**3GPP TSG-RAN4 Meeting #100-e *R4-2115463***

**Online, , 16th Aug 2021 - 27th Aug 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **2210** | **rev** | **-** | **Current version:** | **17.2.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Big CR to TS 38.133: NR\_unlic maintenance Part 1 (Rel-17) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Perf | | | | |  | ***Date:*** | | | 2021-08-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This big CRs merge the mutile endorsed draf CRs. The reason for change in each endorsed draft CR is copied below.  R4-2115417/ R4-2113465 Draft CR: Correction of RMC for NR-U test cases   * SNR test points of NR-U RLM/BFD test cases for 4Rx UEs are TBD.   R4-2114103/ R4-2114104 CR on CORESET RMC for NR-U R16   * For TC with DLBWP.0.2 and CCR.1.1 with 24 RBs, it is identified that there is issue to fully contain the RMC CORESET within the DL BWP as elaborated in R4-2110764. Thus, it is suggested to add a new RMC CORESET with 18 RBs as configuration of CCR.2.3 in licensed operation.   R4-2115287/R4-2114106 CR on TC of cell reselection for NR-U R16   * According to the S criteria in TS 38.304, UE may choose not to perform cell intra-frequency reselection when Srxlev> SIntraSearchP. According to current configuration, Srxlev is calculated as 55 dB > intraSearchP(50dB), which means the test can not be conduced. * SintrasearchP and SnonintrasearchP should be configured for both Cell 1 and Cell2. * SMTC configuration should be provided. * The note should be added to state that the UE is only required to be tested in one of the supported test configurations. * Io is not correct which could not be –infinity * Es/Iot in A.11.1.3.1.2-3 is not defined * Typos are fixed   R4-2115288/R4-2114108 CR on TC of HO for NR-U R16   1. Dedicated CORESET RMC configuration is missing in A.11.2.1.1 to A.11.2.1.8 2. RMSI CORESET RMC configuration is TBD in A.11.2.1.6 to A.11.2.1.8 3. The DL CCA probability and UL CCA probability are not aligned with the lastest agreements. in A.11.2.1.4 to A.11.2.1.8 4. The CCA model is not defined for LBE and FBE in A.11.2.1.5 5. PRACH configuration is not defined for CCA operation 6. The note should be added to state that the UE is only required to be tested in one of the supported test configurations 7. CCA probability, PRACH configuration is not defined in A.12.2.1.1 8. Noc configuration in A.12.2.1.1 is not correct 9. According to the agreements in RAN4#99e, the applicability rule should be added for HO from NR-U to E-UTRA   Typos need to be fixed  R4-2115289/ R4-2113231 Draft CR Correction of Handover TCs   * Update Handover TCs with CCA according to the agreements from the pervious RAN4 meeting.   R4-2115290/ R4-2114434 Correction to RRC re-establishment tests for NR-U in 38.133   * To correct parameters in the test cases verifying the RRC re-establishment requirements for carrier subject to CCA   R4-2115291/ R4-2113233 Draft CR RRC Re-establishment with CCA   * Correction of RRC re-establishment TCs   R4-2115292/ R4-2114436 Correction to RRC re-direction tests for NR-U in 38.133   * To correct parameters in the test cases verifying the RRC re-direction requirements for carrier subject to CCA.   R4-2115293/ R4-2114112 CR on TC of RRC Release with Redirection for NR-U R16/R17   * DL and UL CCA probability configurations are missing in A.11.2.2.3.2 * Dedicated CORESET RMC are not defined in A.11.2.2.3.1/2 * Typos need to be fixed   R4-2115294/ R4-2113469 Draft CR: Correction of random access procedure test cases for NR-U   * Parameter values are in square brackets | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | R4-2115417/ R4-2113465 Draft CR: Correction of RMC for NR-U test cases   * Decrease SNR levels by 3dB for T3 and 3.5dB for T4 for RLM with 4Rx as same as Rel-15 test cases. * Decrease SNR levels by 3dB for T3/T4/T5 for BFD with 4Rx UEs as same as Rel-15 test cases.   R4-2114103/ R4-2114104 CR on CORESET RMC for NR-U R16   * Add new RMC CORESET CCR.1.3 CCA.   R4-2115287/R4-2114106 CR on TC of cell reselection for NR-U R16   * Change Qrxlevmin to -127 in A.11.1.1 * Provide configurations of SintrasearchP and SnonintrasearchP * Provide STMC configurations * Add the note that UE is only required to be tested in one configurations when multiple configurations are provided * Correct the Io value * Define Es/Iot in A.11.1.3.1.2-3. * Fix some typos   R4-2115288/R4-2114108 CR on TC of HO for NR-U R16   1. Add dedicated CORESET RMC configuration in A.11.2.1.1 to A.11.2.1.8 2. Add RMSI CORESET RMC configuration in A.11.2.1.6 to A.11.2.1.8 3. Correct DL CCA probability and UL CCA probability in A.11.2.1.4 to A.11.2.1.8 4. Add CCA model in A.11.2.1.5 5. Add PRACH configuration 6. Add CCA probability, PRACH configuration in A.12.2.1.1 7. Correct Noc configuration in A.12.2.1.1. 8. Add note that the UE is only required to be tested in one of the supported test configurations 9. Add note in A.11.2.1.7 and A.11.2.1.8 about the applicability rule   Typos fixed  R4-2115289/ R4-2113231 Draft CR Correction of Handover TCs   * Definition of CCA parameters according to agreements in the last meeting. * Corection of the interuption time. Clarification of the need for only one out of the two possible configurations needing to be tested.   R4-2115290/R4-2114434 Correction to RRC re-establishment tests for NR-U in 38.133   * PRACH configuration is defined or corrected. The correct one is FR1 PRACH configuration 1 under CCA used for SSB-based contention based random access in FR1 is used. It is defined in Table A.3.8A.2.1-1. * Brackets are removed from test times and signal levels and some configuration parameters. * Io, No and Es/No values are corrected. * Testing requirement is corrected.   Testing requirement is corrected.  R4-2115291/R4-2113233 Draft CR RRC Re-establishment with CCA   * Update testing time in accordance to agreement in the previous meeting. * Definition of re-establishment delay * Correction of test parameters in accordance to CCA configurations.   R4-2115292 Correction to RRC re-direction tests for NR-U in 38.133  The following corrections are done:   * Following missing CCA failure probabilies are defined in one test:   + PCCA\_DL for dynamic channel access and PCCA\_DL for semi-static channel access   + PCCA\_UL for dynamic channel access and PCCA\_UL for semi-static channel access * FR1 PRACH configuration 1 in Table A.3.8A.2.1-1 is stated. * Brackets are removed from some configuration parameters. * Missing notes related to dynamic channel access and semi-static channel access are added.   Test requirement is corrected.  R4-2115293/R4-2114112 CR on TC of RRC Release with Redirection for NR-U R16   * Add DL and UL CCA probability configurations in A.11.2.2.3.2 * Add Dedicated CORESET RMC in A.11.2.2.3.1/2 * Typos are fixed   R4-2115294 Draft CR: Correction of random access procedure test cases for NR-U   * Removal of square brackets * Correction for CCA models. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | R4-2115417/ R4-2113465 Draft CR: Correction of RMC for NR-U test cases   * TE cannot set SNR test points for NR-U RLM/BFD tests for NR-U.   R4-2114103/ R4-2114104 CR on CORESET RMC for NR-U R16   * The test cases are wrong   R4-2115287/R4-2114106 CR on TC of cell reselection for NR-U R16   * The test cases are wrong   R4-2115288/R4-2114108 CR on TC of HO for NR-U R16   * The test cases are wrong   R4-2115289/ R4-2113231 Draft CR Correction of Handover TCs   * Incomplete configuration for Handover test case with CCA.   R4-2115290/ R4-2114434 Correction to RRC re-establishment tests for NR-U in 38.133   * The RRC re-establishment in NR-U cannot be tested or tests will be done with incorrect parameters   R4-2115291/ R4-2113233 Draft CR RRC Re-establishment with CCA   * Incorrect test cases for RRB re-establishment   R4-2115292/ R4-2114436 Correction to RRC re-direction tests for NR-U in 38.133   * The RRC re-rediection in NR-U cannot be tested or tests will be done with incorrect parameters.   R4-2115293/ R4-2114112 CR on TC of RRC Release with Redirection for NR-U R16/R17   * The test cases are wrong   R4-2115294/ R4-2113469 Draft CR: Correction of random access procedure test cases for NR-U   * NR-U random access test cases are not complete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | R4-2115417/ R4-2113465 Draft CR: Correction of RMC for NR-U test cases   * A.3.6A   R4-2114103/ R4-2114104 CR on CORESET RMC for NR-U R16   * A.3.1A.3   R4-2115287/R4-2114106 CR on TC of cell reselection for NR-U R16   * A.11.1.1, A.11.1.2, A.11.1.3, A.11.1.4   R4-2115288/R4-2114108 CR on TC of HO for NR-U R16   * A.11.2.1.1 to A.11.2.1.8   R4-2115289/ R4-2113231 Draft CR Correction of Handover TCs   * A.12.2.1   R4-2115290/ R4-2114434 Correction to RRC re-establishment tests for NR-U in 38.133   * A.11.2.2.1.3.1 and A.11.2.2.1.4.1   R4-2115291/ R4-2113233 Draft CR RRC Re-establishment with CCA   * A.11.2.2.1.1   R4-2115292/ R4-2114436 Correction to RRC re-direction tests for NR-U in 38.133   * A.11.2.2.3.2.2.   R4-2115293/ R4-2114112 CR on TC of RRC Release with Redirection for NR-U R16   * A.11.2.2.3.1   R4-2115294/ R4-2113469 Draft CR: Correction of random access procedure test cases for NR-U   * A.10.1.1.1, A.11.2.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### <Start of Change (from R4-2114104)>

### A.3.1A.3 CORESET for RMC scheduling

#### A.3.1A.3.1 TDD

Table A.3.1A.3.1-1: Control Channel RMC with SCS=30KHz

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | | | |
| Reference channel |  | CCR.1.1 CCA | CCR.1.2 CCA | CCR.1.3 CCA |  |  |  |  |
| Channel bandwidth | MHz | 40 | 40 | 40 |  |  |  |  |
| Subcarrier spacing | kHz | 30 | 30 | 30 |  |  |  |  |
| Allocated resource blocks for CORESET Note 3 |  | 24 | 24 | 18 |  |  |  |  |
| Number of transmitter antennas |  | 1 | 1 | 1 |  |  |  |  |
| Duration of CORESET | symbols | 2 | 2 | 2 |  |  |  |  |
| REG bundle size |  | 6 | 6 | 6 |  |  |  |  |
| DMRS precoder granularity |  | Same as REG bundle size | Same as REG bundle size | Same as REG bundle size |  |  |  |  |
| CCE to REG mapping |  | Interleaved | Interleaved | Interleaved |  |  |  |  |
| Interleave n\_shift |  | 0 | 0 | 0 |  |  |  |  |
| Interleave size |  | 2 | 2 | 2 |  |  |  |  |
| Beamforming Pre-Coder |  | N/A | N/A | N/A |  |  |  |  |
| Aggregation level | CCE | 4 | 8 | 4 |  |  |  |  |
| DCI formats |  | Note 1 | Note 1 | Note 1 |  |  |  |  |
| Payload size (without CRC) | bits | Note 2 | Note 2 | Note 2 |  |  |  |  |
| Note 1: DCI format shall depend upon the test configuration.  Note 2: Payload size shall depend upon the test configuration.  Note 3: Allocated in the same resource blocks where the associated RMC is scheduled. | | | | | | | | |

<End of Change (from R4-2114104>

### <Start of Change (from R4-2113465)>

## A.3.6A Antenna configurations with unlicensed bands

### A.3.6A.1 Antenna configurations for FR1

Unless otherwise specified, NR unlicensed cells in all RRM Test cases in AWGN propagation condition are configured with Antenna Configuration 1x2.

#### A.3.6A.1.1 Antenna connection for 4 Rx capable UEs

##### A.3.6A.1.1.1 Introduction

All tests in clause A.13, A.10, A.11, and A.12 are specified for UEs supporting 2RX. In this clause, the antenna connection method for applying 2RX tests to UEs supporting 4RX antenna ports is specified. No tests are currently specified in clause A.13, A.10, A.11 or A.12 which are applicable only to 4RX antenna ports, so 4RX capable UEs are always tested by reusing tests which were originally specified for 2RX UEs.

##### A.3.6A.1.1.2 Principle of testing

A.3.6A.1.1.2.1 Single carrier tests

For 4RX capable UEs supporting at least one 2RX band, the, all single carrier tests specified in clause A.13. A.10, A.11 and A.12 except those in A.13.4, A.10.5, A.11.6 and A.12.5 shall be tested on any band where 2RX is supported with the antenna connection specified in A.3.6A.1.1.2.4. For single carrier tests specified in clause A.13.4, A.10.5, A.11.6 or A.12.5, all tests shall be tested with the antenna connection specified in A.3.6A.1.1.2.4 for bands where 2RX is supported, and the antenna connection specified in A.3.6A.1.1.2.5 for bands where 4RX is supported.

For 4RX capable UEs which do not support any 2RX band, all tests specified in clauses A.13, A.10, A.11 and A.12 shall be tested using the antenna connection specified in clause A.3.6A.1.1.2.5. For radio link monitoring tests, the SNR levels are modified according to table A.3.6A.1.1.2.1-1 and table A.3.6A.1.1.2.1-2

Table A.3.6A.1.1.2.1-1: Modified parameters for RLM out of sync testing with 4 RX antenna connection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | SNR during T3 (dB) | | | |
|  | Test 1 | Test 2 | Test 3 | Test 4 |
| A.10.3.1.2 | -18 | N/A | N/A | N/A |
| A.10.3.1.4 | TBD | N/A | N/A | N/A |
| A.11.4.1.2 | -18 | N/A | N/A | N/A |
| A.11.4.1.4 | TBD | N/A | N/A | N/A |

Table A.3.6A.1.1.2.1-2: Modified parameters for RLM in sync single carrier testing with 4 RX antenna connection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test case | SNR during T3 (dB) | | SNR during T4 (dB) | |
|  | Test 1 | Test 2 | Test 1 | Test 2 |
| A.10.3.1.3 | -18 | N/A | -8 | N/A |
| A.10.3.1.5 | TBD | N/A | TBD | N/A |
| A.11.4.1.3 | -18 | N/A | -8 | N/A |
| A.11.4.1.5 | TBD | N/A | TBD | N/A |

Table A.3.6A.1.1.2.1-3: Modified parameters for Beam Failure Detection and Link Recovery testing with 4 RX antenna connection

|  |  |  |
| --- | --- | --- |
| Test case | SNR for RS in set q0 during T3, T4 and T5 (dB) | |
|  | Test 1 | Test 2 |
| A.10.3.4.1 | -15 | N/A |
| A.10.3.4.2 | -15 | N/A |
| A.11.4.4.1 | -15 | N/A |
| A.11.4.4.2 | -15 | N/A |

A.3.6A.1.1.2.2 Carrier aggregation tests

All carrier aggregation tests are performed using the antenna connection in clause A.3.6A.1.1.2.4 for the PCell antenna connection if the PCell is on a band where 2RX is supported or the antenna connection in A.3.6A.1.1.2.5 for the PCell antenna connection if the PCell is on a band where 4RX is supported.

All carrier aggregation tests are performed using the antenna connection in clause A.3.6A.1.1.2.4 for the SCell antenna connection if an SCell is on band where 2RX is supported or the testing procedure in A.3.6A.1.1.2.5 for the SCell antenna connection if an SCell is on a band where 4RX is supported.

A.3.6A.1.1.2.3 EN-DC tests

All carrier aggregation tests are performed using the antenna connection in clause A.3.6A.1.1.2.6 for the PCell antenna connection if the PCell is on a band where 2RX is supported or the antenna connection in A.3.6A.1.1.2.7 for the PCell antenna connection if the PCell is on a band where 4RX is supported.

All carrier aggregation tests are performed using the antenna connection in clause A.3.6A.1.1.2.4 for the PSCell or SCell antenna connection if an SCell is on band where 2RX is supported or the testing procedure in A.3.6A.1.1.2.5 for the SCell antenna connection if an SCell or PSCell is on a band where 4RX is supported.

A.3.6A.1.1.2.4 Antenna connection for bands where 2RX is supported

For bands where 2RX is supported, it is left to the UE declaration and AP configuration to decide which 2 of the 4 Rx ports are connected with data source from system simulator. The remaining 2 Rx ports shall be connected with zero input**.** No test parameters or requirements are modified.

A.3.6A.1.1.2.5 Antenna connection for bands where 4RX is supported

For bands where 4RX is supported, all 4 RX antennas are connected with data source from system simulator**.** The system simulator shall provide independent noise and fading (low correlation) for each antenna port. Except for the modifications to radio link monitoring thresholds described in clauses A.3.6A.1.1.2.1 and A.3.6A.1.1.2.2, no test parameters or requirements are modified.

A.3.6A.1.1.2.6 EN-DC LTE Antenna connection for bands where 2RX is supported

For bands where LTE 2RX is supported, it is left to the UE declaration and AP configuration to decide which 2 of the 4 Rx ports are connected with data source from system simulator. The remaining 2 Rx ports shall be connected with zero input**.** No test parameters or requirements are modified.

A.3.6A.1.1.2.7 EN-DC LTE Antenna connection for bands where 4RX is supported

For bands where LTE 4RX is supported, all 4 RX antennas are connected with data source from system simulator**.** The system simulator shall provide independent noise and fading (low correlation) for each antenna port. Except for the modifications to radio link monitoring thresholds described in clauses A.3.8.1.2.1 and A.3.8.1.2.2 of TS 36.133 [15], no test parameters or requirements are modified.

<End of Change (from R4-2113465)>

### <Start of Change (from R4-2113469)>

#### A.10.1.1.1 Random Access

##### A.10.1.1.1.1 4-step RA type contention-based random access for NR PSCell with CCA

###### A.10.1.1.1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits when subject to CCA. This test will verify the requirements in clause 6.2.2A.2 and clause 7.1.2 in an AWGN model.

For this test two cells are used, with the configuration of Cell 1 (E-UTRA PCell) specified in clause A.3.7A.2.1 and Cell 2 configured as PSCell in FR1. Cell 1 is on a licensed band and cell 2 is subjected to CCA. Supported test parameters are shown in Table A.10.1.1.1.1.1-1. UE capable of EN-DC with PSCell in FR1 needs to be tested by using the parameters in Table A.10.1.1.1.1.1-2.

Table A.10.1.1.1.1.1-1: Supported test configurations for contention based random access test in FR1 for PSCell with CCA

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

Table A.10.1.1.1.1.1-2: General test parameters for contention based random access test in FR1 for PSCell with CCA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Test-1 | Comments |
| SSB Configuration | Note 4, 6 | | | Config 1,2 |  | SSB.1 CCA | As defined in A.3.10A |
|  | Note 5, 6 | | | Config 1,2 |  | SSB.2 CCA | As defined in A.3.10A |
| DBT Window Configuration | | | | Config 1,2 |  | DBT.1 | As specified in A.3.28.1 |
| DL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.2 |  |
| Duplex Mode for Cell 2 | | | | Config 1,2 |  | TDD |  |
| TDD Configuration | | | | Config 1,2 |  | TDDConf.1.1 CCA |  |
| OCNG Pattern Note 1 | | | | |  | OCNG pattern 1 | As defined in A.3.2.1. |
| PDSCH parameters Note 3 | | | | Config 1,2 |  | SR.1.1 CCA | As defined in A.3.1A.1. |
| NR RF Channel Number | | | | |  | 1 |  |
| EPRE ratio of PSS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | | | dB | 0 |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | | | dB |  |  |
| SSB with index 0 | |  | | | dB | 3 | Power of SSB with index 0 is set to be above configured *rsrp-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | 3 |  |
|  | | SS-RSRP | | | dBm/ SCS | -95 |  |
| SSB with index 1 | |  | | | dB | -17 | Power of SSB with index 1 is set to be below configured *rsrp-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | -17 |  |
|  | | SS-RSRP | | | dBm/ SCS | -115 |  |
| Io Note 2 | | | | Config 1,2 | dBm | -62.2/38.16MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | | | dBm/ SCS | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power () | | | | | dBm | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| PRACH Configuration | | | | |  | FR1 PRACH configuration 1 under CCA | As defined in A.3.8A.2. |
| DL CCA probability | | | Note 4, 6 | |  | 0.9375 |  |
| PCCA\_DL | | | Note 5, 6 | |  | 0.75 / 0.75 |  |
| LCCA\_DL Note 7 | | | | |  | 4 |  |
| WCCA\_DL Note 8 | | | | |  | Inf |  |
| UL CCA probability | | | Note 4, 6 | |  | 0.87 |  |
| PCCA\_UL | | | Note 5, 6 | |  | 0.75 |  |
| LCCA\_UL Note 7 | | | | |  | 5 |  |
| WCCA\_UL Note 8 | | | | |  | Inf |  |
| Semi-static channel access config period Note 4, 6 | | | | | ms | 2 |  |
| Propagation Condition | | | | | - | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic channel occupancy and semi-static channel occupancy configuration.  Note 7: LCCA\_DL and LCCA\_UL are chosen such that preambleTransMax > 5 + LCCA\_DL + LCCA\_UL.  Note 8: A window WCCA\_DL=WCCA\_UL=Inf is used to indicate that LCCA\_DL and LCCA\_UL are considered during the entire duration of a test run. | | | | | | | |

###### A.10.1.1.1.1.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.10.1.1.1.1.2.1 Random Access Preamble Transmission

To test the UE behavior specified in Clause 6.2.2A.2.1.1 the System Simulator shall receive the Random Access Preamble which belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured *rsrp-ThresholdSSB*, if the UL CCA is successful.

