6 | DLBWP.1.1 | | | | |
| Initial UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.0.1 | | | | |
| Dedicated UL BWP | |  | 1, 2, 3, 4, 5, 6 | ULBWP.1.1 | | | | |
| OCNG patternNote1 | | |  | 1, 2, 3, 4, 5, 6 | OP.1 | | | | |
| SMTC configuration | | |  | 1, 2, 3, 4, 5, 6 | SMTC.1 | | | | |
| SSB configuration | | |  | 1, 2, 4, 5 | SSB.1 FR1 | | | | |
| 3, 6 | SSB.2 FR1 | | | | |
| b2-Threshold1 | | | dBm | 1, 2, 4, 5 | -98 | | | | |
| 3, 6 | -95 | | | | |
| b2-Threshold2EUTRA | | | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -109 | | | | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2, 3, 4, 5, 6 | 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 SSS | | |
| EPRE ratio of OCNG to OCNG DMRS | | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2, 3, 4, 5, 6 | -106 | | | | |
| *Noc*Note2 | | | dBm/SCS | 1, 2, 4, 5 | -106 | | | | |
| 3, 6 | -103 | | | | |
| Ês/Noc | | | dB | 1, 2, 3, 4, 5, 6 | 18 | -2 | | | -2 |
| Ês/IotNote3 | | | dB | 1, 2, 3, 4, 5, 6 | 18 | -2 | | | -2 |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88 | -108 | | | -108 |
|  | | | 3, 6 | -85 | -105 | | | -105 |
| SSB\_RPNote3 | | | dBm/SCS | 1, 2, 4, 5 | -88 | -108 | | | -108 |
|  | | | 3, 6 | -85 | -105 | | | -105 |
| IoNote3 | | | dBm/9.36 MHz | 1, 2, 4, 5 | -59.98 | -75.92 | | | -75.92 |
| dBm/38.16 MHz | 3, 6 | -53.88 | -69.82 | | | -69.82 |
| Propagation condition | | |  | 1, 2, 3, 4, 5, 6 | AWGN | | | | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2, 3, 4, 5, 6 | 1x2 Low | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | | | | |

Table A.6.6.7.2.1-4: Cell specific test parameters for inter-RAT E-UTRAN cell for identification of a new CGI of E-UTRA cell using autonomous gaps

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Configuration** | **Cell 2** | | |
| **T1** | **T2** | **T3** |
| RF channel number |  | 1, 2, 3, 4, 5, 6 | 2 | | |
| Duplex mode |  | 1, 2, 3 | FDD | | |
| 4, 5, 6 | TDD | | |
| TDD special subframe configurationNote1 |  | 4, 5, 6 | 6 | | |
| TDD uplink-downlink configurationNote1 |  | 4, 5, 6 | 1 | | |
| BWchannel | MHz | 1, 2, 3, 4, 5, 6 | 10 MHz: NRB,c = 50 | | |
| PDSCH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 10 MHz: R.3 FDD | | |
| 4, 5, 6 | 10 MHz: R.0 TDD | | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote2 |  | 1, 2, 3 | 10 MHz: R.6 FDD | | |
| 4, 5, 6 | 10 MHz: R.6 TDD | | |
| OCNG PatternsNote2 |  | 1, 2, 3 | 10 MHz: OP.10 FDD | | |
| 4, 5, 6 | 10 MHz: OP.1 TDD | | |
| PBCH\_RA | dB | 1, 2, 3, 4, 5, 6 | 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, 3, 4, 5, 6 | -106 | | |
| Ês/Noc | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 7 | 7 |
| Ês/IotNote5 | dB | 1, 2, 3, 4, 5, 6 | -Infinity | 7 | 7 |
| RSRPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -99 | -99 |
| SCH\_RPNote5 | dBm/15kHz | 1, 2, 3, 4, 5, 6 | -Infinity | -99 | -99 |
| Propagation Condition |  | 1, 2, 3, 4, 5, 6 | AWGN | | |
| Antenna Configuration and Correlation Matrix |  | 1, 2, 3, 4, 5, 6 | 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, and SCH\_RP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | |

**<End of modified section 25>**

**<Start of modified section 26>**

##### A.6.6.7.2.2 Test Requirements

The UE shall transmit a measurement report containing the cell global identifier of cell 2 within 200 milliseconds from the start of T3.

Test requirement = RRC Procedure delay with additional margin + Tidentify\_CGI,E-UTRAN + reporting delay

= 15 + 30 + 150 + 2ms from the start of T3

= 197 ms, allow 200 ms.