The three requirements below are relevant for all cases of PRACH transmissions described within the whole clause A.10.1.1.1.1.2:

* The System Simulator shall implement the UL CCA model of A.3.26.2 for the RACH occasions where PRACH transmissions are expected. The System Simulator shall monitor the RACH occasions to detect if the UE is transmitting PRACH preambles. If a PRACH transmission is detected on a RACH occasion that is expected to have UL CCA failure, the test is considered as failed.
* In case of CCA DL failure, the test equipment should verify that the UE does not transmit PRACH for semi-static channel access mode; for dynamic channel access mode it is assumed that RACH occasions are always scheduled within a UE-initiated COT.
* In case of UL CCA failure, The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.1.2.2 Random Access Response Reception

To test the UE behavior specified in Clause 6.2.2A.2.1.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble. In case of CCA DL failure, the test equipment should delay the transmission of Random Access Response.

The UE may stop monitoring for Random Access Response(s) and shall transmit the msg3 if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble if UL CCA is successful. The System Simulator shall monitor if the UE is transmitting msg3 when CCA UL failure. If a msg3 transmission is detected on a grant expected to have UL CCA failure, the test is considered as failed.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.1.2.3 No Random Access Response Reception

To test the UE behavior specified in clause 6.2.2A.2.1.3 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles. In case of CCA DL failure, the test equipment should delay the transmission of Random Access Response.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.1.2.4 Receiving an UL grant for msg3 retransmission

To test the UE behavior specified in clause 6.2.2A.2.1.4, the System Simulator shall provide an UL grant for msg3 retransmission following a successful Random Access Response if UL CCA is successful. The System Simulator shall monitor if the UE is transmitting msg3 when CCA UL failure. If a msg3 is detected on a grant expected to have UL CCA failure, the test is considered as failed.

The UE shall re-transmit the msg3 upon the reception of an UL grant for msg3 retransmission.

A.10.1.1.1.1.2.5 Contention Resolution Timer expiry

To test the UE behavior specified in Clause 6.2.2A.2.1.6 the System Simulator shall *not* send a response to a msg3.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if the Contention Resolution Timer expires.

##### A.10.1.1.1.2 4-step RA type non-contention based random access for NR PSCell with CCA

###### A.10.1.1.1.2.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits when subject to CCA. This test will verify the requirements in clause 6.2.2A.2 and clause 7.1.2 in an AWGN model.

For this test two cells are used, with the configuration of Cell 1 (E-UTRA PCell) specified in clause A.3.7A.2.1 and Cell 2 configured as PSCell in FR1. Cell 1 is on a licensed band and cell 2 is subjected to CCA. Supported test parameters are shown in Table A.10.1.1.1.2.1-1. UE capable of EN-DC with PSCell in FR1 needs to be tested by using the parameters in Table A.10.1.1.1.2.1-2.

Table A.10.1.1.1.2.1-1: Supported test configurations for non-contention based random access test in FR1 for PSCell with CCA

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

Table A.10.1.1.1.2.1-2: General test parameters for non-contention based random access test in FR1 for PSCell with CCA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Test-1 | Comments |
| SSB Configuration | Note 4, 6 | | | Config 1,2 |  | SSB.1 CCA | As defined in A.3.10A |
|  | Note 5, 6 | | | Config 1,2 |  | SSB.2 CCA | As defined in A.3.10A |
| DBT Window Configuration | | | | Config 1,2 |  | DBT.1 | As specified in A.3.28.1 |
| DL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.2 |  |
| Duplex Mode for Cell 2 | | | | Config 1,2 |  | TDD |  |
| TDD Configuration | | | | Config 1,2 |  | TDDConf.1.1 CCA |  |
| OCNG Pattern Note 1 | | | | |  | OCNG pattern 1 | As defined in A.3.2.1. |
| PDSCH parameters Note 3 | | | | Config 1,2 |  | SR.1.1 CCA | As defined in A.3.1A.1. |
| NR RF Channel Number | | | | |  | 1 |  |
| EPRE ratio of PSS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | | | dB | 0 |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | | | dB |  |  |
| SSB with index 0 | |  | | | dB | 3 | Power of SSB with index 0 is set to be above configured *rsrp-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | 3 |  |
|  | | SS-RSRP | | | dBm/ SCS | -95 |  |
| SSB with index 1 | |  | | | dB | -17 | Power of SSB with index 1 is set to be below configured *rsrp-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | -17 |  |
|  | | SS-RSRP | | | dBm/ SCS | -115 |  |
| Io Note 2 | | | | Config 1,2 | dBm | -62.2/38.16MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | | | dBm/ SCS | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power () | | | | | dBm | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| PRACH Configuration | | | | |  | FR1 PRACH configuration 2 under CCA | As defined in A.3.8A.2. |
| DL CCA probability | | | Note 4, 6 | |  | 0.9375 |  |
| PCCA\_DL | | | Note 5, 6 | |  | 0.75 / 0.75 |  |
| LCCA\_DL Note 7 | | | | |  | 4 |  |
| WCCA\_DL Note 8 | | | | |  | Inf |  |
| UL CCA probability | | | Note 4, 6 | |  | 0.87 |  |
| PCCA\_UL | | | Note 5, 6 | |  | 0.75 |  |
| LCCA\_UL Note 7 | | | | |  | 5 |  |
| WCCA\_UL Note 8 | | | | |  | Inf |  |
| Semi-static channel access config period Note 4, 6 | | | | | ms | 2 |  |
| Propagation Condition | | | | | - | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic channel occupancy and semi-static channel occupancy configuration.  Note 7: LCCA\_DL and LCCA\_UL are chosen such that preambleTransMax > 5 + LCCA\_DL + LCCA\_UL.  Note 8: A window WCCA\_DL=WCCA\_UL=Inf is used to indicate that LCCA\_DL and LCCA\_UL are considered during the entire duration of a test run. | | | | | | | |

###### A.10.1.1.1.2.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink. In the test, the non-contention based random access procedure is not initialized for Other SI requested from UE or beam failure recovery.

A.10.1.1.1.2.2.1 SSB-based Random Access Preamble Transmission

In Test-1, to test the UE behavior specified in Clause 6.2.2A.2.2.1 for SSB-based Random Access Preamble transmission, with the contention-free Random Access Resources and the contention-free PRACH occasions associated with SSBs configured, the System Simulator shall receive the Random Access Preamble which has the Preamble Index associated with the SSB with index 0.

The three requirements below are relevant for all cases of PRACH transmissions described within the whole clause A.10.1.1.1.2.2:

* The System Simulator shall implement the UL CCA model of A.3.26.2 for the RACH occasions where PRACH transmissions are expected. The System Simulator shall monitor the RACH occasions to detect if the UE is transmitting PRACH preambles. If a PRACH transmission is detected on a RACH occasion that is expected to have UL CCA failure, the test is considered as failed.
* In case of CCA DL failure, the test equipment should verify that the UE does not transmit PRACH for semi-static channel access mode; for dynamic channel access mode it is assumed that RACH occasions are always scheduled within a UE-initiated COT.
* In case of UL CCA failure, The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power.

In addition, the System Simulator shall receive the Random Access Preamble on the PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0, and the selected PRACH occasion shall belong to the PRACH occasions permitted by the restrictions given by the *ra-ssb-OccasionMaskIndex*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.2.2.2 Random Access Response Reception

To test the UE behavior specified in Clause 6.2.2A.2.2.2 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a Random Access Response *not* corresponding to the transmitted Random Access Preamble. In case of CCA DL failure, the test equipment should delay the transmission of Random Access Response.

The UE may stop monitoring for Random Access Response(s) if the Random Access Response contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble if UL CCA is successful. The System Simulator shall monitor if the UE is transmitting msg3 when CCA UL failure. If a msg3 is detected on a grant expected to have UL CCA failure, the test is considered as failed.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power if all received Random Access Responses contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.2.2.3 No Random Access Response Reception

To test the UE behavior specified in clause 6.2.2A.2.2.3 the System Simulator shall transmit a Random Access Response containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles. In case of CCA DL failure, the test equipment should delay the transmission of Random Access Response.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2 in TS38.321 [7], and transmit with the calculated PRACH transmission power when the backoff time expires if no Random Access Response is received within the RA Response window configured in *RACH-ConfigCommon*.

In addition, the power applied to all preambles shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The relative power applied to additional preambles shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all PRACH transmissions shall be within the accuracy specified in Clause 7.1.2.

##### A.10.1.1.1.3 2-step RA type contention-based random access for NR PSCell with CCA

###### A.10.1.1.1.3.1 Test Purpose and Environment

The purpose of this test is to verify that the behaviour of the random access procedure is according to the requirements and that the MsgA PRACH, MsgA PUSCH power settings and timing are within specified limits when subject to CCA. This test will verify the requirements in clause 6.2.2A.3 and clause 7.1.2 in an AWGN model.

For this test two cells are used, with the configuration of Cell 1 (E-UTRA PCell) specified in clause A.3.7A.2.1 and Cell 2 configured as PSCell in FR1. Cell 1 is on a licensed band and cell 2 is subjected to CCA. Supported test parameters are shown in Table A.10.1.1.1.3.1-1. UE capable of EN-DC with PSCell in FR1 needs to be tested by using the parameters in Table A.10.1.1.1.3.1-2.

Table A.10.1.1.1.3.1-1: Supported test configurations for 2-step RA type contention based random access test in FR1 for PSCell with CCA

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

Table A.10.1.1.1.3.1-2: General test parameters for 2-step RA type contention based random access test in FR1 for PSCell with CCA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Test-1 | Comments |
| SSB Configuration | Note 4, 6 | | | Config 1,2 |  | SSB.1 CCA | As defined in A.3.10A |
|  | Note 5, 6 | | | Config 1,2 |  | SSB.2 CCA | As defined in A.3.10A |
| DBT Window Configuration | | | | Config 1,2 |  | DBT.1 | As specified in A.3.28.1 |
| DL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.2 |  |
| Duplex Mode for Cell 2 | | | | Config 1,2 |  | TDD |  |
| TDD Configuration | | | | Config 3,4 |  | TDDConf.1.1 CCA |  |
| OCNG Pattern Note 1 | | | | |  | OCNG pattern 1 | As defined in A.3.2.1. |
| PDSCH parameters Note 3 ­ | | | | Config 1,2 |  | SR.1.1 CCA | As defined in A.3.1A.1. |
| NR RF Channel Number | | | | |  | 1 |  |
| EPRE ratio of PSS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | | | dB | 0 |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | | | dB |  |  |
| SSB with index 0 | |  | | | dB | 3 | Power of SSB with index 0 is set to be above configured *msgA-RSRP-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | 3 |  |
|  | | SS-RSRP Note 2 | | | dBm/ SCS | -95 |  |
| SSB with index 1 | |  | | | dB | -17 | Power of SSB with index 1 is set to be below configured *msgA-RSRP-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | -17 |  |
|  | | SS-RSRP Note 2 | | | dBm/ SCS | -115 |  |
| Io | | | | Config 1,2 | dBm | -62.2/38.16MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | | | dBm/ SCS | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power () | | | | | dBm | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| MsgA Configuration | | | | |  | FR1 MsgA configuration 1 under CCA | As defined in A.3.20A.2. |
| *msgA-RSRP-ThresholdSSB* | | | | | dBm | RSRP\_51 | The actual value of the threshold is -105dBm, as defined in TS 38.331 [2]. |
| DL CCA probability | | | Note 4, 6 | |  | 0.9375 |  |
| PCCA\_DL | | | Note 5, 6 | |  | 0.75 / 0.75 |  |
| LCCA\_DL Note 7 | | | | |  | 4 |  |
| WCCA\_DL Note 8 | | | | |  | Inf |  |
| UL CCA probability | | | Note 4, 6 | |  | 0.87 |  |
| PCCA\_UL | | | Note 5, 6 | |  | 0.75 |  |
| LCCA\_UL Note 7 | | | | |  | 5 |  |
| WCCA\_UL Note 8 | | | | |  | Inf |  |
| Semi-static channel access config period Note 4, 6 | | | | | ms | 2 |  |
| Propagation Condition | | | | | - | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic channel occupancy and semi-static channel occupancy configuration.  Note 7: LCCA\_DL and LCCA\_UL are chosen such that preambleTransMax > 5 + LCCA\_DL + LCCA\_UL.  Note 8: A window WCCA\_DL=WCCA\_UL=Inf is used to indicate that LCCA\_DL and LCCA\_UL are considered during the entire duration of a test run. | | | | | | | |

###### A.10.1.1.1.3.2 Test Requirements

Contention based random access is triggered by *not* explicitly assigning a random access preamble via dedicated signalling in the downlink.

A.10.1.1.1.3.2.1 MsgA Transmission

To test the UE behaviour specified in Clause 6.2.2A.3.1.1 the System Simulator shall receive the MsgA with a preamble which belongs to one of the Random Access Preambles associated with the SSB with index 0, which has SS-RSRP above the configured *msgA-RSRP-ThresholdSSB*, if the UL CCA is successful.

below are relevant for all cases of MsgA transmissions described within the clause A.10.1.1.1.3.2:

* The System Simulator shall implement the UL CCA model for the MsgA occasions (i.e. both MsgA PRACH and MsgA PUSCH occasions) where MsgA transmissions are expected. The System Simulator shall monitor the MsgA occasions to detect if the UE is transmitting MsgA. If a MsgA transmission is detected on MsgA occasions that are expected to have UL CCA failure, the test is considered as failed.
* In case of CCA DL failure, the test equipment should verify that the UE does not transmit MsgA for semi-static channel access mode; for dynamic channel access mode it is assumed that MsgA occasions are always scheduled within a UE-initiated COT.
* The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS38.321 [7], and transmit with the calculated PRACH transmission power in case of UL CCA failure.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS38.321 [7], and transmit with the calculated PRACH transmission power in case of UL CCA failure. In addition, the power applied to all MsgA transmission shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.3.2.2 MsgB Reception

To test the UE behaviour specified in Clause 6.2.2A.3.1.2 the System Simulator shall transmit a MsgB with fallbackRAR containing a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a MsgB *not* corresponding to the transmitted Random Access Preamble. In case of CCA DL failure, the test equipment should delay the transmission of MsgB.

The UE may stop monitoring for MsgB(s) and shall transmit the msg3 if the MsgB with a fallbackRAR contains a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble if UL CCA is successful. The System Simulator shall monitor if the UE is transmitting msg3 when CCA UL failure. If a msg3 is detected on a grant expected to have UL CCA failure, the test is considered as failed.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS 38.321 [7], and transmit with the calculated MsgA PRACH and MsgA PUSCH transmission power when the backoff time expires if all received MsgB’s contain Random Access Preamble identifiers that do not match the transmitted Random Access Preamble .

In addition, the power applied to all MsgA transmission shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.3.2.3 No MsgB Reception

To test the UE behavior specified in clause 6.2.2A.3.1.3 the System Simulator shall transmit a MsgB with fallbackRAR containing a successRAR message and a Random Access Preamble identifier corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles. In case of CCA DL failure, the test equipment should delay the transmission of MsgB.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS 38.321 [7], and transmit with the calculated MsgA PRACH and MsgA PUSCH transmission power when the backoff time expires if no MsgB is received within the MsgB Response window.

In addition, the power applied to all MsgA transmission shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

##### A.10.1.1.1.4 2-step RA type non-contention based random access for NR PSCell with CCA

###### A.10.1.1.1.4.1 Test Purpose and Environment

The purpose of this test is to verify that the behavior of the random access procedure is according to the requirements and that the PRACH power settings and timing are within specified limits when subject to CCA. This test will verify the requirements in clause 6.2.2A.3 and clause 7.1.2 in an AWGN model.

For this test two cells are used, with the configuration of Cell 1 (E-UTRA PCell) specified in clause A.3.7.2.1 and Cell 2 configured as PSCell in FR1. Cell 1 is on a licensed band and cell 2 is subjected to CCA. Supported test parameters are shown in Table A.10.1.1.1.4.1-1. UE capable of EN-DC with PSCell in FR1 needs to be tested by using the parameters in Table A.10.1.1.1.4.1-2.

Table A.10.1.1.1.4.1-1: Supported test configurations for non-contention based random access test for 2-step RA type in FR1 for PSCell with CCA

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

Table A.10.1.1.1.4.1-2: General test parameters for non-contention based random access test for 2-step RA type in FR1 for PSCell with CCA

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | | | Unit | Test-1 | Comments |
| SSB Configuration | Note 4, 6 | | | Config 1,2 |  | SSB.1 CCA | As defined in A.3.10A |
|  | Note 5, 6 | | | Config 1,2 |  | SSB.2 CCA | As defined in A.3.10A |
| DBT Window Configuration | | | | Config 1,2 |  | DBT.1 | As specified in A.3.28.1 |
| DL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.1 |  |
| UL CCA model | | | | Config 1,2 |  | As specified in A.3.26.2.2 |  |
| Duplex Mode for Cell 2 | | | | Config 1,2 |  | TDD |  |
| TDD Configuration | | | | Config 1,2 |  | TDDConf.1.1 CCA |  |
| OCNG Pattern Note 1 | | | | |  | OCNG pattern 1 | As defined in A.3.2.1. |
| PDSCH parameters Note 3 | | | | Config 1,2 |  | SR.1.1 CCA | As defined in A.3.1A.1. |
| NR RF Channel Number | | | | |  | 1 |  |
| EPRE ratio of PSS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PBCH to PBCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDCCH\_DMRS to SSS | | | | | dB | 0 |  |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | | | | dB |  |  |
| EPRE ratio of PDSCH\_DMRS to SSS | | | | | dB |  |  |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | | | | dB |  |  |
| SSB with index 0 | |  | | | dB | 3 | Power of SSB with index 0 is set to be above configured *msgA-RSRP-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | 3 |  |
|  | | SS-RSRP | | | dBm/ SCS | -95 |  |
| SSB with index 1 | |  | | | dB | -17 | Power of SSB with index 1 is set to be below configured *msgA-RSRP-ThresholdSSB* |
|  | |  | | Config 1,2 | dBm/15kHz | -101 |  |
|  | |  | | | dB | -17 |  |
|  | | SS-RSRP | | | dBm/ SCS | -115 |  |
| Io Note 2 | | | | Config 1,2 | dBm | -62.2/38.16MHz | For symbols without SSB index 1 |
| ss-PBCH-BlockPower | | | | | dBm/ SCS | -5 | As defined in clause 6.3.2 in TS 38.331 [2]. |
| Configured UE transmitted power (PCMAX,f,c) | | | | | dBm | 23 | As defined in clause 6.2.4 in TS 38.101-1. |
| MsgA Configuration | | | | |  | FR1 MsgA configuration 2 under CCA | As defined in A.3.20A.2. |
| *msgA-RSRP-ThresholdSSB* | | | | | dBm | RSRP\_51 | The actual value of the threshold is -105dBm, as defined in TS 38.331 [2]. |
| DL CCA probability | | | Note 4, 6 | |  | 0.9375 |  |
| PCCA\_DL | | | Note 5, 6 | |  | 0.75 / 0.75 |  |
| LCCA\_DL Note 7 | | | | |  | 4 |  |
| WCCA\_DL Note 8 | | | | |  | Inf |  |
| UL CCA probability | | | Note 4, 6 | |  | 0.87 |  |
| PCCA\_UL | | | Note 5, 6 | |  | 0.75 |  |
| LCCA\_UL Note 7 | | | | |  | 5 |  |
| WCCA\_UL Note 8 | | | | |  | Inf |  |
| Semi-static channel access config period Note 4, 6 | | | | | ms | 2 |  |
| Propagation Condition | | | | | - | AWGN |  |
| Note 1: OCNG shall be used such that the cell is fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. The OCNG pattern is chosen during the test according to the presence of a DL reference measurement channel.  Note 2: SS-RSRP, Es/Iot and Io levels have been derived from other parameters for information purpose. They are not settable parameters.  Note 3: The DL PDSCH reference measurement channel is used in the test only when a downlink transmission dedicated to the UE under test is required.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy. The first value corresponds PCCA\_DL1 and the second value corresponds to the PCCA\_DL2.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic channel occupancy and semi-static channel occupancy configuration.  Note 7: LCCA\_DL and LCCA\_UL are chosen such that preambleTransMax > 5 + LCCA\_DL + LCCA\_UL.  Note 8: A window WCCA\_DL=WCCA\_UL=Inf is used to indicate that LCCA\_DL and LCCA\_UL are considered during the entire duration of a test run. | | | | | | | |

###### A.10.1.1.1.4.2 Test Requirements

Non-Contention based random access is triggered by explicitly assigning a random access preamble via dedicated signalling in the downlink. In the test, the non-contention based random access procedure is not initialized for Other SI requested from UE or beam failure recovery.

A.10.1.1.1.4.2.1 MsgA Transmission

In Test-1, to test the UE behavior specified in Clause 6.2.2A.3.2.1 for MsgA transmission, with the contention-free Random Access Resources and the contention-free PRACH occasions associated with SSBs configured, the System Simulator shall receive the MsgA which has the Preamble Index associated with the SSB with index 0.

In addition, the System Simulator shall receive the MsgA on the PRACH occasion which belongs to the PRACH occasions corresponding to the SSB with index 0, and the selected PRACH occasion shall belong to the PRACH occasions permitted by the restrictions given first by the *msgA-SSB-SharedRO-MaskIndex* if configured, or next by the *ra-ssb-OccasionMaskIndex* if configured.

The three requirements below are relevant for all cases of MsgA transmissions described within the clause A.10.1.1.1.4.2:

* The System Simulator shall implement the UL CCA model for the MsgA occasions (i.e. both MsgA PRACH and MsgA PUSCH occasions) where MsgA transmissions are expected. The System Simulator shall monitor the MsgA occasions to detect if the UE is transmitting MsgA. If a MsgA transmission is detected on MsgA occasions that are expected to have UL CCA failure, the test is considered as failed.
* In case of CCA DL failure, the test equipment should verify that the UE does not transmit MsgA for semi-static channel access mode; for dynamic channel access mode it is assumed that MsgA occasions are always scheduled within a UE-initiated COT.
* The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS38.321 [7], and transmit with the calculated PRACH transmission power in case of UL CCA failure.

In addition, the power applied to all MsgA transmission shall be in accordance with what is specified in Clause 6.2.2A.2. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.4.2.2 MsgB Reception

To test the UE behavior specified in Clause 6.2.2A.3.2.2 the System Simulator shall transmit a MsgB containing a successRAR MAC subPDU corresponding to the transmitted Random Access Preamble after 5 MsgA transmissions have been received by the System Simulator. In response to the first 4 preambles, the System Simulator shall transmit a MsgB *not* corresponding to the transmitted Random Access Preamble. In case of CCA DL failure, the test equipment should delay the transmission of MsgB.

The UE may stop monitoring for MsgB if the MsgB contains a successRAR MAC subPDU corresponding to the transmitted Random Access Preamble.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS38.321 [7], and transmit with the calculated MsgA transmission power if Random Access Responses Reception has not been considered as successful.

In addition, the power applied to all MsgA transmissions shall be in accordance with what is specified in Clause 6.2.2A.3. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

A.10.1.1.1.4.2.3 No MsgB Reception

To test the UE behavior specified in clause 6.2.2A.3.2.3 the System Simulator shall transmit a MsgB corresponding to the transmitted Random Access Preamble after 5 preambles have been received by the System Simulator. The System Simulator shall *not* respond to the first 4 preambles. In case of CCA DL failure, the test equipment should delay the transmission of MsgB.

The UE shall again perform the Random Access Resource selection procedure specified in clause 5.1.2a in TS38.321 [7], and transmit with the calculated MsgA transmission power when the backoff time expires if no MsgB is received within the MsgB Response window configured in *RACH-ConfigGenericTwoStepRA*.

In addition, the power applied to all MsgA transmissions shall be in accordance with what is specified in Clause 6.2.2A.3. The power of the first MsgA preamble shall be -16 dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18]. The power of the first MsgA PUSCH transmission shall be dBm with an accuracy specified in clause 6.3.4.2 of TS 38.101-1 [18], where indicates the MsgA PUSCH numerology. The relative power applied to additional MsgA transmissions shall have an accuracy specified in clause 6.3.4.3 of TS 38.101-1 [18].

The transmit timing of all MsgA transmissions shall be within the accuracy specified in Clause 7.1.2.

<End of Change (from R4-2113469)>

### <Start of Change (from R4-2114106)>

## A.11.1 RRC\_IDLE state mobility

### A.11.1.1 Cell re-selection with both source and target NR carrier frequencies under CCA

#### A.11.1.1.1 Cell reselection to FR1 intra-frequency NR cells when subject to CCA on the serving and target cell

##### A.11.1.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the intra frequency NR cell reselection requirements subject to CCA specified in clause 4.2A.2.3. Supported test configurations are shown in table A. 11.1.1.1.2-1.

##### A.11.1.1.1.2 Test Parameters

The test scenario comprises of 1 NR carrier that is subject to CCA and 2 cells as given in tables A.11.1.1.1.2-1, A.11.1.1.1.2-2 and A.11.1.1.1.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Only cell 1 is already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas. Furthermore, UE has not registered with network for the tracking area containing cell 2.

Table A.11.1.1.1.2-1: Supported test configurations

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

Table A.11.1.1.1.2-2: General test parameters for intra frequency NR cell re-selection test case when subject to CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial | Active cell |  | 1 | Cell1 |  |
| condition | Neighbour cells |  | 1 | Cell2 |  |
| T2 end condition | Active cell |  | 1 | Cell2 |  |
| Neighbour cells |  | 1 | Cell1 |  |
| Final condition | Active cell |  | 1 | Cell1 |  |
| RF Channel Number | |  | 1 | 1 |  |
| Time offset between cells | |  | 1 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | Semi-static channel access |  | 1 | SSB.1 CCA | (As defined in A.3.10A ) |
| Dynamic channel access | SSB.2 CCA |
| DBT Window Configuration | |  | 1 | DBT.1 | As specified in clause A.3.28.1. |
| SMTC confituration | |  |  | SMTC.1 |  |
| DL CCA model | |  | 1 | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | 1 | As specified in clause A.3.26.2.2 |  |
| DRX cycle length | | s | 1 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | >7 | During T1, Cell 2 shall be powered off, and during the off time the physical cell identity shall be changed, The intention is to ensure that Cell 2 has not been detected by the UE prior to the start of period T2 |
| T2 | | s | 1 | 40 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 1 | 15 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.1.1.2-3: Cell specific test parameters for intra frequency NR cell re-selection test case in AWGN when subject to CCA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| TDD configuration |  | 1 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1 | 0.9 | | | 0.9 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1 | 0.75 | | | 0.75 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 1 | 0.5 | | | 0.5 | | |
| UL CCA probability PCCA\_UL |  | 1 | 1 | | | 1 | | |
| Md,max |  | 1 | 16 | | | 16 | | |
| Mm,max |  | 1 | 4 | | | 4 | | |
| Me,max |  | 1 | 8 | | | 8 | | |
| PDSCH RMC |  | 1 | SR.1.1 CCA | | | SR.1.1 CCA | | |
| RMSI CORESET |  | 1 | CR.1.1 CCA | | | CR.1.1 CCA | | |
| Dedicated CORESET |  | 1 | CCR.1.1 CCA | | | CCR.1.1 CCA | | |
| OCNG Pattern |  | 1 | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -127 | | | -127 | | |
| Pcompensation | dB | 1 | 0 | | | 0 | | |
| Qhysts | dB | 1 | 0 | | | 0 | | |
| Qoffsets, n | dB | 1 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1 | SS-RSRP | | | SS-RSRP | | |
|  | dB | 1 | 16 | -3.11 | 2.79 | -infinity | 2.79 | -3.11 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Note2 | dBm/SCS | 1 | -95 | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | |
|  | dB | 1 | 16 | 13 | 16 | -infinity | 16 | 13 |
|  |
| SS-RSRP Note3 | dBm/SCS | 1 | -79 | -82 | -79 | -infinity | -79 | -82 |
|  |  |
|  |  |
| Io | dBm/38.16 MHz | 1 | -47.85 | -46.12 | -46.12 | Same as parameters specified in Cell 1 columns- | | |
| Treselection | s | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SintrasearchP | dB | 1 | 50 | | | 50 | | |
| Propagation Condition |  | 1 | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | |

##### A.11.1.1.1.3 Test Requirements

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

The cell re-selection delay to a newly detectable cell shall be less than (25 + Md)\*1.28 + TSI\_CCA s. Md is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tdetect,NR\_Intra\_CCA. If Md > Md,max the UE is required to restart the detection of Cell 2.

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

The cell re-selection delay to an already detected cell shall be less than (5+Me)\*1.28 + TSI\_CCA s. Me is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tevaluate,NR\_Intra\_CCA. If Me > Me,max the UE is required to restart the evaluation of Cell 2.

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

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

Where:

Tdetect, NR\_Intra\_CCA See Table 4.2A.2.3-1 in clause 4.2A.2.3

Tevaluate, NR\_ intra\_CCA See Table 4.2A.2.3-1 in clause 4.2A.2.3

TSI\_CCA Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell.

This gives a total of (25 + Md)\*1.28 + TSI\_CCA s for the cell re-selection delay to a newly detectable cell and (5+Me)\*1.28 + TSI\_CCA s for the cell re-selection delay to an already detected cell in the test case.

#### A.11.1.1.2 Cell reselection to FR1 inter-frequency NR case when subject to CCA on the serving and target cell

##### A.11.1.1.2.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements subject to CCA specified in clause 4.2A.2.4. Supported test configurations are shown in table A.11.1.1.2.2-1.

##### A.11.1.1.2.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers that are subject to CCA respectively as given in tables A.11.1.1.2.2-1, A.11.1.1.2.2-2 and A.11.1.1.2.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

Table A.11.1.1.2.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of cell 1 with CCA | Description of cell 2 with CCA |
| 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |

Table A.11.1.1.2.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case when subject to CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1 | Cell2 | The UE camps on cell 2 in the initial phase and during T1 period the UE reselects to cell 1 |
| T1 end condition | Active cell |  | 1 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
| Neighbour cells |  | 1 | Cell2 |
| T3 end condition | Active cell |  | 1 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T3 |
| RF Channel Number | |  | 1 | 1, 2 |  |
| Time offset between cells | |  | 1 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | Semi-static channel access |  | 1 | SSB.1 CCA  (As defined in A.3.10A ) |  |
| Dynamic channel access | SSB.2 CCA  (As defined in A.3.10A ) |
| DBT Window Configuration | |  | 1 | DBT.1 | As specified in clause A.3.28.1. |
| SMTC configuration | |  | 1 | SMTC.1 |  |
| DL CCA model | |  | 1 | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | 1 | As specified in clause A.3.26.2.2 |  |
| DRX cycle length | | s | 1 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1 | Not configured |  |
| T1 | | s | 1 | 15 | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1 | >7 | During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3. |
| T3 | | s | 1 | 75 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.1.2.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case in AWGN

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| TDD configuration |  | 1 | TDDConf.1.1 CCA | | | TDDConf.1.1 CCA | | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1 | 0.9 | | | 0.9 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1 | 0.75 | | | 0.75 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 2 | 0.5 | | | 0.5 | | |
| UL CCA probability PCCA\_UL |  | 1 | 1 | | | 1 | | |
| Md,max |  | 1 | 16 | | | 16 | | |
| Mm,max |  | 1 | 4 | | | 4 | | |
| Me,max |  | 1 | 8 | | | 8 | | |
| PDSCH RMC |  | 1 | SR.1.1 CCA | | | SR.1.1 CCA | | |
| RMSI CORESET |  | 1 | CR.1.1 CCA | | | CR.1.1 CCA | | |
| Dedicated CORESET |  | 1 | CCR.1.1 CCA | | | CCR.1.1 CCA | | |
| OCNG Pattern |  | 1 | OP.1 defined in A.3.2.1 | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1 | DLBWP.0.1 | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1 | ULBWP.0.1 | | | ULBWP.0.1 | | |
| RLM-RS |  | 1 | SSB | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1 | -137 | | | -137 | | |
|  |  |
| Pcompensation | dB | 1 | 0 | | | 0 | | |
| Qhysts | dB | 1 | 0 | | | 0 | | |
| Qoffsets, n | dB | 1 | 0 | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1 | SS-RSRP | | | SS-RSRP | | |
|  | dB | 1 | 14 | 14 | 14 | -4 | -infinity | 12 |
| Note2 | dBm/SCS | 1 | -95 | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | |
|  | dB | 1 | 14 | 14 | 14 | -4 | -infinity | 12 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -81 | -81 | -81 | -99 | -infinity | -83 |
|  |  |
|  |  |
| Io | dBm/38.16 MHz | 1 | -49.79 | -49.79 | -49.79 | -62.50 | -infinity | -51.69 |
|  |
|  |
| Treselection | s | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1 | 50 | | | 50 | | |
| Threshx, high | dB | 1 | 48 | | | 48 | | |
| Threshserving, low | dB | 1 | 44 | | | 44 | | |
| Threshx, low | dB | 1 | 50 | | | 50 | | |
| Propagation Condition |  | 1 | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | |

##### A.11.1.1.2.3 Test Requirements

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

The cell re-selection delay to a higher priority cell shall be less than 60 + 1.28 x (5 + Me) + TSI\_CCA s. Me is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tevaluate,NR\_Intra\_CCA. If Me > Me,max the UE is required to restart the evaluation of cell 2.

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

The cell re-selection delay to a lower priority cell shall be less than 1.28 x (5 + Me) + TSI\_CCA s. Me is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tevaluate,NR\_Intra\_CCA. If Me > Me,max the UE is required to restart the evaluation of cell 2.

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

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

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, NR\_ inter\_CCA See Table 4.2A.2.4-1 in clause 4.2A.2.4

TSI\_CCA Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell.

This gives a total of 60 + 1.28 x (5 + Me) + TSI\_CCA s for the cell re-selection delay to a higher priority cell and 1.28 x (5 + Me) + TSI\_CCA s for the cell re-selection delay to a lower priority cell in the test case.

### A.11.1.2 Cell re-selection to NR with source NR carrier frequency under CCA

#### A.11.1.2.1 Cell reselection to FR1 inter-frequency NR case when serving cell is subject to CCA

##### A.11.1.2.1.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements specified in clause 4.2.2.4 when the serving cell is subject to CCA. Supported test configurations are shown in table A.11.1.2.1.2-1.

##### A.11.1.2.1.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers where the first carrier is subject to CCA as given in tables A.11.1.2.1.2-1, A.11.1.2.1.2-2 and A.11.1.2.1.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

Table A.11.1.2.1.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | | |

Table A.11.1.2.1.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case when serving cell is subject to CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2, 3 | Cell2 | The UE camps on cell 2 which is subject to CCA in the initial phase and during T1 period the UE reselects to cell 1 which is an inter-frequency NR cell |
| T1 end condition | Active cell |  | 1, 2, 3 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
| Neighbour cells |  | 1, 2, 3 | Cell2 |
| T3 end condition | Active cell |  | 1, 2, 3 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T3 |
| RF Channel Number | |  | 1, 2, 3 | 1, 2 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
|  | |  | 2 | 3 μs | Synchronous cells |
|  | |  | 3 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1, 2, 3 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1 | Cell 1: SSB.1 FR1  Cell 2: SSB.1 CCA for semi-static channel access;  Cell 2: SSB.2 CCA for dynamic channel access |  |
|  | |  | 2 | Cell 1: SSB.1 FR1  Cell 2: SSB.1 CCA for semi-static channel access;  Cell 2: SSB.2 CCA for dynamic channel access |  |
|  | |  | 3 | Cell 1: SSB.2 FR1  Cell 2: SSB.1 CCA for semi-static channel access;  Cell 2: SSB.2 CCA for dynamic channel access |  |
| SMTCconfiguration | |  | 1 | Cell 1: SMTC pattern 2  Cell 2: N/A |  |
|  | |  | 2 | Cell 1: SMTC pattern 1  Cell 2: N/A |  |
|  | |  | 3 | Cell 1: SMTC pattern 1  Cell 2: N/A |  |
| DBT Window Configuration | |  | 1, 2, 3 | Cell 1: N/A  Cell 2: DBT.1 | As specified in clause A.3.28.1. |
| DL CCA model | |  | 1, 2, 3 | Cell 1: N/A  Cell 2: As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | 1, 2, 3 | Cell 1: N/A  Cell 2: As specified in clause A.3.26.2.2 |  |
| DRX cycle length | | s | 1, 2, 3 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1, 2, 3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1, 2, 3 | Not configured |  |
| T1 | | s | 1, 2, 3 | 15 | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1, 2, 3 | >7 | During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3. |
| T3 | | s | 1, 2, 3 | 75 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.2.1.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case in AWGN when serving cell is subject to CCA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | Cell 2 | | |
| T1 | T2 | T3 | | T1 | T2 | T3 |
| TDD configuration |  | 1 | N/A | | | | TDDConf.1.1.CCA | | |
|  |  | 2 | TDDConf.1.1 | | | | TDDConf.1.1.CCA | | |
|  |  | 3 | TDDConf.2.1 | | | | TDDConf.1.1.CCA | | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1, 2, 3 | N/A | | | | 0.9 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1, 2, 3 | N/A | | | | 0.75 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 1, 2, 3 | N/A | | | | 0.5 | | |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | | | | 1 | | |
| Md,max |  | 1, 2, 3 | N/A | | | | 16 | | |
| Mm,max |  | 1, 2, 3 | N/A | | | | 4 | | |
| Me,max |  | 1, 2, 3 | N/A | | | | 8 | | |
| PDSCH RMC |  | 1 | SR.1.1 FDD | | | | SR.1.1 CCA | | |
| configuration |  | 2 | SR.1.1 TDD | | | | SR.1.1 CCA | | |
|  |  | 3 | SR.2.1 TDD | | | | SR.1.1 CCA | | |
| RMSI CORESET |  | 1 | CR.1.1 FDD | | | | CR.1.1 CCA | | |
| RMC configuration |  | 2 | CR.1.1 TDD | | | | CR.1.1 CCA | | |
|  |  | 3 | CR.2.1 TDD | | | | CR.1.1 CCA | | |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | | | | CCR.1.1 CCA | | |
| RMC configuration |  | 2 | CCR.1.1 TDD | | | | CCR.1.1 CCA | | |
|  |  | 3 | CCR.2.1 TDD | | | | CCR.1.1 CCA | | |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2, 3 | SSB | | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | | | | -137 | | |
|  |  | 3 | -137 | | | | -137 | | |
| Pcompensation | dB | 1, 2, 3 | 0 | | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | | | | SS-RSRP | | |
|  | dB | 1 | 14 | 14 | 14 | | -4 | -infinity | 12 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| Note2 | dBm/SCS | 1 | -98 | | | -95 | | | |
|  |  | 2 | -98 | | | -95 | | | |
|  |  | 3 | -95 | | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | | |
|  |  | 2 |  | | | | | | |
|  |  | 3 |  | | | | | | |
|  | dB | 1 | 14 | 14 | 14 | | -4 | -infinity | 12 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -84 | -84 | -84 | | -102 | -infinity | -83 |
|  |  | 2 | -84 | -84 | -84 | | -102 | -infinity | -83 |
|  |  | 3 | -81 | -81 | -81 | | -99 | -infinity | -83 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -55.88 | | -68.60 | -- | -- |
|  | dBm/9.36 MHz | 2 | -55.88 | -55.88 | -55.88 | | -68.60 | -- | -- |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -49.79 | | -62.50 | -63.96 | -51.69 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | 50 | | | | 50 | | |
| Threshx, highP | dB | 1, 2, 3 | 48 | | | | 48 | | |
| Threshserving, lowP | dB | 1, 2, 3 | 44 | | | | 44 | | |
| Threshx, lowP | dB | 1, 2, 3 | 50 | | | | 50 | | |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | |

##### A.11.1.2.1.3 Test Requirements

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

The cell re-selection delay to a higher priority cell shall be less than 60 + 1.28 x (5 + Me) + TSI\_CCA s. Me is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tevaluate,NR\_Intra\_CCA. If Me > Me,max the UE is required to restart the evaluation of cell 2.

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

The cell re-selection delay to a lower priority cell shall be less than 8 s.

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

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

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, NR\_ inter\_CCA See Table 4.2A.2.4-1 in clause 4.2A.2.4

TSI\_CCA Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell.

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

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

This gives a total of 60 + 1.28 x (5 + Me) + TSI\_CCA s for the cell re-selection delay to a higher priority cell and 7.68 s for the cell re-selection delay to a lower priority cell in the test case, which we allow 8 s.

### A.11.1.3 Cell re-selection from NR carrier with target NR carrier frequency under CCA

#### A.11.1.3.1 Cell reselection to FR1 inter-frequency NR case when target cell is subject to CCA

##### A.11.1.3.1.1 Test Purpose and Environment

This test is to verify the requirement for the inter frequency NR cell reselection requirements specified in clause  4.2A.2.4 when the target cell is subject to CCA. Supported test configurations are shown in table A. 11.1.3.1.2-1.