- The UE shall be scheduled continuously throughout the test, and from the start of T3 until 200 ms at least the number of ACK/NACK specified in NOTE 2 shall be detected as being transmitted by the UE.

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

NOTE 1: 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.

NOTE 2: The overall ACK/NACK number is caused by two parts. Firstly, at least X ACK/NACK shall be sent during identifying the cell global identifier of cell 2, where X is defined in Table 8.2.2.2.15-1 . Secondly, given that continuous DL data allocation, additional 20/40 ACK/NACK shall be sent from the start of T3 until 200 ms excludes 150 ms for identifying the cell global identifier of cell 2.

**<End of modified section 26>**

**<Start of modified section 27>**

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, A.4.5.5.2.1-3 and A.10.3.4.2.1-4 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** | **Test 2** |  |
| Active E-UTRA PCell | | | | |  | Cell 1 | Cell 1 |  |
| E-UTRA RF Channel Number | | | | |  | 1 | 1 |  |
| Active PSCell | | | | |  | Cell 2 | Cell 2 |  |
| RF Channel Number | | | | |  | 2 | 2 |  |
| DL CCA model | | | | |  | As specified in A.3.26.2.1 | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | |  | As specified in A.3.26.2.2 | As specified in A.3.26.2.2 |  |
| Duplex mode | | | | Config 1, 2 |  | TDD | TDD |  |
| BWchannel | | | | Config 1, 2 | MHz | 40: NRB,c = 106 | 40: NRB,c = 106 |  |
| DL initial BWP configuration | | | | Config 1, 2 |  | DLBWP.0.1 | DLBWP.0.1 |  |
| DL dedicated BWP configuration | | | | Config 1, 2 |  | DLBWP.1.1 | DLBWP.1.1 |  |
| UL initial BWP configuration | | | | Config 1, 2 |  | ULBWP.0.1 | ULBWP.0.1 |  |
| UL dedicated BWP configuration | | | | Config 1, 2 |  | ULBWP.1.1 | ULBWP.1.1 |  |
| TDD configuration | | | | Config 1, 2 |  | TDDConf.1.1 CCA | TDDConf.1.1 CCA |  |
| CORESET Reference Channel | | | | Config 1, 2 |  | CR.1.1 CCA | CR.1.1 CCA |  |
| SSB Configuration | | | | Config 1, 2 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |
| DBT Window Configuration | | | | Config 1, 2 |  | DBT.1 | DBT.1 |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1, 2 |  | 30 KHz | 30 KHz |  |
| PRACH Configuration | | | | Config 1, 2 |  | Table A.3.8.2.2-1 | Table A.3.8.2.2-1 |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 | 0 |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 | 1 |  |
| OCNG parameters | | | | |  | OP.1 | OP.1 |  |
| CP length | | | | |  | Normal | Normal |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low | 2x2 Low |  |
| Beam failure | | DCI format | | |  | 1-0 | 1-0 |  |
| detection transmission parameters | | Number of Control OFDM symbols | | |  | 2 | 2 |  |
|  | | Aggregation level | | | CCE | 8 | [2] |  |
|  | | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | | dB | 0 | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | | dB | 0 | 0 |  |
|  | | DMRS precoder granularity | | |  | REG bundle size | REG bundle size |  |
|  | | REG bundle size | | |  | 6 | 6 |  |
| DRX | | | | |  | DRX.7 | DRX.7 | A.3.3.7 |
| Gap pattern ID | | | | |  | N.A. | N.A. |  |
| gapOffset | | | | |  | 0 | 0 |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent | 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 | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 | n1 | see TS 38.321 [7], clause 5.17 |
| beamFailureDetectionTimer | | | | |  | pbfd4 | 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.2.1 TDD |  |
| CSI-RS for tracking | | | Config 1, 2 | |  | TRS.1.2 TDD | TRS.1.2 TDD |  |
| SSB Index assigned as RLM RS | | | | |  | 0,1 | 0,1 |  |
| T310 timer | | | | | ms | [1000] | [1000] |  |
| N310 | | | | |  | [2] | [2] |  |
| T1 | | | | | s | [1] | [1] | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | [9.01] | [8.37] |  |
| T3 | | | | | s | [5.16] | [4.52] |  |
| T4 | | | | | s | [0] | [0] |  |
| T5 | | | | | s | [3.89] | [3.39] |  |
| D1 | | | | | s | [3.85] | [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 | Semi-static channel access PCCA\_DLNote 10, 12 | |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | Dynamic channel access, PCCA\_DL\_1/PCCA\_DL\_2  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 | 3 | | | |
| 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 channel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1, where LCBD,max=3 for TDRX > 320. | | | | | | | | |