##### A.11.1.3.1.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers where the second carrier is subject to CCA as given in tables A.11.1.3.1.2-1, A.11.1.3.1.2-2 and A.11.1.3.1.2-3. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

Table A.11.1.3.1.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell without CCA | Description of a cell with CCA |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| The UE is only required to be tested in one of the supported test configurations. | | |

Table A.11.1.3.1.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case when target cell is subject to CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2, 3 | Cell2 | The UE camps on cell 2 which is an inter-frequency NR cell in the initial phase and during T1 period the UE reselects to cell 1 which is cell subject to CCA |
|  | Neighbour cell |  | 1, 2, 3 | Cell 1 |  |
| T1 end condition | Active cell |  | 1, 2, 3 | Cell1 | The UE shall perform reselection to cell 1 during T1 |
|  | Neighbour cells |  | 1, 2, 3 | Cell2 |  |
| T3 end condition | Active cell |  | 1, 2, 3 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T3 |
|  | Neighbour cell |  | 1, 2, 3 | Cell 1 |  |
| RF Channel Number | |  | 1, 2, 3 | 1, 2 |  |
| Time offset between cells | |  | 1 | 3 ms | Asynchronous cells |
|  | |  | 2 | 3 μs | Synchronous cells |
|  | |  | 3 | 3 μs | Synchronous cells |
| Access Barring Information | | - | 1, 2, 3 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1 | Cell 1: SSB.1 CCA for semi-static channel access;  Cell 1: SSB.2 CCA for dynamic channel access;  Cell 2: SSB.1 FR1 |  |
|  | |  | 2 | Cell 1: SSB.1 CCA for semi-static channel access;  Cell 1: SSB.2 CCA for dynamic channel access;  Cell 2: SSB.1 FR1 |  |
|  | |  | 3 | Cell 1: SSB.1 CCA for semi-static channel access;  Cell 1: SSB.2 CCA for dynamic channel access; Cell 2: SSB.2 FR1 |  |
| SMTCconfiguration | |  | 1 | Cell 1: SMTC.1  Cell 2: SMTC.2 |  |
|  | |  | 2 | Cell 1: SMTC.1  Cell 2: SMTC.1 |  |
|  | |  | 3 | Cell 1: SMTC.1  Cell 2: SMTC.1 |  |
| DBT Window Configuration | |  | 1, 2, 3 | Cell 1: DBT.1  Cell 2: N/A | As specified in clause A.3.28.1. |
| DL CCA model | |  | 1, 2, 3 | Cell 1: As specified in clause A.3.26.2.1  Cell 2: N/A |  |
| UL CCA model | |  | 1, 2, 3 | Cell 1: As specified in clause A.3.26.2.2  Cell 2: N/A |  |
| DRX cycle length | | s | 1, 2, 3 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1, 2, 3 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| rangeToBestCell | |  | 1, 2, 3 | Not configured |  |
| T1 | | s | 1, 2, 3 | 15 | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1, 2, 3 | >7 | During T2, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T3. |
| T3 | | s | 1, 2, 3 | 75 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.3.1.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case in AWGN when target cell is subject to CCA

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | | Cell 2 | | |
| T1 | T2 | T3 | | T1 | T2 | T3 |
| TDD configuration |  | 1 | TDDConf.1.1.CCA | | | | N/A | | |
|  |  | 2 | TDDConf.1.1.CCA | | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.1.1.CCA | | | | TDDConf.2.1 | | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1, 2, 3 | 0.9 | | | | N/A | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1, 2, 3 | 0.75 | | | | N/A | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 1, 2, 3 | 0.5 | | | | N/A | | |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | 1 | | | | N/A | | |
| Md,max |  | 1, 2, 3 | 16 | | | | N/A | | |
| Mm,max |  | 1, 2, 3 | 4 | | | | N/A | | |
| Me,max |  | 1, 2, 3 | 8 | | | | N/A | | |
| PDSCH RMC |  | 1 | SR.1.1 CCA | | | | SR.1.1 FDD | | |
| configuration |  | 2 | SR.1.1 CCA | | | | SR.1.1 TDD | | |
|  |  | 3 | SR.1.1 CCA | | | | SR.2.1 TDD | | |
| RMSI CORESET |  | 1 | CR.1.1 CCA | | | | CR.1.1 FDD | | |
| RMC configuration |  | 2 | CR.1.1 CCA | | | | CR.1.1 TDD | | |
|  |  | 3 | CR.1.1 CCA | | | | CR.2.1 TDD | | |
| Dedicated CORESET |  | 1 | CCR.1.1 CCA | | | | CCR.1.1 FDD | | |
| RMC configuration |  | 2 | CCR.1.1 CCA | | | | CCR.1.1 TDD | | |
|  |  | 3 | CCR.1.1 CCA | | | | CCR.2.1 TDD | | |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | | | | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | | | | DLBWP.0.1 | | |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | | | | ULBWP.0.1 | | |
| RLM-RS |  | 1, 2, 3 | SSB | | | | SSB | | |
| Qrxlevmin | dBm/SCS | 1, 2 | -137 | | | | -140 | | |
|  |  | 3 | -137 | | | | -137 | | |
| Pcompensation | dB | 1, 2, 3 | 0 | | | | 0 | | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | | | | SS-RSRP | | |
|  | dB | 1 | 14 | 14 | 14 | | -4 | -infinity | 12 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| Note2 | dBm/SCS | 1 | -95 | | | -98 | | | |
|  |  | 2 | -95 | | | -98 | | | |
|  |  | 3 | -95 | | | | | | |
| Note2 | dBm/15 kHz | 1 | -98 | | | | | | |
|  |  | 2 |  | | | | | | |
|  |  | 3 |  | | | | | | |
|  | dB | 1 | 14 | 14 | 14 | | -4 | -infinity | 12 |
|  |  | 2 |  |  |  | |  |  |  |
|  |  | 3 |  |  |  | |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -81 | -81 | -81 | | -102 | -infinity | -86 |
|  |  | 2 | -81 | -81 | -81 | | -102 | -infinity | -86 |
|  |  | 3 | -81 | -81 | -81 | | -99 | -infinity | -83 |
| Io | dBm/9.36 MHz | 1 | -- | -- | -- | | -68.60 | -70.05 | -57.78 |
|  | dBm/9.36 MHz | 2 | -- | -- | -- | | -68.60 | -70.05 | -57.78 |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -49.79 | | -62.50 | -63.96 | -51.69 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1, 2, 3 | 50 | | | | 50 | | |
| Threshx, highP | dB | 1, 2, 3 | 48 | | | | 48 | | |
| Threshserving, lowP | dB | 1, 2, 3 | 44 | | | | 44 | | |
| Threshx, lowP | dB | 1, 2, 3 | 50 | | | | 50 | | |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | |

##### A.11.1.3.1.3 Test Requirements

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

The cell re-selection delay to a higher priority cell shall be less than 68 s.

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

1.28 x (5 + Me) + TSI\_CCA s. Me is the number of DRX cycles with at least one SMTC where there are no SSBs available during the Tevaluate,NR\_Intra\_CCA. If Me > Me,max the UE is required to restart the evaluation of cell 2.

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

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

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, NR\_ inter\_CCA See Table 4.2A.2.4-1 in clause 4.2A.2.4

TSI\_CCA Maximum repetition period of relevant system info blocks that needs to be received by the UE to camp on a cell.

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

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

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority cell and 1.28 x (5 + Me) + TSI\_CCA s for the cell re-selection delay to a lower priority cell in the test case.

### A.11.1.4 Inter-RAT cell re-selection to E-UTRAN with source NR carrier frequency under CCA

#### A.11.1.4.1 Cell reselection to higher priority E-UTRAN when serving cell is subject to CCA

##### A.11.1.4.1.1 Test Purpose and Environment

This test is to verify the requirement for the NR cell subject to CCA to E-UTRAN inter-RAT cell reselection requirements specified in clause 4.2A.2.5 when the E-UTRAN cell is of higher priority.

##### A.11.1.4.1.2 Test Parameters

The test scenario comprises of one NR cell which is subject to CCA and one E-UTRAN cell as given in tables A.11.1.4.1.2-1, A.11.1.4.1.2-2, A.11.1.4.1.2-3 and A.11.1.4.1.2-4. The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively. NR cell 1 is already identified by the UE prior to the start of the test. E-UTRAN cell 2 is of higher priority than cell 1.

Table A.11.1.4.1.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | | |

Table A.11.1.4.1.2-2: General test parameters for NR cell subject to CCA to E-UTRAN cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell1 | The UE camps on cell 1 in the initial phase and during T2 period the UE reselects to cell 2. |
| T2 end | Active cell |  | 1, 2 | Cell2 | The UE shall perform reselection to cell |
| condition | Neighbour cells |  | 1, 2 | Cell1 | 2 during T2. |
| T3 end | Active cell |  | 1, 2 | Cell1 | The UE shall perform reselection to cell |
| condition | Neighbour cells |  | 1, 2 | Cell2 | 1 during T3 for iteration of the tests. |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SMTC configuration | |  | 1, 2 | SMTC.1 |  |
| DBT Window Configuration | |  | 1, 2 | DBT.1 | As specified in clause A.3.28.1. |
| SSB configuration | |  |  | Cell 1: SSB.1 CCA for semi-static channel access;  Cell 1: SSB.2 CCA for dynamic channel access; |  |
| DL CCA model | |  | 1, 2 | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | 1, 2 | As specified in clause A.3.26.2.2 |  |
| DRX cycle length | | s | 1, 2 | 1.28 | The value shall be used for all cells in the test. |
| NR PRACH configuration index | |  | 1, 2 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| E-UTRAN PRACH configuration index | |  | 1 | 53 | As specified in table 5.7.1-2 in TS 36.211 [23] |
| 2 | 4 |
| E-UTRAN PRACH | |  | 1 | 53 | As specified in table 5.7.1-2 in |
| configuration index | |  | 2 | 4 | TS 36.211 [23] |
| T1 | | s | 1, 2 | >7 | During T1, cell 2 shall be powered off, and during the off time the physical cell identity shall be changed. The intention is to ensure that cell 2 has not been detected by the UE prior to the start of period T2. |
| T2 | | s | 1, 2 | 75 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | | s | 1, 2 | 15 | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.4.1.2-3: Cell specific test parameters for NR cell 1 subject to CCA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | | |
| **T1** | **T2** | **T3** |
| TDD configuration |  | 1, 2 | TDDConf.1.1.CCA | | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1, 2 | 0.9 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1, 2 | 0.75 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 1, 2 | 0.5 | | |
| UL CCA probability PCCA\_UL |  | 1, 2 | 1 | | |
| Md,max |  | 1, 2 | 16 | | |
| Mm,max |  | 1, 2 | 4 | | |
| Me,max |  | 1, 2 | 8 | | |
| PDSCH parameters |  | 1, 2 | SR.1.1 CCA | | |
| RMSI CORESET parameters |  | 1, 2 | CR.1.1 CCA | | |
| Dedicated CORESET parameters |  | 1, 2 | CCR.1.1 CCA | | |
| SSB parameters |  | 1, 2 | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access | | |
| NR SMTC parameters |  | 1, 2 | SMTC.1 | | |
| OCNG Pattern |  | 1, 2 | OP.1 defined in A.3.2.1 | | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0 | | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0 | | |
| RLM-RS |  | 1, 2 | SSB | | |
| Qrxlevmin | dBm/SCS | 1, 2 | -137 | | |
|  | dBm/SCS | 1, 2 | -95 | | |
|  | dBm/15 kHz | 1, 2 | -98 | | |
| SS-RSRP |  | 1, 2 | -81 | -81 | -81 |
|  | dB | 1, 2 | 14 | 14 | 14 |
|  | dB | 1, 2 | 14 | 14 | 14 |
| Io | dBm/38.16 MHz | 1, 2 | -49.79 | -49.79 | -49.79 |
| Treselection | S | 1, 2 | 0 | | |
| Snonintrasearch | dB | 1, 2 | 50 | | |
| Threshx, high (Note 2) | dB | 1, 2 | 48 | | |
| Threshserving, low | dB | 1, 2 | 44 | | |
| Threshx, low | dB | 1, 2 | 50 | | |
| Propagation Condition |  | 1, 2 | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: This refers to the value of Thresh**x, high** which is included in NR system information, and is a threshold for the E-UTRA target cell  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | |

Table A.11.1.4.1.2-4: Cell specific test parameters for E-UTRA cell 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 2** | | | |
| **T1** | **T2** | | **T3** |
| E-UTRA RF Channel number |  | 1 | | | |
| BWchannel | MHz | 10 | | | |
| OCNG Patterns defined in TS 36.133 [15] clause A.3.2 |  | OP.2 TDD for test configuration 1, 2, 3;  OP.2 FDD for test configuration 4, 5, 6 | | | |
| PBCH\_RA | dB | 0 | | | |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 1 | dB |
| OCNG\_RBNote 1 | dB |
| Qrxlevmin | dBm | -140 | | | |
|  | dBm/15 kHz | -98 | | | |
| RSRP | dBm/15 KHz | -infinity | | -86 | -102 |
|  | dB | -infinity | | 12 | -4 |
|  | dB | -infinity | | 12 | -4 |
| TreselectionEUTRAN | S | 0 | | | |
| Snonintrasearch | dB | 50 | | | |
| Threshx, high (Note 2) | dB | 48 | | | |
| Threshserving, low | dB | 44 | | | |
| Threshx, low | dB | 50 | | | |
| Propagation Condition |  | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: This refers to the value of Thresh**x, high** which is included in E-UTRA system information, and is a threshold for the NR target cell | | | | | |

##### A.11.1.4.1.3 Test Requirements

The cell reselection delay to a higher priority E-UTRAN cell is defined as the time from the beginning of time period T2, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a higher priority cell shall be less than 68 s.

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

NOTE: The cell re-selection delay to a higher priority cell can be expressed as: Thigher\_priority\_search + Tevaluate, E-UTRAN + TSI-E-UTRA,

Where:

Thigher\_priority\_search See clause 4.2.2.7

Tevaluate, E-UTRAN See Table 4.2.2.5-1 in clause 4.2.2.5

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

This gives a total of 67.68 s, allow 68 s for the cell re-selection delay to a higher priority E-UTRAN cell.

#### A.11.1.4.2 Cell reselection to lower priority E-UTRAN when serving cell is subject to CCA

##### A.11.1.4.2.1 Test Purpose and Environment

This test is to verify the requirement for the NR cell subject to CCA to E-UTRAN inter-RAT cell reselection requirements specified in clause 4.2A.2.5 when the E-UTRAN cell is of lower priority.

The test scenario comprises of one NR cell and one E-UTRAN cell as given in tables A.11.1.4.2.1-1, A.11.1.4.2.1-2, A.11.1.4.2.1-3 and A.11.1.4.2.1-4. The test consists of three successive time periods, with time duration of T1 and T2 respectively. Both NR cell 1 and E-UTRAN cell 2 are already identified by the UE prior to the start of the test. E-UTRAN cell 2 is of lower priority than cell 1.

Table A.11.1.4.2.1-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations. | | |

Table A.11.1.4.2.1-2: General test parameters for NR cell subject to CCA to E-UTRAN cell re-selection test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2 | Cell1 | The UE camps on cell 1 in the initial phase. |
| T1 end condition | Active cell |  | 1, 2 | Cell2 | The UE shall perform reselection to cell 2 during T1. |
| Neighbour cells |  | 1, 2 | Cell1 |
| T2 end condition | Active cell |  | 1, 2 | Cell1 | The UE shall perform reselection to cell 1 during T2 for iteration of the tests. |
| Neighbour cells |  | 1, 2 | Cell2 |
| Access Barring Information | | - | 1, 2 | Not Sent | No additional delays in random access procedure. |
| SMTC configuration | |  | 1, 2 | SMTC.1 |  |
| DBT Window Configuration | |  | 1, 2 | DBT.1 | As specified in clause A.3.28.1. |
| DL CCA model | |  | 1, 2 | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | 1, 2 | As specified in clause A.3.26.2.2 |  |
| DRX cycle length | | s | 1, 2 | 1.28 | The value shall be used for all cells in the test. |
| NR PRACH configuration index | |  | 1, 2 | 102 | The detailed configuration is specified in TS 38.211 clause 6.3.3.2 |
| E-UTRAN PRACH | |  | 1 | 53 | As specified in table 5.7.1-2 in TS 36.211 [23] |
| configuration index | |  | 2 | 4 |
| T1 | | s | 1, 2 | 15 | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | | s | 1, 2 | 75 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.4.2.1-3: Cell specific test parameters for NR cell 1 subject to CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | |
| **T1** | **T2** |
| TDD configuration |  | 1, 2 | TDDConf.1.1.CCA | |
| DL CCA probability for semi-static channel access (PCCA\_DL) |  | 1, 2 | 0.9 | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) |  | 1, 2 | 0.75 | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) |  | 1, 2 | 0.5 | |
| UL CCA probability PCCA\_UL |  | 1, 2 | 1 | |
| Md,max |  | 1, 2 | 16 | |
| Mm,max |  | 1, 2 | 4 | |
| Me,max |  | 1, 2 | 8 | |
| PDSCH RMC configuration |  | 1, 2 | SR.1.1 CCA | |
| RMSI CORESET RMC  Configuration |  | 1, 2 | CR.1.1 CCA | |
| Dedicated CORESET RMC |  | 1, 2 | CCR.1.1 CCA | |
| Configuration |
| SSB configuration |  | 1, 2 | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access | |
|  |
| SMTC configuration |  | 1, 2 | SMTC.1 | |
|  |
|  |
| OCNG Pattern |  | 1, 2 | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | 1, 2 | DLBWP.0 | |
| Initial UL BWP configuration |  | 1, 2 | ULBWP.0 | |
| RLM-RS |  | 1, 2 | SSB | |
| Qrxlevmin | dBm/SCS | 1, 2 | -137 | |
|  | dBm/SCS | 1, 2 | -95 | |
|  | dBm/15 kHz | 1, 2 | -98 | |
| SS-RSRP | dBm/SCS | 1, 2 | -99 | -83 |
|  | dB | 1, 2 | -4 | 12 |
|  |  |  |  |
|  |  |  |  |
|  | dB | 1, 2 | -4 | 12 |
|  |  |  |  |
|  |  |  |  |
| Io | dBm/38.16 MHz | 1, 2 | -62.50 | -51.69 |
| Treselection | S | 1, 2 | 0 | |
| Snonintrasearch | dB | 1, 2 | 50 | |
| Threshx, high (Note 2) | dB | 1, 2 | 48 | |
| Threshserving, low | dB | 1, 2 | 44 | |
| Threshx, low | dB | 1, 2 | 50 | |
| Propagation Condition |  | 1, 2 | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: This refers to the value of Thresh**x, high** which is included in NR system information, and is a threshold for the E-UTRA target cell  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | |

Table A.11.1.4.2.1-4: Cell specific test parameters for E-UTRA cell 2

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Cell 2 | |
| T1 | T2 |
| E-UTRA RF Channel number |  | 1 | |
| BWchannel | MHz | 10 | |
| OCNG Patterns defined in TS 36.133 [15] clause A.3.2 |  | OP.2 TDD for test configuration 1, 2, 3;  OP.2 FDD for test configuration 4, 5, 6 | |
| PBCH\_RA | dB | 0 | |
| PBCH\_RB | dB |
| PSS\_RA | dB |
| SSS\_RA | dB |
| PCFICH\_RB | dB |
| PHICH\_RA | dB |
| PHICH\_RB | dB |
| PDCCH\_RA | dB |
| PDCCH\_RB | dB |
| PDSCH\_RA | dB |
| PDSCH\_RB | dB |
| OCNG\_RANote 1 | dB |
| OCNG\_RBNote 1 | dB |
| Qrxlevmin | dBm | -140 | |
|  | dBm/15 kHz | -98 | |
| RSRP | dBm/15 KHz | -84 | -84 |
|  | dB | 14 | 14 |
|  | dB | 14 | 14 |
| TreselectionEUTRAN | S | 0 | |
| Snonintrasearch | dB | 50 | |
| Threshx, high (Note 2) | dB | 48 | |
| Threshserving, low | dB | 44 | |
| Threshx, low | dB | 50 | |
| Propagation Condition |  | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: This refers to the value of Thresh**x, high** which is included in E-UTRA system information, and is a threshold for the NR target cell | | | |

##### A.11.1.4.2.2 Test Requirements

The cell reselection delay to a lower priority E-UTRAN cell is defined as the time from the beginning of time period T1, to the moment when the UE camps on cell 2, and starts to send preambles on the PRACH for sending the *RRCSetupRequest* message to perform a Tracking Area Update procedure on cell 2.

The cell re-selection delay to a lower priority cell shall be less than 8 s.

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

NOTE: The cell re-selection delay to a lower priority cell can be expressed as: Tevaluate, E-UTRAN + TSI-E-UTRA,

Where:

Tevaluate, E-UTRAN See Table 4.2.2.5-1 in clause 4.2.2.5

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

This gives a total of 7.68 s, allow 8 s for the cell re-selection delay to a lower priority E-UTRAN cell.

<End of Change (from R4-2114106)>

### <Start of Change (from R4-2113231)>

## A.12.2 RRC\_CONNECTED state mobility

### A.12.2.1 Handover

#### A.12.2.1.1 E-UTRAN - NR with CCA handover

##### A.12.2.1.1.1 Test Purpose and Environment

This test shall verify the E-UTRAN to NR FR1 handover requirements specified in clause 5.3.4A in TS 36.133 [15].

The test comprises of one E-UTRA carrier and one NR carrier with CCA. There are two cells and one cell on each carrier. Cell 1 is the E-UTRAN cell and Cell 2 is an inter-RAT NR neighbour cell with CCA.

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. Gap pattern configuration with id #0 as specified in Table 8.1.2.1-1 of TS 36.133 [15] is configured before T2 begins to enable inter-RAT frequency monitoring. A RRC message implying handover shall be sent to the UE during period T2 after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain Cell 2 as the target cell.

Supported test configurations are shown in table A.12.2.1.1-1. General test parameters are provided in Table A.12.2.1.1-2. Cell specific test parameters for Cell 1 and Cell 2 are provided in Tables A.12.2.1.1-3 and A.12.2.1.1-4 respectively.

Table A.12.2.1.1-1: Supported test configurations for E-UTRAN inter-RAT NR handover

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

Table A.12.2.1.1-2: General test parameters for E-UTRAN inter-RAT NR handover

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| NR RF Channel Number | |  | 1 | 1 NR carrier frequency with CCA is used in the test |
| LTE RF Channel Number | |  | 2 | 1 E-UTRAN carrier frequency is used in the test |
| Initial conditions | Active cell |  | Cell 1 | E-UTRAN cell |
| Neighbouring cell |  | Cell 2 | NR cell with CCA |
| Final condition | Active cell |  | Cell 2 |  |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| NR measurement quantity | |  | SS-RSRP |  |
| E-UTRAN measurement quantity | |  | RSRP |  |
| b2-Threshold1 | | dBm | -84 | Absolute E-UTRAN RSRP threshold for event B2 |
| b2-Threshold2NR | | dBm | As specified in Table A.12.2.1.1-4 | Absolute NR SS-RSRP threshold for event B2 |
| Hysteresis | | dB | 0 |  |
| TimeToTrigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| DRX | |  | OFF | Non-DRX test |
| Access Barring Information | | - | Not sent | No additional delays in random access procedure |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Gap pattern configuration Id | |  | 0 | As specified in Table 8.1.2.1-1 started before T2 starts [15] |
| T1 | | s | [5] |  |
| T2 | | s | [£5] |  |
| T3 | | s | [1] |  |

Table A.12.2.1.1-3: Cell specific test parameters for E-UTRAN inter-RAT NR handover with CCA (Cell 1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | | |
| T1 | T2 | T3 |
| RF channel number |  | 1, 2 | 2 | | |
| Duplex mode |  | 1 | FDD | | |
|  |  | 2 | TDD | | |
| TDD special subframe configurationNote1 |  | 1, 2 | 6 | | |
| TDD uplink-downlink configurationNote1 |  | 1, 2 | 1 | | |
| BWchannel | MHz | 1, 2 | 5 MHz: NRB,c = 25  10 MHz: NRB,c = 50  20 MHz: NRB,c = 100 | | |
| PRACH ConfigurationNote2 |  | 1 | 4 | | |
| 2 | 53 | | |
| PDSCH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 5 MHz: R.7 FDD  10 MHz: R.3 FDD  20 MHz: R.6 FDD | | |
| 2 | 5 MHz: R.4 TDD  10 MHz: R.0 TDD  20 MHz: R.3 TDD | | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 5 MHz: R.11 FDD  10 MHz: R.6 FDD  20 MHz: R.10 FDD | | |
| 2 | 5 MHz: R.11 TDD  10 MHz: R.6 TDD  20 MHz: R.10 TDD | | |
| OCNG PatternsNote3 |  | 1 | 5 MHz: OP.20 FDD  10 MHz: OP.10 FDD  20 MHz: OP.17 FDD | | |
| 2 | 5 MHz: OP.9 TDD  10 MHz: OP.1 TDD  20 MHz: OP.7 TDD | | |
| PBCH\_RA | dB | 1, 2 | 0 | | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RANote4 |
| OCNG\_RBNote4 |
| NocNote5 | dBm/15kHz | 1, 2 | -98 | | |
| Ês/Noc | dB | 1, 2 | 7 | 7 | 7 |
| Ês/IotNote6 | dB | 1, 2 | 7 | 7 | 7 |
| RSRPNote6 | dBm/15kHz | 1, 2 | -91 | -91 | -91 |
| SCH\_RPNote6 | dBm/15kHz | 1, 2 | -91 | -91 | -91 |
| IoNote6 | dBm/9MHz | 1, 2 | -62.43 | -62.43 | -62.43 |
| Propagation Condition |  | 1, 2 | AWGN | | |
| Antenna Configuration and Correlation Matrix Note7 |  | 1, 2 | 1x2 Low | | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211 [23].  Note 3: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 4: 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 5: 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 6: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 7: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | | |

Table A.12.2.1.1-4: Cell specific test parameters E-UTRAN inter-RAT NR with CCA handover (Cell 2)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Configuration | Cell 2 | | |
|  | T1 | T2 | T3 |
| RF channel number | | |  | 1, 2 | 1 | | |
| DL CCA probability PCCA\_DL | | Semi-static channel access Note 4, 6 |  | 1, 2 | PCCA\_DL=0.9375 | | |
|  | | Dynamic channel access Note 5, 6 |  | 1, 2 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| UL CCA probability PCCA\_UL | | Semi-static channel access Note 4, 6 |  | 1, 2 | PCCA\_UL=0.87 | | |
|  | | Dynamic channel access Note 5, 6 |  | 1, 2 | PCCA\_UL=0.75 | | |
| LCCA\_DL | | | - | 1, 2 | 5 | | |
| WCCA\_DL | | | ms | 1, 2 | T304 | | |
| LCCA\_UL | | | - | 1, 2 | 5 | | |
| WCCA\_UL | | | ms | 1, 2 | T304 | | |
| T304 | | | ms | 1, 2 | 500 | | |
| Duplex mode | | |  | 1, 2 | TDD | | |
| TDD Configuration | | |  | 1, 2 | TDDConf.1.1 CCA | | |
| BWchannel | | | MHz | 1, 2 | 40: NRB,c = 106 (TDD) | | |
| PDSCH reference measurement channel | | |  | 1, 2 | SR.1.1 CCA | | |
| CORESET reference channel | | |  | 1, 2 | CR.1.1 CCA | | |
| PRACH configuration | | |  | 1, 2 | FR1 PRACH configuration 1 under CCA | | |
| OCNG patternNote1 | | |  | 1, 2 | OP.1 | | |
| BWP | Initial DL BWP | |  | 1, 2 | DLBWP.0.1 | | |
| Dedicated DL BWP | | DLBWP.1.1 | | |
| Initial UL BWP | | ULBWP.0.1 | | |
| Dedicated UL BWP | | ULBWP.1.1 | | |
| SMTC configuration | | |  | 1, 2 | SMTC.1 | | |
| SSB configuration | | Semi-static channel access Note 4, 6 |  | 1, 2 | SSB.1 CCA | | |
|  | | Dynamic channel access Note 5, 6 |  | 1, 2 | SSB.2 CCA | | |
| DBT window configuration | | |  |  | As defined in A.3.28.1 | | |
| b2-Threshold2NR | | | dBm | 1 | -105 | | |
| 2 | -103 | | |
| EPRE ratio of PSS to SSS | | | dB | 1, 2 | 0 | | |
| EPRE ratio of PBCH\_DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH\_DMRS | | |
| EPRE ratio of PDCCH\_DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH\_DMRS | | |
| EPRE ratio of PDSCH\_DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH\_DMRS | | |
| EPRE ratio of OCNG DMRS to SSS | | |
| EPRE ratio of OCNG to OCNG DMRS | | |
| *Noc*Note2 | | | dBm/15 KHz | 1, 2 | -98 | | |
| *Noc*Note2 | | | dBm/SCS | 1, 2 | -95 | | |
| Ês/Noc | | | dB | 1, 2 | -inifinit | 0 | 0 |
| Ês/IotNote3 | | | dB | 1, 2 | -inifinit | 0 | 0 |
| SS-RSRPNote3 | | | dBm/SCS | 1, 2 | -inifinit | -95 | -95 |
| IoNote3 | | | dBm/38.16 MHz | 1, 2 | -63.96 | -60.94 | -60.94 |
| Propagation condition | | |  | 1, 2 | AWGN | | |
| Antenna Configuration and Correlation Matrix | | |  | 1, 2 | 1x2 Low | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for *Noc* to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | |

##### A.12.2.1.1.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than TBD ms from the beginning of time period T3.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms and is specified in TS36.331.

Tinterrupt = 62 + ( L1´ + L3) \* TSMTC; Tinterrupt is defined in TS36.133 clause 5.3.4A.3 where

L1´ is the number of SMTC occasions not available at the UE during the inter-RAT detection period.

L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure. L3 = 0 for Type 2C UL channel access procedure as defined in TS 37.213 [57].

TSMTC = 20 ms is the SMTC periodicity ms in the test.

This gives a total of 112 + (L1´ + L3)\*20 ms.

<End of Change (from R4-2113231)>

### <Start of Change (from R4-2114108)>

### A.11.2.1 Handover

#### A.11.2.1.1 Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; known target cell

##### A.11.2.1.1.1 Test Purpose and Environment

This test is to verify the requirement for the NR intra frequency handover requirements from FR1 carrier under CCA to FR1 carrier under CCA specified in clause 6.1B.1.2.

##### A.11.2.1.1.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.1.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.1.2-2, and A.11.2.1.1.2-3.

The test consists of three successive time periods, with time durations of T1, T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

NR shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.11.2.1.1.2-1: Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA test configurations

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

Table A.11.2.1.1.2-2: General test parameters Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 | On the carrier under CCA |
|  | Neighbouring cell |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell |  | Cell 2 | On the carrier under CCA |
| DL CCA model | Dynamic channel accessNote 1, 3 |  | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2, 3 |
| UL CCA model | Dynamic channel access Note 1, 3 |  | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T304 | | ms | 500 |  |
| LCCA\_DL | |  | 5 |  |
| WCCA\_DL | | ms | T304 |  |
| LCCA\_UL | |  | 5 |  |
| WCCA\_UL | | ms | T304 |  |
| T1 | | s | 5 |  |
| T2 | | s | ≤ 5 |  |
| T3 | | s | ≥ Tinterrupt | Tinterrupt is defined in clause 6.1B.1.2 |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | |

Table A.11.2.1.1.2-3: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | | | | | Cell 2 | | | | |
|  | | |  | T1 | | T2 | | T3 | | T1 | | T2 | | T3 |
| NR RF Channel Number | | |  | 1 | | | | | | 1 | | | | |
| PCCA\_DL for dynamic channel access Note 4,6 | | | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | |
| PCCA\_DL for semi-static channel access Note 5,6 | | | - | PCCA\_DL=0.9375 | | | | | | PCCA\_DL=0.9375 | | | | |
| PCCA\_UL for dynamic channel access Note 4,6 | | | - | 0.75 | | | | | | 0.75 | | | | |
| PCCA\_UL for semi-static channel access Note 5,6 | | | - | 0.87 | | | | | | 0.87 | | | | |
| TDD configuration | | Config 1 |  | TDDConf.1.1 CCA | | | | | | | | | | |
| BWchannel | | Config 1 |  | 40: NRB,c = 106 | | | | | | | | | | |
| BWP BW | | Config 1 |  | 40: NRB,c = 106 | | | | | | | | | | |
| DRX Cycle | | | ms | Not Applicable | | | | | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 CCA | | | | | | | | | | |
| CORESET Reference Channel | | Config 1 |  | CR.1.1 CCA | | | | | | | | | | |
| Dedicated CORESET RMC configuration | | Config 1 |  | CCR.1.1 CCA | | | | | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.1 TDD | | | | | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | | | | | |
| SMTC Configuration | | |  | SMTC.1 | | | | | | | | | | |
| DBT window configuration | | Config 1 |  | DBT.1 | | | | | | | | | | |
| SSB configuration for semi-static channel accessNote 4, 6 | | Config 1 |  | SSB.1 CCA | | | | | | | | | | |
| SSB configuration for dynamic channel accessNote 5, 6 | | Config 1 |  | SSB.2 CCA | | | | | | | | | | |
| ssb-PositionQCL | | Config 1 |  | [1] | | | | | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 under CCA | | | | | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | | | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | | | | | |
| Note2 | Config 1 | | dBm/SCS | -95 | | | | | | | | | | |
|  | | | dB | 8 | -3.3 | | -3.3 | | -Infinity | | 2.36 | | 2.36 | |
|  | | | dB | 8 | 8 | | 8 | | -Infinity | | 11 | | 11 | |
| SSB\_RP | Config 1 | | dBm/SCS | -87 | -87 | | -87 | | -Infinity | | -84 | | -84 | |
| IoNote3 | Config 1 | | dBm/  38.16MHz | -55.31 | -50.96 | | -50.96 | | -55.31 | | -50.96 | | -50.96 | |
| Propagation condition | | | - | AWGN | | | | | AWGN | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | | | | |

##### A.11.2.1.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tinterrupt from the beginning of time period T3, where Tinterrupt ­is defined in clause 6.1B.1.2

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

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

Tsearch = 0.

Tprocessing = 20 ms.

Tmargin = 2 ms.

T∆ = (1+ L2) \*20 ms.

TIU = (1+ L3)\*10 + 10 ms

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2], L2 is the number of SMTC occasions not available at the UE during the time tracking period where L2 ≤ LCCA\_DL, and L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure, where L3 ≤ LCCA\_UL. L3 = 0 for Type 2C UL channel access procedure as defined in TS 37.213 [33]. The interruption time considering the potential extensions caused by L1,L2 , L3 and by the UL CCA failure detection/recovery mechanism is limited by the T304 timer. The UE behaviour at the T304 timer expiry is detailed in TS 38.331 [2].Test equipment should make sure that LCCA\_DL and LCCA\_UL are not exceeded during a test by monitoring the number of CCA failures and preventing additional CCA failures from happening after LCCA\_DL or LCCA\_UL is reached.

#### A.11.2.1.2 Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; unknown target cell

##### A.11.2.1.2.1 Test Purpose and Environment

This test is to verify the requirement intra frequency handover requirements from FR1 carrier under CCA to FR1 carrier under CCA specified in clause 6.1B.1.2.

##### A.11.2.1.2.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.2.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.2.2-2, and A.11.2.1.2.2-3.

The test scenario comprises of two carriers and one cell on each carrier. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 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 receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.11.2.1.2.2-1: Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA test configurations

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

Table A.11.2.1.2.2-2: General test parameters Intra-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 | On the carrier under CCA |
|  | Neighbouring cell |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell |  | Cell 2 | On the carrier under CCA |
| DL CCA model | Dynamic channel accessNote 1, 3 |  | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2, 3 |
| UL CCA model | Dynamic channel access Note 1, 3 |  | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T304 | | ms | 500 |  |
| LCCA\_DL | |  | 5 |  |
| WCCA\_DL | | ms | T304 |  |
| LCCA\_UL | |  | 5 |  |
| WCCA\_UL | | ms | T304 |  |
| T1 | | s | 5 |  |
| T2 | | s | ≥ Tinterrupt | Tinterrupt is defined in clause 6.1B.1.2 |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic  channel occupancy only. | | | | |

Table A.11.2.1.2.2-3: Cell specific test parameters for NR FR1-FR1 Intra frequency handover test case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | | | Cell 2 | | |
|  | | |  | T1 | | T2 | | T1 | | T2 |
| NR RF Channel Number | | |  | 1 | | | | 1 | | |
| PCCA\_DL for dynamic channel access Note 4,6 | | | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| PCCA\_DL for semi-static channel access Note 5,6 | | | - | PCCA\_DL=0.9375 | | | | PCCA\_DL=0.9375 | | |
| PCCA\_UL for dynamic channel access Note 4,6 | | | - | 0.75 | | | | 0.75 | | |
| PCCA\_UL for semi-static channel access Note 5,6 | | | - | 0.87 | | | | 0.87 | | |
| TDD configuration | | Config 1 |  | TDDConf.1.1 CCA | | | | | | |
| BWchannel | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| BWP BW | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| DRX Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 CCA | | | | | | |
| CORESET Reference Channel | | Config 1 |  | CR.1.1 CCA | | | | | | |
| Dedicated CORESET RMC configuration | | Config 1 |  | CCR.1.1 CCA | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.2 TDD | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | |
| SMTC Configuration | | |  | SMTC.1 | | | | | | |
| DBT window configuration | | Config 1 |  | DBT.1 | | | | | | |
| SSB configuration for semi-static channel access Note 4, 6 | | Config 1 |  | SSB.1 CCA | | | | | | |
| SSB configuration for dynamic channel access Note 5, 6 | | Config 1 |  | SSB.2 CCA | | | | | | |
| ssb-PositionQCL | | Config 1 |  | [1] | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 under CCA | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | |
| Note2 | Config 1 | | dBm/SCS | -95 | | | | | | |
|  | | | dB | 8 | -0.64 | | -Infinity | | -0.64 | |
|  | | | dB | 8 | 8 | | -Infinity | | 8 | |
| SSB\_RP | Config 1 | | dBm/SCS | -87 | -87 | | -Infinity | | -87 | |
| IoNote3 | Config 1 | | dBm/  38.16MHz | -55.31 | -52.60 | | -55.31 | | -52.60 | |
| Propagation condition | | | - | AWGN | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | |

##### A.11.2.1.2.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tinterrupt from the beginning of time period T3, where Tinterrupt ­is defined in clause 6.1B.1.2

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

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

Tsearch = (1+L1)\* 20 ms.

Tprocessing = 20 ms.

Tmargin = 2 ms.

T∆ = (1+ L2) \*20 ms.

TIU = (1+ L3)\*10 + 10 ms

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2], L1 is the number of SMTC occasions not available at the UE during the intra-frequency detection period, L2 is the number of SMTC occasions not available at the UE during the time tracking period, where L1 + L2 ≤ LCCA\_DL, and L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure, where L3 ≤ LCCA\_UL. L3 = 0 for Type 2C UL channel access procedure as defined in TS 37.213 [33]. The interruption time considering the potential extensions caused by L1,,L2 , L3 and by the UL CCA failure detection/recovery mechanism is limited by the T304 timer.

#### A.11.2.1.3 Inter-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA; unknown target cell

##### A.11.2.1.3.1 Test Purpose and Environment

This test is to verify the requirement for inter frequency handover requirements from FR1 carrier under CCA to FR1 carrier under CCA specified in clause 6.1B.1.2.

##### A.11.2.1.3.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.3.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.3.2-2, and A.11.2.1.3.2-3.

The test scenario comprises of two carriers and one cell on each carrier. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 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 receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.11.2.1.3.2-1: Inter-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA test configurations

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

Table A.11.2.1.3.2-2: General test parameters Inter-frequency handover from FR1 carrier under CCA to FR1 carrier under CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 | On the carrier under CCA |
|  | Neighbouring cell |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell |  | Cell 2 | On the carrier under CCA |
| DL CCA model | Dynamic channel accessNote 1, 3 |  | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2, 3 |
| UL CCA model | Dynamic channel access Note 1, 3 |  | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| T304 | | ms | 500 |  |
| LCCA\_DL | |  | 5 |  |
| WCCA\_DL | | ms | T304 |  |
| LCCA\_UL | |  | 5 |  |
| WCCA\_UL | | ms | T304 |  |
| T1 | | s | 5 |  |
| T2 | | s | ≤ Tinterrupt | Tinterrupt is defined in clause 6.1B.1.2 |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic  channel occupancy only. | | | | |

Table A.11.2.1.3.2-3: Cell specific test parameters for NR FR1-FR1 Inter frequency handover test case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | | | Cell 2 | | |
|  | | |  | T1 | | T2 | | T1 | | T2 |
| NR RF Channel Number | | |  | 1 | | | | 2 | | |
| PCCA\_DL for dynamic channel access Note 4,6 | | | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| PCCA\_DL for semi-static channel access Note 5,6 | | | - | PCCA\_DL=0.9375 | | | | PCCA\_DL=0.9375 | | |
| PCCA\_UL for dynamic channel access Note 4,6 | | | - | 0.75 | | | | 0.75 | | |
| PCCA\_UL for semi-static channel access Note 5,6 | | | - | 0.87 | | | | 0.87 | | |
| TDD configuration | | Config 1 |  | TDDConf.1.1 CCA | | | | | | |
| BWchannel | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| BWP BW | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| DRX Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 CCA | | | | | | |
| CORESET Reference Channel | | Config 1 |  | CR1.1 CCA | | | | | | |
| Dedicated CORESET RMC configuration | | Config 1 |  | CCR.1.1 CCA | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.2 TDD | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | |
| SMTC Configuration | | |  | SMTC.1 | | | | | | |
| DBT window configuration | | Config 1 |  | DBT.1 | | | | | | |
| SSB configuration for semi-static channel access Note 4, 6 | | Config 1 |  | SSB.1 CCA | | | | | | |
| SSB configuration for dynamic channel access Note 5, 6 | | Config 1 |  | SSB.2 CCA | | | | | | |
| ssb-PositionQCL | | Config 1 |  | [1] | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 under CCA | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | |
| Note2 | Config 1 | | dBm/SCS | -95 | | | | | | |
|  | | | dB | 4 | 4 | | -Infinity | | 5 | |
|  | | | dB | 4 | 4 | | -Infinity | | 5 | |
| SSB\_RP | Config 1 | | dBm/SCS | -91 | -91 | | -Infinity | | -90 | |
| IoNote3 | Config 1 | | dBm/  38.16MHz | -58.49 | -58.49 | | -63.94 | | -57.75 | |
| Propagation condition | | | - | AWGN | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | |

##### A.11.2.1.3.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tinterrupt from the beginning of time period T3, where Tinterrupt ­is defined in clause 6.1B.1.2

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

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

Tsearch = (3+L1’)\* 20 ms.