**Table A.10.3.4.2.1-4: Cell specific test parameters for FR1 PSCell for SSB-based beam failure detection and link recovery testing in DRX mode**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Test 2** | | | | |
|  | | |  | **T1** | **T2** | **T3** | **T4** | **T5** |
| DL CCA probability PCCA\_DL | | Semi-static channel access PCCA\_DLNote 10, 12 |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | | Dynamic channel access, PCCA\_DL\_1/PCCA\_DL\_2  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 | 3 | | | |
| 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 | [2] | [-4] | [-4] | [-4] |
| 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 channel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1, where LCBD,max=3 for TDRX > 320. | | | | | | | | |

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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.

In Test 1, the UE is verified to meet the beam failure detection for BFD-RS SSB Es/Iot < -7 dB.

In Test 2, the UE is verified to meet the beam failure detection for BFD-RS SSB Es/Iot ≥ -7 dB.

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 modified section 27>**

**<Start of modified section 28>**

#### 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 ms | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 ms | | 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 ms | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 ms | | | | 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 | | | |
| 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. | | | | | | | | | | | |

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 ms | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 ms | | 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 ms | | | | Synchronous EN-DC |
| Time offset between serving and neighbour cells |  | Config 1,2 | 3 ms | | | | 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 | | | |
| LCCA\_DL | |  | Config 1,2 | 2 | | | | 2 | | | |
| 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. | | | | | | | | | | | |

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 ms | | 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 ms | | 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 ms | | | | 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 ms | | | | 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 | | | |
| 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. | | | | | | | | | | | |

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 ms | | 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 ms | | 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 ms | | | | 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 ms | | | | 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 | | | |
| LCCA\_DL | |  | Config 1,2,3,4,5,6 | 2 | | | | 2 | | | |
| 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. | | | | | | | | | | | |

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 modified section 27>**

**<Start of modified section 28>**

#### 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, A.11.4.4.2.1-3 and A.11.4.4.2.1-4 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.11.4.4.2.1-1 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: The UE is only required to pass in one of the supported test configurations in FR1 | |