Tprocessing = 20 ms.

Tmargin = 2 ms.

T∆ = (1+ L2) \*20 ms.

TIU = (1+ L3)\*10 + 10 ms

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2], L1’is the number of SMTC occasions not available at the UE during the inter-frequency detection period, L2 is the number of SMTC occasions not available at the UE during the time tracking period, where L1’ + L2 ≤ LCCA\_DL, and L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure, where L3 ≤ LCCA\_UL. L3 = 0 for Type 2C UL channel access procedure as defined in TS 37.213 [33]. The interruption time considering the potential extensions caused by ,L1´,L2 , L3 and by the UL CCA failure detection/recovery mechanism is limited by the T304 timer.

#### A.11.2.1.4 Inter-frequency handover from FR1 carrier under CCA to FR1; known target cell

##### A.11.2.1.4.1 Test Purpose and Environment

This test is to verify the requirement for the NR with CCA FR1-NR FR1 handover requirements specified in clause 6.1.1.2.

##### A.11.2.1.4.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.4.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.4.2-2, and A.11.2.1.4.2-3.

The test consists of three successive time periods, with time durations of T1 T2 and T3 respectively. At the start of time duration T1, the UE may not have any timing information of cell 2.

NR with CCA shall send a RRC message implying handover to cell 2. The RRC message implying handover shall be sent to the UE during period T2, after the UE has reported Event A3. T3 is defined as the end of the last TTI containing the RRC message implying handover.

Table A.11.2.1.4.2-1: Handover from NR with CCA FR1 to NR FR1 test configuration

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

Table A.11.2.1.4.2-2: General test parameters handover from NR with CCA FR1 to NR FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 | NR cell with CCA |
|  | Neighbouring cell |  | Cell 2 | NR cell |
| Final condition | Active cell |  | Cell 2 |  |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| A3-Offset | | dB | 0 |  |
| Hysteresis | | dB | 0 |  |
| Time To Trigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

Table A.11.2.1.4.2-3: Cell specific test parameters for NR with CCA FR1 – NR FR1 handover test case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Test | Cell 1 | | | Cell 2 | | |
|  | | |  | configuration | T1 | T2 | T3 | T1 | T2 | T3 |
| NR RF Channel Number | | |  | 1,2,3 | 1 | | | 2 | | |
| Duplex mode | | |  | 1 | TDD | | | FDD | | |
|  | | |  | 2 | TDD | | | TDD | | |
|  | | |  | 3 | TDD | | | TDD | | |
| TDD configuration | | |  | 1 | TDDConf.1.1 CCA | | | Not Applicable | | |
|  | | |  | 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 | | |
|  | | |  | 3 | TDDConf.1.1 CCA | | | TDDConf.2.1 | | |
| BWchannel | | | MHz | 1 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | | |
|  | | |  | 2 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | | |
|  | | |  | 3 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | | |
| BWP BW | | | MHz | 1 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | | |
|  | | |  | 2 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | | |
|  | | |  | 3 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | | |
| DRX Cycle | | | ms | 1,2,3 | Not Applicable | | | | | |
| PDSCH Reference measurement channel | | |  | 1 | SR.1.1 CCA | | | SR.1.1 FDD | | |
|  | | |  | 2 | SR.1.1 CCA | | | SR.1.1 TDD | | |
|  | | |  | 3 | SR.1.1 CCA | | | SR2.1 TDD | | |
| CORESET Reference Channel | | |  | 1 | CR1.1 CCA | | | CR.1.1 FDD | | |
|  | | |  | 2 | CR1.1 CCA | | | CR.1.1 TDD | | |
|  | | |  | 3 | CR1.1 CCA | | | CR2.1 TDD | | |
| Dedicated CORESET RMC configuration | | |  | 1 | CCR.1.1 CCA | | | CCR.1.1 FDD | | |
|  | 2 | CCR.1.1 CCA | | | CCR.1.1 TDD | | |
|  | 3 | CCR.1.1 CCA | | | CCR.2.1 TDD | | |
| DL CCA probability for semi-static channel access (PCCA\_DL)DL CCA probability PCCA\_DL | | |  | 1,2,3 | 0.9375 | | | N/A | | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_1) | | |  | 1,2,3 | 0.75 | | | N/A | | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_2) | | |  | 1,2,3 | 0.75 | | | N/A | | |
| UL CCA probability for semi-static channel access PCCA\_UL | | |  | 1,2,3 | 0.75 | | | N/A | | |
| UL CCA probability for dynamic static channel access PCCA\_UL | | |  | 1,2,3 | 0.87 | | |  | | |
| TRS configuration | | |  | 1 | TRS.1.2 TDD | | | TRS.1.1 FDD | | |
|  | | |  | 2 | TRS.1.2 TDD | | | TRS.1.1 TDD | | |
|  | | |  | 3 | TRS.1.2 TDD | | | TRS.1.2 TDD | | |
| OCNG Patterns | | |  |  | OP.1 | | | | | |
| SMTC Configuration | | |  |  | SMTC.1 | | | | | |
| SSB Configuration | | Semi-static channel access |  | 1,2 | SSB.1 CCA  (As defined in A.3.10A ) | | | SSB.1 FR1 | | |
| Dynamic channel access |  |  | SSB.2 CCA  (As defined in A.3.10A ) | | |  | | |
|  | | Semi-static channel access |  | 3 | SSB.1 CCA  (As defined in A.3.10A ) | | | SSB.2 FR1 | | |
|  | | Dynamic channel access |  |  | SSB.2 CCA  (As defined in A.3.10A ) | | |  | | |
| DBT window configuration | | |  |  | As defined in A.3.28.1 | | | Not applicable | | |
| PDSCH/PDCCH subcarrier spacing | | | kHz | 1,2 | 30 kHz | | | 15 kHz | | |
|  | | |  | 3 | 30 kHz | | | 30 kHz | | |
| PUCCH/PUSCH subcarrier spacing | | | kHz | 1,2 | 30 kHz | | | 15 kHz | | |
|  | | |  | 3 | 30 kHz | | | 30 kHz | | |
| PRACH configuration | | |  |  | FR1 PRACH configuration 1 under CCA | | | FR1 PRACH configuration 1 | | |
| BWP configuration | | Initial DL BWP |  | 1,2,3 | DLBWP.0.1 | | | | | |
|  | | Dedicated DL BWP |  | 1,2,3 | DLBWP.1.1 | | | | | |
|  | | Initial UL BWP |  | 1,2,3 | ULBWP.0.1 | | | | | |
|  | | Dedicated UL BWP |  | 1,2,3 | ULBWP.1.1 | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 1,2,3 | 0 | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | | 1,2,3 |
| EPRE ratio of PBCH to PBCH DMRS | | | 1,2,3 |
| EPRE ratio of PDCCH DMRS to SSS | | | 1,2,3 |
| EPRE ratio of PDCCH to PDCCH DMRS | | | 1,2,3 |
| EPRE ratio of PDSCH DMRS to SSS | | | 1,2,3 |
| EPRE ratio of PDSCH to PDSCH | | | 1,2,3 |
| EPRE ratio of OCNG DMRS to SSSNote1 | | | 1,2,3 |
| EPRE ratio of OCNG to OCNG DMRSNote1 | | | 1,2,3 |
| Note2 | | | dBm/SCS | 1,2 | [-101] | | | -98 | | |
|  | | |  | 3 | [-101] | | | -95 | | |
|  | | | dB | 1,2,3 | 8 | -3.3 | -3.3 | -Infinity | 2.36 | 2.36 |
|  | | | dB | 1,2,3 | 8 | 8 | 8 | -Infinity | 11 | 11 |
| SSB\_RP | Config 1 | | dBm/SCS | 1,2,3 | -90 | -90 | -90 | -Infinity | -87 | -87 |
| IoNote3 | Config 1 | | dBm/  9.36MHz | 1,2,3 | -61.41 | -57.06 | -57.06 | -61.41 | -57.06 | -57.06 |
| Propagation condition | | | - | 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | |

##### A.11.2.1.4.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 112 ms from the beginning of time period T3.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2].

Tinterrupt = 102 ms in the test. Tinterrupt is defined in clause 6.1.1.2.2.

This gives a total of 112 ms.

#### A.11.2.1.5 Inter-frequency handover from FR1 carrier under CCA to FR1; unknown target cell

##### A.11.2.1.5.1 Test Purpose and Environment

This test is to verify the requirement for the NR with CCA FR1-NR FR1 handover requirements specified in clause 6.1.1.2.

##### A.11.2.1.5.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.5.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.5.2-2, and A.12.2.1.7.2-3.

The test scenario comprises of two carriers and one cell on each carrier. Cell 1 is the NR with CCA cell and Cell 2 is an NR neighbour cell. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1 and T2 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 receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.11.2.1.5.2-1: Handover from NR with CCA FR1 to NR FR1 test configuration

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

Table A.11.2.1.5.2-2: General test parameters handover from NR with CCA FR1 to NR FR1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 | NR cell with CCA |
|  | Neighbouring cell |  | Cell 2 | NR cell |
| Final condition | Active cell |  | Cell 2 |  |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 μs | Synchronous cells |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |

Table A.11.2.1.5.2-3: Cell specific test parameters for NR with CCA FR1 – NR FR1 handover test case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 1 | | | Cell 2 | |
|  |  |  | T1 | T2 | | T1 | T2 |
| NR RF Channel Number |  | 1, 2, 3 | 1 | | | 2 | |
| Duplex mode |  | 1 | TDD | | | FDD | |
|  | 2 | TDD | | | TDD | |
|  | 3 | TDD | | | TDD | |
| DL CCA model |  | 1, 2, 3 | As specified in clause A.3.26.2.1 | | | N/A | |
| UL CCA model |  | 1, 2, 3 | As specified in clause A.3.26.2.2 | | |  | |
| TDD configuration |  | 1 | TDDConf.1.1 CCA | | | Not Applicable | |
|  | 2 | TDDConf.1.1 CCA | | | TDDConf.1.1 | |
|  | 3 | TDDConf.1.1 CCA | | | TDDConf.2.1 | |
| BWchannel | MHz | 1 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | |
| 2 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | |
| 3 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| BWP BW | MHz | 1 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | |
| 2 | 40: NRB,c = 106 | | | 10: NRB,c = 52 | |
| 3 | 40: NRB,c = 106 | | | 40: NRB,c = 106 | |
| DRX Cycle | ms |  | Not Applicable | | | | |
| PDSCH Reference measurement channel |  | 1 | SR.1.1 CCA | | | SR.1.1 FDD | |
|  | 2 | SR.1.1 CCA | | | SR.1.1 TDD | |
|  | 3 | SR.1.1 CCA | | | SR2.1 TDD | |
| CORESET Reference Channel |  | 1 | CR2.1 TDD | | | CR.1.1 FDD | |
|  | 2 | CR2.1 TDD | | | CR.1.1 TDD | |
|  | 3 | CR2.1 TDD | | | CR2.1 TDD | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 CCA | | | CCR.1.1 FDD | |
|  | 2 | CCR.1.1 CCA | | | CCR.1.1 TDD | |
|  | 3 | CCR.1.1 CCA | | | CCR.2.1 TDD | |
| TRS configuration |  | 1 | TRS.1.2 TDD | | | TRS.1.1 FDD | |
|  | 2 | TRS.1.2 TDD | | | TRS.1.1 TDD | |
|  | 3 | TRS.1.2 TDD | | | TRS.1.2 TDD | |
| DL CCA probability for semi-static channel access (PCCA\_DL)DL CCA probability PCCA\_DL |  | 1, 2, 3 | 0.9375 | | | N/A | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_1) |  | 1, 2, 3 | 0.75 | | | N/A | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_2) |  | 1, 2, 3 | 0.75 | | | N/A | |
| UL CCA probability for semi-static channel access PCCA\_UL |  | 1, 2, 3 | 0.75 | | | N/A | |
| UL CCA probability for dynamic static channel access PCCA\_UL |  | 1, 2, 3 | 0.87 | | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | | | |
| SMTC Configuration |  | 1, 2, 3 | SMTC.1 | | | | |
| DBT window configuration |  | 1, 2, 3 | As defined in A.3.28.1 | | | N/A | |
| SSB configuration | Semi-static channel access | 1,2 | SSB.1 CCA  (As defined in A.3.10A ) | | | SSB.1 FR1 | |
| Dynamic channel access |  | SSB.2 CCA  (As defined in A.3.10A ) | | |
| Semi-static channel access | 3 | SSB.1 CCA  (As defined in A.3.10A ) | | | SSB.2 FR1 | |
| Dynamic channel access |  | SSB.2 CCA  (As defined in A.3.10A ) | | |
| ssb-PositionQCL |  |  | [1] | | | N/A | |
| PDSCH/PDCCH subcarrier spacing | kHz | 1 | 30 kHz | | | 15 kHz | |
| 2 | 30 kHz | | | 15 kHz | |
| 3 | 30 kHz | | | 30 kHz | |
| PUCCH/PUSCH subcarrier spacing | kHz | 1 | 30 kHz | | | 15 kHz | |
| 2 | 30 kHz | | | 15 kHz | |
| 3 | 30 kHz | | | 30 kHz | |
| PRACH configuration |  | 1,2,3 | FR1 PRACH configuration 1 | | FR1 PRACH configuration 1 under CCA | | |
| BWP configuration | Initial DL BWP | 1,2,3 | DLBWP.0.1 | | | | |
| Dedicated DL BWP | 1,2,3 | DLBWP.1.1 | | | | |
| Initial UL BWP | 1,2,3 | ULBWP.0.1 | | | | |
| Dedicated UL BWP | 1,2,3 | ULBWP.1.1 | | | | |
| EPRE ratio of PSS to SSS | dB | 1,2,3 | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | 1,2,3 |
| EPRE ratio of PBCH to PBCH DMRS | 1,2,3 |
| EPRE ratio of PDCCH DMRS to SSS | 1,2,3 |
| EPRE ratio of PDCCH to PDCCH DMRS | 1,2,3 |
| EPRE ratio of PDSCH DMRS to SSS | 1,2,3 |
| EPRE ratio of PDSCH to PDSCH | 1,2,3 |
| EPRE ratio of OCNG DMRS to SSSNote1 | 1,2,3 |
| EPRE ratio of OCNG to OCNG DMRSNote1 | 1,2,3 |
| Note2 | dBm/SCS | 1,2,3 | [-101] | | | -98 | |
|  | [-101] | | | -95 | |
|  | dB | 1,2,3 | -Infinity | 5 | | 4 | 4 |
|  | dB | 1,2,3 | -Infinity | 5 | | 4 | 4 |
| SSB\_RP | dBm/SCS | 1,2,3 | -Infinity | -93 | | -94 | -94 |
|  | -Infinity | -90 | | -91 | -91 |
| IoNote3 | dBm/  9.36MHz | 1,2,3 | -70.05 | -63.85 | | -64.59 | -64.59 |
|  | dBm/  38.16MHz | 1,2,3 | -63.94 | -57.75 | | -58.49 | -58.49 |
| Propagation condition | - | 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: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | |

##### A.11.2.1.5.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 132 ms from the beginning of time period T2.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2].

Tinterrupt = 122 ms in the test. Tinterrupt is defined in clause 6.1.1.2.2.

This gives a total of 132 ms.

#### A.11.2.1.6 Inter-frequency handover from FR1 to FR1 carrier under CCA; unknown target cell

##### A.11.2.1.6.1 Test Purpose and Environment

This test is to verify the requirement for inter frequency handover requirements from FR1 to FR1 carrier under CCA specified in clause 6.1B.1.2.

##### A.11.2.1.6.2 Test Parameters

Supported test configurations are shown in table A.11.2.1.6.2-1. Both handover delay and interruption length are tested by using the parameters in table A.11.2.1.6.2-2, and A.11.2.1.6.2-3.

The test scenario comprises of two carriers and one cell on each carrier. No gap patterns are configured in the test case. The test consists of two successive time periods, with time durations of T1, T2 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 receives a RRC handover command from the network. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE.

Table A.11.2.1.6.2-1: Inter-frequency handover from FR1 to FR1 carrier under CCA test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | | |

Table A.11.2.1.6.2-2: General test parameters Inter-frequency handover from FR1 to FR1 carrier under CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial conditions | Active cell |  | Cell 1 |  |
|  | Neighbouring cell |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell |  | Cell 2 | On the carrier under CCA |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| T1 | | s | 5 |  |
| T2 | | s | ≤ Tinterrupt | Tinterrupt is defined in clause 6.1B.1.2 |

Table A.11.2.1.6.2-3: Cell specific test parameters for NR FR1-FR1 Inter frequency handover test case

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Configuration | Cell 1 | | Cell 2 | | |
|  | |  |  | T1 | T2 | T1 | | T2 |
| NR RF Channel Number | |  | 1, 2, 3 | 1 | | 2 | | |
| DL CCA probability for semi-static channel access (PCCA\_DL)DL CCA probability PCCA\_DL | |  | 1, 2, 3 | N/A | | 0.9375 | | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_1) | |  | 1, 2, 3 | N/A | | 0.75 | | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_2) | |  | 1, 2, 3 | N/A | | 0.75 | | |
| UL CCA probability for semi-static channel access PCCA\_UL | |  | 1, 2, 3 | N/A | | 0.75 | | |
| UL CCA probability for dynamic static channel access PCCA\_UL | |  | 1, 2, 3 | N/A | | 0.87 | | |
| TDD configuration | |  | 1 | N/A | | TDDConf.1.1.CCA | | |
|  | 2 | TDDConf.1.1 | | TDDConf.1.1.CCA | | |
|  | 3 | TDDConf.1.2 | | TDDConf.1.1.CCA | | |
| BWchannel | |  | 1 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | 2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | |
| BWP BW | |  | 1 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | 2 | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | 3 | 40: NRB,c = 106 | | 40: NRB,c = 106 | | |
| DRX Cycle | | ms |  | Not Applicable | | | | |
| PDSCH Reference | |  | 1 | SR.1.1 FDD | | SR.1.1 CCA | | |
|  | 2 | SR.1.1 TDD | | SR.1.1 CCA | | |
|  | 3 | SR.2.1 TDD | | SR.1.1 CCA | | |
| CORESET Reference Channel | |  | 1 | CR.1.1 FDD | | CR.1.1 CCA | | |
|  | 2 | CR.1.1 TDD | | CR.1.1 CCA | | |
|  | 3 | CR.2.1 TDD | | CR.1.1 CCA | | |
| Dedicated CORESET RMC configuration | |  | 1 | CCR.1.1 FDD | | CCR.1.1 CCA | | |
|  | 2 | CCR.1.1 TDD | | CCR.1.1 CCA | | |
|  | 3 | CCR.2.1 TDD | | CCR.1.1 CCA | | |
| TRS configuration | |  | 1 | TRS.1.1 FDD | | TRS.1.2 TDD | | |
|  | 2 | TRS.1.1 TDD | | TRS.1.2 TDD | | |
|  | 3 | TRS.1.2 TDD | | TRS.1.2 TDD | | |
| OCNG Patterns | |  | 1, 2, 3 | OP.1 | | | | |
| SMTC Configuration | |  | 1, 2, 3 | SMTC.1 | | | | |
| DBT window configuration | |  | 1, 2, 3 | N/A | | As defined in A.3.28.1 | | |
| SSB configuration | |  | 1, 2 | SSB.1 FR1 | | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access; | | |
|  | 3 | SSB.2 FR1 | | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access; | | |
| ssb-PositionQCL | |  |  | N/A | | [1] | | |
| PDSCH/PDCCH subcarrier spacing | | kHz | 1 | 15 kHz | | 30 kHz | | |
| 2 | 15 kHz | | 30 kHz | | |
| 3 | 30 kHz | | 30 kHz | | |
| PUCCH/PUSCH subcarrier spacing | | kHz | 1 | 15 kHz | | 30 kHz | | |
| 2 | 15 kHz | | 30 kHz | | |
| 3 | 30 kHz | | 30 kHz | | |
| PRACH configuration | |  |  | FR1 PRACH configuration 1 | | | FR1 PRACH configuration 1 CCA | |
| BWP configuration | Initial DL BWP |  | 1, 2, 3 | DLBWP.0.1 | | | | |
|  | Dedicated DL BWP |  | 1, 2, 3 | DLBWP.1.1 | | | | |
|  | Initial UL BWP |  | 1, 2, 3 | ULBWP.0.1 | | | | |
|  | Dedicated UL BWP |  | 1, 2, 3 | ULBWP.1.1 | | | | |
| EPRE ratio of PSS to SSS | | dB |  | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98 | | | | |
| Note2 | Config 1 | dBm/SCS | 1, 2 | -98 | | | | |
|  | 3 | -95 | | | | |
|  | | dB |  | 4 | 4 | -Infinity | | 5 |
|  | | dB |  | 4 | 4 | -Infinity | | 5 |
| SSB\_RP | Config 1 | dBm/SCS | 1, 2 | -94 | -94 | -Infinity | | -93 |
|  | 3 | -91 | -91 | -Infinity | | -90 |
| IoNote3 | Config 1 | dBm/  9.36MHz | 1, 2 | -64.59 | -64.59 | -70.05 | | -63.85 |
|  | dBm/  38.16MHz | 3 | -58.49 | -58.49 | -63.94 | | -57.75 |
| Propagation condition | | - |  | AWGN | | AWGN | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | |

##### A.11.2.1.6.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tinterrupt from the beginning of time period T3, where Tinterrupt ­is defined in clause 6.1B.1.2

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 10 ms and is specified in clause 12 in TS 38.331 [2], L1’is the number of SMTC occasions not available at the UE during the inter-frequency detection period, L2 is the number of SMTC occasions not available at the UE during the time tracking period, and L3 is the number of consecutive SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failure. L3 = 0 for Type 2C UL channel access procedure as defined in TS 37.213 [33]. The interruption time considering the potential extensions caused by L1,L1´,L2 , L3 and by the UL CCA failure detection/recovery mechanism is limited by the T304 timer. The UE behaviour at the T304 timer expiry is detailed in TS 38.331 [2].