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 | Test 2 |  |
| Active PSCell | | | | |  | Cell 1 | Cell 1 |  |
| RF Channel Number | | | | |  | 1 | 1 |  |
| DL CCA model | | | | |  | As specified in A.3.26.2.1 | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | |  | As specified in A.3.26.2.2 | As specified in A.3.26.2.2 |  |
| Duplex mode | | | | Config 1 |  | TDD | TDD |  |
| BWchannel | | | | Config 1 | MHz | 40: NRB,c = 106 | 40: NRB,c = 106 |  |
| DL initial BWP configuration | | | | Config 1 |  | DLBWP.0.1 | DLBWP.0.1 |  |
| DL dedicated BWP configuration | | | | Config 1 |  | DLBWP.1.1 | DLBWP.1.1 |  |
| UL initial BWP configuration | | | | Config 1 |  | ULBWP.0.1 | ULBWP.0.1 |  |
| UL dedicated BWP configuration | | | | Config 1 |  | ULBWP.1.1 | ULBWP.1.1 |  |
| TDD Configuration | | | | Config 1 |  | TDDConf.1.1 CCA | TDDConf.1.1 CCA |  |
| CORESET Reference Channel | | | | Config 1 |  | CR.1.1 CCA | CR.1.1 CCA |  |
| SSB Configuration | | | | Config 1 |  | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access | SSB.3 CCA for semi-static channel access  SSB.4 CCA for dynamic channel access |  |
| DBT Window Configuration | | | | Config 1 |  | DBT.1 | DBT.1 |  |
| PDSCH/PDCCH subcarrier spacing | | | | Config 1 |  | 30 KHz | 30 KHz |  |
| PRACH Configuration | | | | Config 1 |  | Table A.3.8.2.2-1 | Table A.3.8.2.2-1 |  |
| SSB Index assigned as BFD RS (q0) | | | | |  | 0 | 0 |  |
| SSB Index assigned as CBD RS (q1) | | | | |  | 1 | 1 |  |
| OCNG parameters | | | | |  | OP.1 | OP.1 |  |
| CP length | | | | |  | Normal | Normal |  |
| Correlation Matrix and Antenna Configuration | | | | |  | 2x2 Low | 2x2 Low |  |
| Beam failure detection transmission parameters | | DCI format | | |  | 1-0 | 1-0 |  |
|  | | Number of Control OFDM symbols | | |  | 2 | 2 |  |
|  | | Aggregation level | | | CCE | 8 | [2] |  |
|  | | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | | | dB | 0 | 0 |  |
|  | | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | | | dB | 0 | 0 |  |
|  | | DMRS precoder granularity | | |  | REG bundle size | REG bundle size |  |
|  | | REG bundle size | | |  | 6 | 6 |  |
| DRX | | | | |  | DRX.7 | DRX.7 | A.3.3.7 |
| Gap pattern ID | | | | |  | N.A. | N.A. |  |
| gapOffset | | | | |  | 0 | 0 |  |
| rlmInSyncOutOfSyncThreshold | | | | |  | absent | 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 | -95 | Threshold used for Qin\_LR\_SSB |
| powerControlOffsetSS | | | | |  | db0 | db0 | Used for deriving rsrp-ThresholdCSI-RS |
| beamFailureInstanceMaxCount | | | | |  | n1 | n1 | see clause 5.17 of TS 38.321 [7] |
| beamFailureDetectionTimer | | | | |  | pbfd4 | 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.2.1 TDD |  |
| CSI-RS for tracking | | | Config 1 | |  | TRS.1.2 TDD | TRS.1.2 TDD |  |
| SSB Index assigned as RLM RS | | |  | |  | 0, 1 | 0, 1 |  |
| T310 Timer | | |  | | ms | [1000] | [1000] |  |
| N310 | | |  | |  | [2] | [2] |  |
| T1 | | | | | s | [1] | [1] | During this time the the UE shall be fully synchronized to cell 1 |
| T2 | | | | | s | [9.01] | [8.37] |  |
| T3 | | | | | s | [5.16] | [4.52] |  |
| T4 | | | | | s | [0] | [0] |  |
| T5 | | | | | s | [3.89] | [3.89] |  |
| D1 | | | | | s | [3.85] | [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\_DL | | Semi-static channel access PCCA\_DLNote 10, 12 |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | | Dynamic channel access, PCCA\_DL\_1/PCCA\_DL\_2  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 | 3 | | | |
| 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 channel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1, where LCBD,max=3 for TDRX > 320. | | | | | | | | |

Table A.11.4.4.2.1-4: Cell specific test parameters for FR1 PCell for SSB-based beam failure detection and link recovery testing in DRX mode

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test 2 | | | | |
|  | | |  | T1 | T2 | T3 | T4 | T5 |
| DL CCA probability PCCA\_DL | | Semi-static channel access PCCA\_DLNote 10, 12 |  | 1.0 | 0.9375 | 0.9375 | 0.9375 | 0.9375 |
|  | | Dynamic channel access, PCCA\_DL\_1/PCCA\_DL\_2  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 | 3 | | | |
| 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 | [2] | [-4] | [-4] | [-4] |
| 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 channel access, the UE can be tested under dynamic channel occupancy only.  Note 13: As defined in Table 8.5A.5.2-1, where LCBD,max=3 for TDRX > 320. | | | | | | | | |

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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.

In Test 1, the UE is verified to meet the beam failure detection for BFD-RS SSB Es/Iot < -7 dB.

In Test 2, the UE is verified to meet the beam failure detection for BFD-RS SSB Es/Iot ≥ -7 dB.

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 modified section 28>**

**<Start of modified section 29>**

#### 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 | 3ms | | 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 | 3ms | | | | 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 | | | |
| 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. | | | | | | | | | | | | | |

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 | 3ms | | 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 | 3ms | | | | 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 | | | |
| LCCA\_DL | | |  | Config 1 | 2 | | | | | 2 | | | |
| 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. | | | | | | | | | | | | | |

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 | 3ms | | 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 | 3ms | | | | 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 | | | |
| 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. | | | | | | | | | | | | |

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 | 3ms | | 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 | 3ms | | | | 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 | | | |
| LCCA\_DL | | |  | Config 1,2,3 | 2 | | | | 2 | | | |
| 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. | | | | | | | | | | | | |

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 modified section 29>**

**<Start of modified section 30>**

#### 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 | 3ms | | 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 | 3ms | | | | 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 | |
| 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. | | | | | | | | | | |

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 | 3ms | | 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 | 3ms | | | | 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 | |
| LCCA\_DL | | |  | Config 1,2,3 | Not Applicable | | 2 | | 2 | |
| 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. | | | | | | | | | | |

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 modified section 30>**