#### A.11.2.1.7 SA NR FR1 carrier under CCA - E-UTRAN handover with known target cell

##### A.11.2.1.7.1 Test Purpose and Environment

The purpose of this set of tests is to verify that the UE can make correct inter-RAT E-UTRAN handover when operating in standalone (SA) operation with PCell in FR1 carrier under CCA. This test shall verify the NR to E-UTRAN handover requirements as specified in clause 6.1.2.1.

The test comprises of one NR carrier under CCA and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN neighbour 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. Gap pattern configuration with id #0 as specified in Table 9.1.2-1 is configured before T2 begins to enable inter-RAT frequency monitoring.

A RRC message implying handover shall be sent to the UE during period T2 after the UE has reported Event B2. The start of T3 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain Cell 2 as the target cell.

Supported test configurations are shown in table A.11.2.1.7-1. General test parameters are provided in Table A.11.2.1.7-2. Cell specific test parameters for Cell 1 and Cell 2 are provided in Tables A.11.2.1.7-3 and A.11.2.1.7-4 respectively.

Table A.11.2.1.7-1: Supported test configurations for SA inter-RAT E-UTRAN handover tests

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations.  Note 2: The UE supporting SA operation only on NR band(s) with shared spectrum access is required to be tested. | | |

Table A.11.2.1.7-2: General test parameters for SA inter-RAT E-UTRAN handover

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| NR RF Channel Number | |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number | |  | 2 | 1 E-UTRAN carrier frequency is used in the test |
| Initial conditions | Active cell |  | Cell 1 | NR cell on a carrier under CCA |
|  | Neighbouring cell |  | Cell 2 | E-UTRAN cell |
| Final condition | Active cell |  | Cell 2 |  |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| NR measurement quantity | |  | SS-RSRP |  |
| E-UTRAN measurement quantity | |  | RSRP |  |
| b2-Threshold1 | | dBm | As specified in Table A.11.2.1.7-3 | Absolute NR SS-RSRP threshold for event B2 |
| b2-Threshold2EUTRAN | | dBm | -98 | Absolute E-UTRAN RSRP threshold for event B2 |
| Hysteresis | | dB | 0 |  |
| TimeToTrigger | | s | 0 |  |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| DRX | |  | OFF | Non-DRX test |
| Access Barring Information | | - | Not sent | No additional delays in random access procedure |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| Gap pattern configuration Id | |  | 0 | As specified in Table 9.1.2-1 started before T2 starts |
| T1 | | s | 5 |  |
| T2 | | s | ≤5 |  |
| T3 | | s | 1 |  |

Table A.11.2.1.7-3: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 1)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Configuration | Cell 1 | | |
|  | |  |  | T1 | T2 | T3 |
| RF channel number | |  | 1, 2 | 1 | | |
| TDD Configuration | |  | 1, 2 | TDDConf.1.1.CCA | | |
| DL CCA probability for semi-static channel access (PCCA\_DL)DL CCA probability PCCA\_DL | |  | 1, 2 | 0.9375 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) | |  | 1, 2 | 0.75 | | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) | |  | 1, 2 | 0.75 | | |
| UL CCA probability for semi-static channel access PCCA\_UL | |  | 1, 2 | 0.75 | | |
| UL CCA probability for dynamic static channel access PCCA\_UL | |  | 1, 2 | 0.87 | | |
| BWchannel | |  | 1, 2 | 40: NRB,c = 106 (TDD) | | |
| PDSCH reference measurement channel | |  | 1, 2 | SR.1.1 CCA | | |
| CORESET reference channel | |  | 1, 2 | CR.1.1 CCA | | |
| Dedicated CORESET RMC configuration | |  | 1, 2 | CCR.1.1 CCA | | |
| TRS configuration | |  | 1, 2 | TRS.1.2 TDD | | |
| OCNG patternNote1 | |  | 1, 2 | OP.1 | | |
| BWP | Initial DL BWP |  | 1, 2 | DLBWP.0.1 | | |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | | |
|  | Initial UL BWP |  |  | ULBWP.0.1 | | |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | | |
| SMTC configuration | |  | 1, 2 | SMTC.1 | | |
| DBT window configuration | |  | 1, 2 | As defined in A.3.28.1 | | |
| SSB configuration | |  | 1, 2 | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access; | | |
| b2-Threshold1 | | dBm | 1, 2 | -93 | | |
| EPRE ratio of PSS to SSS | | dB | 1, 2 | 0 | | |
| EPRE ratio of PBCH\_DMRS to SSS | |  |  |  | | |
| EPRE ratio of PBCH to PBCH\_DMRS | |  |  |  | | |
| EPRE ratio of PDCCH\_DMRS to SSS | |  |  |  | | |
| EPRE ratio of PDCCH to PDCCH\_DMRS | |  |  |  | | |
| EPRE ratio of PDSCH\_DMRS to SSS | |  |  |  | | |
| EPRE ratio of PDSCH to PDSCH\_DMRS | |  |  |  | | |
| EPRE ratio of OCNG DMRS to SSS | |  |  |  | | |
| EPRE ratio of OCNG to OCNG DMRS | |  |  |  | | |
| *Noc*Note2 | | dBm/15 KHz | 1, 2 | -100 | -104 | -100 |
| *Noc*Note2 | | dBm/SCS | 1, 2 | -97 | -101 | -97 |
| Ês/Noc | | dB | 1, 2 | 12 | 0 | -4 |
| Ês/IotNote3 | | dB | 1, 2 | 12 | 0 | -4 |
| SS-RSRPNote3 | | dBm/SCS | 1, 2 | -85 | -101 | -101 |
| IoNote3 | | dBm/38.16 MHz | 1, 2 | -53.68 | -66.9448 | -64.49 |
| Propagation condition | |  | 1, 2 | AWGN | | |
| Antenna Configuration and Correlation Matrix | |  | 1, 2 | 1x2 Low | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for *Noc* to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | |

Table A.11.2.1.7-4: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 2)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 2 | | |
|  |  |  | T1 | T2 | T3 |
| RF channel number |  | 1, 2 | 2 | | |
| Duplex mode |  | 1 | FDD | | |
| 2 | TDD | | |
| TDD special subframe configurationNote1 |  | 2 | 6 | | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | | |
| BWchannel | MHz | 1, 2 | 10 MHz: NRB,c = 50 | | |
| PRACH ConfigurationNote2 |  | 1 | 4 | | |
|  |  | 2 | 53 | | |
| PDSCH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 10 MHz: R.3 FDD | | |
|  |  | 2 | 10 MHz: R.0 TDD | | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 10 MHz: R.6 FDD | | |
|  |  | 2 | 10 MHz: R.6 TDD | | |
| OCNG PatternsNote3 |  | 1 | 10 MHz: OP.10 FDD | | |
|  |  | 2 | 10 MHz: OP.1 TDD | | |
| PBCH\_RA | dB | 1, 2 | 0 | | |
| PBCH\_RB |  |  |  | | |
| PSS\_RA |  |  |  | | |
| SSS\_RA |  |  |  | | |
| PCFICH\_RB |  |  |  | | |
| PHICH\_RA |  |  |  | | |
| PHICH\_RB |  |  |  | | |
| PDCCH\_RA |  |  |  | | |
| PDCCH\_RB |  |  |  | | |
| PDSCH\_RA |  |  |  | | |
| PDSCH\_RB |  |  |  | | |
| OCNG\_RANote4 |  |  |  | | |
| OCNG\_RBNote4 |  |  |  | | |
| NocNote5 | dBm/15kHz | 1, 2 | -98 | | |
| Ês/Noc | dB | 1, 2 | -Infinity | 8 | 78 |
| Ês/IotNote6 | dB | 1, 2 | -Infinity | 78 | 78 |
| RSRPNote6 | dBm/15kHz | 1, 2 | -Infinity | -90 | -90 |
| SCH\_RPNote6 | dBm/15kHz | 1, 2 | -Infinity | -90 | -90 |
| IoNote6 | dBm/9MHz | 1, 2 | -67.21  +10log(NRB,c/100) | -58.57  +10log(NRB,c/100) | -58.57  +10log(NRB,c/100) |
| Propagation Condition |  | 1, 2 | AWGN | | |
| Antenna Configuration and Correlation Matrix Note7 |  | 1, 2 | 1x2 Low | | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211 [23].  Note 3: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 4: 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 5: 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 6: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 7: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | | |

##### A.11.2.1.7.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 85 ms from the beginning of time period T3.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms and is specified in clause 6.1.2.1.

Tinterrupt = 35 ms in the test; Tinterrupt is defined in clause 6.1.2.1.

This gives a total of 85 ms.

#### A.11.2.1.8 SA NR FR1 carrier under CCA - E-UTRAN handover with unknown target cell

##### A.11.2.1.8.1 Test Purpose and Environment

The purpose of this set of tests is to verify that the UE can make correct inter-RAT E-UTRAN handover when operating in standalone (SA) operation with PCell in FR1 carrier under CCA. This test shall verify the NR to E-UTRAN handover requirements for the case when the target E-UTRAN cell is unknown as specified in clause 6.1.2.1.

The test comprises of one NR carrier under CCA and one E-UTRA carrier. There are two cells and one cell on each carrier. Cell 1 is the NR PCell and Cell 2 is an inter-RAT E-UTRAN neighbour cell. The test consists of two successive time periods, with time durations of T1 and T2 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. No Gap pattern shall be configured.

A RRC message implying handover shall be sent to the UE during period T1. The start of T2 is the instant when the last TTI containing the RRC message implying handover is sent to the UE. The handover message shall contain Cell 2 as the target cell.

Supported test configurations are shown in table A.11.2.1.8-1. General test parameters are provided in Table A.11.2.1.8-2. Cell specific test parameters for Cell 1 and Cell 2 are provided in Tables A.11.2.1.8-3 and A.11.2.1.8-4 respectively.

Table A.11.2.1.8-1: Supported test configurations for SA inter-RAT E-UTRAN handover tests

|  |  |  |
| --- | --- | --- |
| Configuration | Description of a cell with CCA | Description of a cell without CCA |
| 1 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode | LTE 10 MHz bandwidth, FDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations.  Note 2: The UE supporting SA operation only on NR band(s) with shared spectrum access is required to be tested. | | |

Table A.11.2.1.8-2: General test parameters for SA inter-RAT E-UTRAN handover

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| NR RF Channel Number | |  | 1 | 1 NR carrier frequency is used in the test |
| LTE RF Channel Number | |  | 2 | 1 E-UTRAN carrier frequency is used in the test |
| Initial conditions | Active cell |  | Cell 1 | NR cell on a carrier under CCA |
| Neighbouring cell |  | Cell 2 | E-UTRAN cell |
| Final condition | Active cell |  | Cell 2 |  |
| DL CCA model | |  | As specified in clause A.3.26.2.1 |  |
| UL CCA model | |  | As specified in clause A.3.26.2.2 |  |
| NR measurement quantity | |  | SS-RSRP |  |
| DRX | |  | OFF | Non-DRX test |
| Access Barring Information | | - | Not sent | No additional delays in random access procedure |
| Time offset between cells | |  | 3 ms | Asynchronous cells |
| T1 | | s | ≤5 |  |
| T2 | | s | 1 |  |

Table A.11.2.1.8-3: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Configuration** | **Cell 1** | |
| **T1** | **T2** |
| RF channel number | |  | 1, 2 | 1 | |
| DL CCA probability for semi-static channel access (PCCA\_DL)DL CCA probability PCCA\_DL | |  | 1, 2 | 0.9375 | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_1) | |  | 1, 2 | 0.75 | |
| DL CCA probability for dynamic channel access (PCCA\_DL\_2) | |  | 1, 2 | 0.75 | |
| UL CCA probability for semi-static channel access PCCA\_UL | |  | 1, 2 | 0.75 | |
| UL CCA probability for dynamic static channel access PCCA\_UL | |  | 1, 2 | 0.87 | |
| TDD Configuration | |  | 1, 2 | TDDConf.1.1.CCA | |
| BWchannel | | MHz | 1, 2 | 40: NRB,c = 106 (TDD) | |
| PDSCH reference measurement channel | |  | 1, 2 | SR.1.1 CCA | |
| CORESET reference channel | |  | 1, 2 | CR.1.1 CCA | |
| Dedicated CORESET RMC configuration | |  | 1, 2 | CCR.1.1 CCA | |
| TRS configuration | |  | 1, 2 | TRS.1.2 TDD | |
| OCNG patternNote1 | |  | 1, 2 | OP.1 | |
| BWP | Initial DL BWP |  | 1, 2 | DLBWP.0.1 | |
| Dedicated DL BWP | DLBWP.1.1 | |
| Initial UL BWP | ULBWP.0.1 | |
| Dedicated UL BWP | ULBWP.1.1 | |
| SMTC configuration | |  | 1, 2 | SMTC.1 | |
| DBT window configuration | |  | 1, 2 | As defined in A.3.28.1 | |
| SSB configuration | |  | 1, 2 | SSB.1 CCA for semi-static channel access;  SSB.2 CCA for dynamic channel access; | |
| EPRE ratio of PSS to SSS | | dB | 1, 2 | 0 | |
| EPRE ratio of PBCH\_DMRS to SSS | |
| EPRE ratio of PBCH to PBCH\_DMRS | |
| EPRE ratio of PDCCH\_DMRS to SSS | |
| EPRE ratio of PDCCH to PDCCH\_DMRS | |
| EPRE ratio of PDSCH\_DMRS to SSS | |
| EPRE ratio of PDSCH to PDSCH\_DMRS | |
| EPRE ratio of OCNG DMRS to SSS | |
| EPRE ratio of OCNG to OCNG DMRS | |
| *Noc*Note2 | | dBm/15 KHz | 1, 2 | -98 | |
| *Noc*Note2 | | dBm/SCS | 1, 2 | -95 | |
| Ês/Noc | | dB | 1, 2 | 0 | 0 |
| Ês/IotNote3 | | dB | 1, 2 | 0 | 0 |
| SS-RSRPNote3 | | dBm/SCS | 1, 2 | -95 | -95 |
| IoNote3 | | dBm/38.16 MHz | 1, 2 | -60.94 | -60.94 |
| Propagation condition | |  | 1, 2 | AWGN | |
| Antenna Configuration and Correlation Matrix | |  | 1, 2 | 1x2 Low | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for *Noc* to be fulfilled.  Note 3: Ês/Iot, SS-RSRP, and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | |

Table A.11.2.1.8-4: Cell specific test parameters for SA inter-RAT E-UTRA handover (Cell 2)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Configuration | Cell 2 | |
| T1 | T2 |
| RF channel number |  | 1, 2 | 2 | |
| Duplex mode |  | 1 | FDD | |
| 2 | TDD | |
| TDD special subframe configurationNote1 |  | 2 | 6 | |
| TDD uplink-downlink configurationNote1 |  | 2 | 1 | |
| BWchannel | MHz | 1, 2 | 10 MHz: NRB,c = 50 | |
| PRACH ConfigurationNote2 |  | 1 | 4 | |
| 2 | 53 | |
| PDSCH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 10 MHz: R.3 FDD | |
| 2 | 10 MHz: R.0 TDD | |
| PCFICH/PDCCH/PHICH parameters:  DL Reference Measurement ChannelNote3 |  | 1 | 10 MHz: R.6 FDD | |
| 2 | 10 MHz: R.6 TDD | |
| OCNG PatternsNote3 |  | 1 | 10 MHz: OP.10 FDD | |
| 2 | 10 MHz: OP.1 TDD | |
| PBCH\_RA | dB | 1, 2 | 0 | |
| PBCH\_RB |
| PSS\_RA |
| SSS\_RA |
| PCFICH\_RB |
| PHICH\_RA |
| PHICH\_RB |
| PDCCH\_RA |
| PDCCH\_RB |
| PDSCH\_RA |
| PDSCH\_RB |
| OCNG\_RANote4 |
| OCNG\_RBNote4 |
| NocNote5 | dBm/15kHz | 1, 2 | -98 | |
| Ês/Noc | dB | 1, 2 | -Infinity | 7 |
| Ês/IotNote6 | dB | 1, 2 | -Infinity | 7 |
| RSRPNote6 | dBm/15kHz | 1, 2 | -Infinity | -91 |
| SCH\_RPNote6 | dBm/15kHz | 1, 2 | -Infinity | -91 |
| IoNote6 | dBm/9MHz | 1, 2 | -70.22 | -62.43 |
| Propagation Condition |  | 1, 2 | AWGN | |
| Antenna Configuration and Correlation Matrix Note7 |  | 1, 2 | 1x2 Low | |
| Note 1: Special subframe and uplink-downlink configurations are specified in table 4.2-1 in TS 36.211 [23].  Note 2: PRACH configurations are specified in table 5.7.1-2 and table 5.7.1-3 in TS 36.211 [23].  Note 3: DL RMCs and OCNG patterns are specified in clauses A 3.1 and A 3.2 of TS 36.133 [15] respectively.  Note 4: 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 5: 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 6: Ês/Iot, RSRP, SCH\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 7: Propagation condition and correlation matrix are defined in clause B.2 in TS 36.101 [25]. | | | | |

##### A.11.2.1.8.2 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than 165 ms from the beginning of time period T2.

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

NOTE: The handover delay can be expressed as: RRC procedure delay + Tinterrupt, where:

RRC procedure delay = 50 ms and is specified in clause 6.1.2.1.

Tinterrupt = 115 ms in the test; Tinterrupt is defined in clause 6.1.2.1.

This gives a total of 165 ms.

<End of Change (from R4-2114108)>

### <Start of Change (from R4-2113233)>

### A.11.2.2 RRC connection mobility control

#### A.11.2.2.1 RRC re-establishment

##### A.11.2.2.1.1 Intra-frequency RRC Re-establishment with CCA in FR1

A.11.2.2.1.1.1 Test Purpose and Environment

The purpose is to verify that the NR intra-frequency RRC re-establishment delay with CCA in FR1 with known target cell is within the specified limits. These tests will verify the requirements in clause 6.2.1A.

The test parameters are given in table A.11.2.2.1.1.1-1, table A.11.2.2.1.1.1-2 and table A.11.2.2.1.1.1-3 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell with CCA, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

Table A.11.2.2.1.1.1-1: Supported test configurations

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

Table A.11.2.2.1.1.1-2: General test parameters for NR intra-frequency RRC Re-establishment test case with CCA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Value | Comment |
| Initial Condition | Active cell | - | Cell1 | Cell 1 is with CCA. |
|  | Neighbour cells | - | Cell2 | Cell 2 is with CCA. |
| Final condition | Active cell | - | Cell2 |  |
| RF Channel Number | | - | 1 |  |
| DL CCA model | Dynamic channel accessNote 1, 3 | - | As specified in clause A.3.26.2.1 |  |
|  | Semi-static channel access Note 2, 3 | - |  |  |
| UL CCA model | Dynamic channel access Note 1, 3 | - | As specified in clause A.3.26.2.2 |  |
|  | Semi-static channel access Note 2,3 | - |  |  |
| Time offset between cells | | - | 3 ms | Synchronous cells |
| N310 | | - | 1 | Maximum consecutive out-of-sync indications from lower layers |
| N311 | | - | 1 | Minimum consecutive in-sync indications from lower layers |
| T310 | | ms | 0 | Radio link failure timer; T310 is disabled |
| T311 | | ms | 3000 | RRC re-establishment timer |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| SSB configuration | Dynamic channel access Note 1, 3 | - | SSB.2 CCA | Table A.3.10A.1.2-1 |
|  | Semi-static channel access Note 2, 3 | - | SSB.1 CCA | Table A.3.10A.1.1-1 |
| DBT window configuration | | - | DBT.1 | Table A.3.28.1-1 |
| SMTC configuration | | - | SMTC pattern 1 |  |
| DRX cycle length | | s | OFF |  |
| PRACH configuration | | - | FR1 PRACH configuration 1 under CCA | Table A.3.8A.2.1-1 |
| T1 | | s | 5 |  |
| T2 | | ms | 480 | Time for the UE to detect RLF |
| T3 | | s | 2 |  |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | |

**Table A.11.2.2.1.1.1-3: Cell specific test parameters for NR intra-frequency RRC Re-establishment test case with CCA**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | | | | **Cell 2** | | | | |
| **T1** | | **T2** | | **T3** | **T1** | **T2** | | | **T3** |
| TDD configuration | - | TDDConf.1.1 CCA | | | | | TDDConf.1.1 CCA | | | | |
| DL CCA probability PCCA\_DL for dynamic channel access Note 4,6 | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | |
| DL CCA probability PCCA\_DL for semi-static channel access Note 5,6 | - | PCCA\_DL=0.9375 | | | | | PCCA\_DL=0.9375 | | | | |
| UL CCA probability PCCA\_UL | - | 1 | | | | | 1 | | | | |
| PDSCH RMC configuration |  | SR.1.1 CCA | | | | | SR.1.1 CCA | | | | |
| RMSI CORESET RMC configuration |  | CR.1.1 CCA | | | | | CR.1.1 CCA | | | | |
| Dedicated CORESET RMC configuration |  | CCR.1.1 CCA | | | | | CCR.1.1 CCA | | | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | | | OP.1 defined in A.3.2.1 | | | | |
| TRS configuration |  | TRS.1.2 TDD | | | | | N/A | | | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | | | DLBWP.0.1 | | | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | | | ULBWP.0.1 | | | | |
| Active DL BWP confgiuration |  | DLBWP.1.1 | N/A | | N/A | | N/A | | N/A | DLBWP.1.1 | |
| Active UL BWP configuration |  | ULBWP.1.1 | N/A | | N/A | | N/A | | N/A | ULBWP.1.1 | |
| RLM-RS |  | SSB | | | | | SSB | | | | |
|  | dB | 1.54 | | -infinity | | -infinity | -3.79 | 4 | | | 4 |
| Note2 | dBm/SCS | -95 | | | | | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | | | | | |
|  | dB | 7 | | -infinity | | -infinity | 4 | 4 | | | 4 |
| SS-RSRP Note3 | dBm/SCS | -88 | | -infinity | | -infinity | -91 | -91 | | | -91 |
| Io | dBm/38.16 MHz | -54.65 | | -58.50 | | -58.50 | -54.65 | -58.50 | | | -58.50 |
| Propagation Condition |  | AWGN | | | | | | | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 5: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | |

A.11.2.2.1.1.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to a known NR intra frequency cell with CCA shall be less than 1350 + MAX (200, (5+K1) x 20) ms.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Where:

TUL\_grant = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence TUL\_grant is not used.

Where

Nfreq = 1

Tidentify\_intra\_NR\_CCA = MAX (200 ms, (5+K1) x TSMTC), where

K1 is the number of SMTC occasions not available at the UE due to DL CCA failures during RRC re-establishment period on the carrier with CCA.

TSMTC = 20 ms is the SMTC periodicity.

Tidentify\_inter\_NR\_CCA = 0 ms

TSI-NR\_CCA = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target intra-frequency NR cell.

TPRACH\_CCA = TSSB,RO + 10 ms, where:

- TSSB,RO is the SSB to PRACH occasion association period as defined in Table 8.1-1 of TS 38.213 [39], which is TSSB,RO=10 ms for FR1 PRACH configuration 1 under CCA.

This gives a total of 1350 + MAX (200, (5+K1) x 20) ms.

##### A.11.2.2.1.2 Inter-frequency RRC Re-establishment with CCA in FR1

A.11.2.2.1.2.1 Test Purpose and Environment

The purpose is to verify that the NR inter-frequency RRC re-establishment delay with CCA in FR1 without known target cell is within the specified limits. These tests will verify the requirements in clause 6.2.1A.

### <End of Change (from R4-2113233)>

### <Start of Change (from R4-2114434)>

A.11.2.2.1.3 Intra-frequency RRC Re-establishment with CCA in FR1 without serving cell timing

A.11.2.2.1.3.1 Test Purpose and Environment

The purpose is to verify that the NR intra-frequency RRC re-establishment delay with CCA in FR1 without serving cell timing is within the specified limits. These tests will verify the requirements in clause 6.2.1A.

The test parameters are given in table A.11.2.2.1.3.1-1, table A.11.2.2.1.3.1-2 and table A.11.2.2.1.3.1-3 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell with CCA, is deactivated. The time period T3 starts after the occurrence of the radio link failure.

**Table A.11.2.2.1.3.1-1: Supported test configurations**

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

**Table A.11.2.2.1.3.1-2: General test parameters for NR intra-frequency RRC Re-establishment test case in FR1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial Condition | Active cell | - | Cell1 | Cell 1 is with CCA. |
|  | Neighbour cells | - | Cell2 | Cell 2 is with CCA. |
| Final condition | Active cell | - | Cell2 |  |
| RF Channel Number | | - | 1 |  |
| DL CCA model | Dynamic channel accessNote 1,3 | - | As specified in clause A.3.26.2.1 |  |
|  | Semi-static channel access Note 2,3 | - |  |
| UL CCA model | Dynamic channel access Note 1,3 | - | As specified in clause A.3.26.2.2 |  |
|  | Semi-static channel access Note 2,3 | - |  |
| Time offset between cells | | - | 3 μs | Synchronous cells |
| N310 | | - | 1 | Maximum consecutive out-of-sync indications from lower layers |
| N311 | | - | 1 | Minimum consecutive in-sync indications from lower layers |
| T310 | | ms | 0 | Radio link failure timer; T310 is disabled |
| T311 | | ms | 3000 | RRC re-establishment timer |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| SSB configuration | Dynamic channel access Note 1, 3 | - | SSB.2 CCA | Table A.3.10A.1.2-1 |
|  | Semi-static channel access Note 2, 3 | - | SSB.1 CCA | Table A.3.10A.1.1-1 |
| DBT window configuration | | - | DBT.1 | Table A.3.28.1-1 |
| SMTC configuration | | - | SMTC pattern 1 |  |
| DRX cycle length | | s | OFF |  |
| PRACH configuration | | - | FR1 PRACH configuration 1 | Table A.3.8A.2.1-1 |
| T1 | | s | 5 |  |
| T2 | | ms | 6 | Time for the UE to detect RLF |
| T3 | | s | 3 |  |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only. | | | | |

**Table A.11.2.2.1.3.1-3: Cell specific test parameters for NR intra-frequency RRC Re-establishment test case in FR1**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Cell 1** | | | | | **Cell 2** | | | | |
| **T1** | | **T2** | | **T3** | **T1** | **T2** | | | **T3** |
| TDD configuration |  | TDDConf.1.1 CCA | | | | | TDDConf.1.1 CCA | | | | |
| DL CCA probability PCCA\_DL for dynamic channel access Note 4,6 | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | |
| DL CCA probability PCCA\_DL for semi-static channel access Note 5,6 | - | PCCA\_DL=0.9375 | | | | | PCCA\_DL=0.9375 | | | | |
| UL CCA probability PCCA\_UL | - | 1 | | | | | 1 | | | | |
| PDSCH RMC configuration |  | SR.1.1 CCA | | | | | SR.1.1 CCA | | | | |
| RMSI CORESET RMC configuration |  | CR.1.1 CCA | | | | | CR.1.1 CCA | | | | |
| Dedicated CORESET RMC configuration |  | CCR.1.1 CCA | | | | | CCR.1.1 CCA | | | | |
| OCNG Pattern |  | OP.1 defined in A.3.2.1 | | | | | OP.1 defined in A.3.2.1 | | | | |
| TRS configuration |  | TRS.1.2 TDD | | | | | N/A | | | | |
| Initial DL BWP configuration |  | DLBWP.0.1 | | | | | DLBWP.0.1 | | | | |
| Initial UL BWP configuration |  | ULBWP.0.1 | | | | | ULBWP.0.1 | | | | |
| Active DL BWP confgiuration |  | DLBWP.1.1 | N/A | | N/A | | N/A | | N/A | DLBWP.1.1 | |
| Active UL BWP configuration |  | ULBWP.1.1 | N/A | | N/A | | N/A | | N/A | ULBWP.1.1 | |
| RLM-RS |  | SSB | | | | | SSB | | | | |
|  | dB | 4 | | -infinity | | -infinity | -infinity | -infinity | | | 4 |
| Note2 | dBm/SCS | -95 | | | | | | | | | |
| Note2 | dBm/15 kHz | -98 | | | | | | | | | |
|
|  | dB | 7 | | -infinity | | -infinity | -infinity | -infinity | | | 4 |
| SS-RSRP Note3 | dBm/SCS | -91 | | -infinity | | -infinity | -infinity | -infinity | | | -91 |
| Io | dBm/38.16 MHz | -58.50 | | -63.94 | | -63.94 | -63.94 | -63.94 | | | -58.50 |
| Propagation Condition |  | AWGN | | | | | | | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  NOTE 4: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 5: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only. | | | | | | | | | | | |

A.11.2.2.1.3.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown NR intra frequency cell without serving cell timing shall be less than 1350 + MAX (800 ms, (10+ K1) x 20) ms.

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Where:

TUL\_grant = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence TUL\_grant is not used.

Where,

Nfreq = 1

Tidentify\_intra\_NR = MAX (800 ms, (10+ K1) x TSMTC), where

K1 is the number of SMTC occasions not available at the UE due to DL CCA failures during RRC re-establishment period on the carrier with CCA.

TSMTC is the SMTC periodicity which is 20 ms.

Tidentify\_inter\_NR\_CCA = 0 ms

TSI-NR\_CCA = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 38.331 [2] for the target intra-frequency NR cell.

TPRACH\_CCA = (1+ K3)\*TSSB,RO + 10 ms, where:

- TSSB,RO is the SSB to PRACH occasion association period as defined in Table 8.1-1 of TS 38.213 [39]. It is 10 ms for FR1 PRACH configuration 1 under CCA.

- K3 = 0.

This gives total =1350 + MAX (800 ms, (10+ K1) x 20) ms.

A.11.2.2.1.4 Inter-frequency RRC Re-establishment from NR FR1 carrier without CCA to NR FR1 carrier under CCA

A.11.2.2.1.4.1 Test Purpose and Environment

The purpose is to verify that the NR inter-frequency RRC re-establishment delay requirement for RRC re-establishment from NR FR1 carrier without CCA to NR FR1 inter-frequency carrier under CCA with unknown target cell. These tests will verify the requirements in clause 6.2.1A.

The test parameters are given in table A.11.2.2.1.4.1-1, table A.11.2.2.1.4.1-2 and table A.11.2.2.1.4.1-3 below. The test consists of 3 successive time periods, with time duration of T1, T2 and T3 respectively. At the start of time period T2, cell 1, which is the active cell, becomes inactive. The time period T3 starts after the occurrence of the radio link failure. During T1, the UE shall be configured with the carrier frequency of cell 2 (with RF Channel Number #2) to ensure that the UE has the context of the carrier frequency of cell 2 by the end of T1.

**Table A.11.2.2.1.4.1-1: Supported test configurations inter-frequency RRC re-establishment from NR FR1 without under CCA to NR FR1 inter-frequency carrier under CCA**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **Source cell without CCA** | **Target cell with CCA** |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | | |

**Table A.11.2.2.1.4.1-2: General test parameters for NR inter-frequency RRC Re-establishment test case from NR FR1 carrier without CCA to NR FR1 inter-frequency carrier under CCA**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** | **Comment** |
| Initial condition | Active cell | |  | Cell1 |  |
| Neighbour cells | |  | Cell2 |  |
| Final condition | Active cell | |  | Cell2 |  |
| RF Channel Number | | |  | 1, 2 |  |
| Time offset between cells | | |  | 3 μs | Synchronous cells |
| DL CCA model | | Dynamic channel accessNote 1,3 | - | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2,3 | - |  |
| UL CCA model | | Dynamic channel access Note 1,3 | - | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 | - |  |
| N310 | | | - | 1 | Maximum consecutive out-of-sync indications from lower layers |
| N311 | | | - | 1 | Minimum consecutive in-sync indications from lower layers |
| T310 | | | ms | 0 | Radio link failure timer; T310 is disabled |
| T311 | | | ms | 5000 | RRC re-establishment timer |
| Access Barring Information | | | - | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | | s | OFF |  |
| PRACH configuration | | |  | FR1 PRACH configuration 1 | Table A.3.8A.2.1-1 |
| T1 | | | s | 5 |  |
| T2 | | | ms | 480 | Time for the UE to detect RLF |
| T3 | | | s | ≥ TUE\_re-establish\_delay\_CCA | As defined in clause 6.2.1A |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic cannel access, the UE can be tested under dynamic channel occupancy only. | | | | | |

**Table A.11.2.2.1.4.1-3: Cell specific test parameters for NR inter-frequency RRC Re-establishment test case from NR FR1 carrier without CCA to NR FR1 inter-frequency carrier under CCA**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | **Test config** | **Unit** | **Cell 1** | | | | | **Cell 2** | | | | |
| **T1** | | **T2** | | **T3** | **T1** | **T2** | | | **T3** |
| TDD configuration | | 1 |  | N/A | | | | | TDDConf.1.1.CCA | | | | |
| 2 |  | TDDConf.1.1 | | | | | TDDConf.1.1.CCA | | | | |
| 3 |  | TDDConf.2.1 | | | | | TDDConf.1.1.CCA | | | | |
| PDSCH RMC configuration | | 1 |  | SR.1.1 FDD | | | | | SR.1.1 CCA | | | | |
| 2 |  | SR.1.1 TDD | | | | | SR.1.1 CCA | | | | |
| 3 |  | SR.2.1 TDD | | | | | SR.1.1 CCA | | | | |
| RMSI CORESET RMC configuration | | 1 |  | CR.1.1 FDD | | | | | CR.1.1 CCA | | | | |
| 2 |  | CR.1.1 TDD | | | | | CR.1.1 CCA | | | | |
| 3 |  | CR.2.1 TDD | | | | | CR.1.1 CCA | | | | |
| Dedicated CORESET RMC configuration | | 1 |  | CCR.1.1 FDD | | | | | CCR.1.1 CCA | | | | |
| 2 |  | CCR.1.1 TDD | | | | | CCR.1.1 CCA | | | | |
| 3 |  | CCR.2.1 TDD | | | | | CCR.1.1 CCA | | | | |
| OCNG Pattern | | 1 |  | OP.1 defined in A.3.2.1 | | | | | OP.1 defined in A.3.2.1 | | | | |
| TRS configuration | | 1 |  | TRS.1.1 FDD | | | | | TRS.1.2 TDD | | | | |
| 2 |  | TRS.1.1 TDD | | | | | TRS.1.2 TDD | | | | |
| 3 |  | TRS.1.2 TDD | | | | | TRS.1.2 TDD | | | | |
| SMTC configuration | | 1,2,3 |  | SMTC.1 | | | | | SMTC.1 | | | | |
| SSB configuration | Semi- static channel acces | 1,2 |  | SSB.1 FR1 | | | | | SSB.1 CCA | | | | |
| Semi- static channel acces | 3 |  | SSB.2 FR1 | | | | | SSB.1 CCA | | | | |
| Dymamic channel acces | 1,2 |  | SSB.1 FR1 | | | | | SSB.2 CCA | | | | |
| Dymamic channel acces | 3 |  | SSB.2 FR1 | | | | | SSB.2 CCA | | | | |
| Initial DL BWP configuration | | 1,2,3 |  | DLBWP.0.1 | | | | | DLBWP.0.1 | | | | |
| Initial UL BWP configuration | | 1,2,3 |  | ULBWP.0.1 | | | | | ULBWP.0.1 | | | | |
| Active DL BWP confgiuration | | 1,2,3 |  | DLBWP.1.1 | N/A | | N/A | | N/A | | N/A | DLBWP.1.1 | |
| Active UL BWP configuration | | 1,2,3 |  | ULBWP.1.1 | N/A | | N/A | | N/A | | N/A | ULBWP.1.1 | |
| DL CCA probability for semi-static channel access (PCCA\_DL) | | 1,2,3 |  | N/A | N/A | | N/A | | 1 | | 1 | 0.9375 | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_1) | | 1,2,3 |  | N/A | N/A | | N/A | | 1 | | 1 | 0.75 | |
| DL CCA probability for for dynamic static channel access (PCCA\_DL\_2) | | 1,2,3 |  | N/A | N/A | | N/A | | 1 | | 1 | 0.75 | |
| UL CCA probability (PCCA\_UL) | | 1,2,3 |  | N/A | N/A | | N/A | | 1 | | 1 | 1 | |
| RLM-RS | | 1,2,3 |  | SSB | | | | | SSB | | | | |
|  | | 1,2,3 | dB | 4 | | -infinity | | -infinity | -infinity | -infinity | | | 7 |
| Note2 | | 1,2,3 | dBm/15 KHz | -98 | | | | | | | | | |
| Note2 | | 1,2 | dBm/SCS | -98 | | | | | | | | | |
| 3 |  | -95 | | | | | | | | | |
|  | | 1,2,3 | dB | 4 | | -infinity | | -infinity | -infinity | -infinity | | | 7 |
| SS-RSRP Note3 | | 1, 2 | dBm/SCS | -94 | | -infinity | | -infinity | -infinity | -infinity | | | -91 |
|  | | 3 | -91 | | -infinity | | -infinity | -infinity | -infinity | | | -88 |
| Io | | 1,2 | dBm/9.36 MHz | -64.59 | | -70. 05 | | -70. 05 | -70. 05 | -70.05 | | | -62.26 |
| 3 | dBm/38.16 MHz | -58.50 | | -63.94 | | -63.94 | -63.94 | -63.94 | | | -56.15 |
| Propagation Condition | | 1,2,3 |  | AWGN | | | | | | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: Parameters PCCA\_DL, PCCA\_DL\_1, PCCA\_DL\_2 and PCCA\_UL are defined in clause A.3.20.2.  Note 5:      For UE supporting both semi-static and dynamic cannel access, the UE must be tested under both dynamic and semi-static channel occupancy configurations. | | | | | | | | | | | | | |

A.11.2.2.1.4.2 Test Requirements

The RRC re-establishment delay is defined as the time from the start of time period T3, to the moment when the UE starts to send PRACH preambles to cell 2 for sending the *RRCReestablishmentRequest* message to cell 2.

The RRC re-establishment delay to an unknown NR inter frequency cell shall be less .

The rate of correct RRC re-establishments observed during repeated tests shall be at least 90%.

NOTE: The RRC re-establishment delay in the test is derived from the following expression:

Where:

TUL\_grant = It is the time required to acquire and process uplink grant from the target cell. The PRACH reception at the system simulator is used as a trigger for the completion of the test; hence TUL\_grant is not used.

Nfreq = 2

Tidentify\_intra\_NR\_CCA = MAX (800 ms, (10+ K1) x 20) ms

Tidentify\_inter\_NR\_CCA = MAX (800 ms, ([13]+K2,2) x 20) ms

TSI = 1280 ms; it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target inter-frequency NR cell.

TPRACH\_CCA = It is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell. TPRACH\_CCA = (1+ K3)\*TSSB,RO + 10 ms; where K3=0 and TSSB,RO=10 ms for FR1 PRACH configuration 1 under CCA.

K1 is the number of SMTC occasions not available at the UE due during RRC re-establishment period on the carrier with CCA and with RF channel number # 1.

K2,2 is the number of SMTC occasions not available at the UE during RRC re-establishment period on the carrier with CCA and with RF channel number # 2.

This gives total =1350+MAX (800 ms, (10+ K1) x 20) ms+MAX (800 ms, ([13]+K2,2) x 20) ms.

### <End of Change (from R4-2114434)>

### <Start of Change (from R4-2114112)>

#### A.11.2.2.3 RRC connection release with redirection

##### A.11.2.2.3.1 Redirection from NR FR1 carrier under CCA to NR FR1 carrier under CCA

A.11.2.2.3.1.1 Test Purpose and Environment

This test is to verify RRC connection release with redirection from NR FR1 carrier under CCA to NR FR1 carrier under CCA specified in clause 6.2.3.2.3.

A.11.2.2.3.1.2 Test Parameters

Supported test configurations are shown in table A.11.2.2.3.1.2-1. The time delay is tested by using the parameters in table A.11.2.2.3.1.2-2, and A.11.2.2.3.1.2-3.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. The *RRCRelease* message shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

Table A.11.2.2.3.1.2-1: Redirection from NR to NR test configurations

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

Table A.11.2.2.3.1.2-2: General test parameters for Redirection from NR to NR test case

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Value | Comment |
| Initial conditions | Active cell | |  | Cell 1 | On the carrier under CCA |
|  | Neighbouring cell | |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell | |  | Cell 2 | On the carrier under CCA |
| Filter coefficient | | |  | 0 | L3 filtering is not used |
| Access Barring Information | | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | | |  | 3 μs | Synchronous cells |
| DL CCA model | | Dynamic channel accessNote 1, 3 |  | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2, 3 |
| UL CCA model | | Dynamic channel access Note 1, 3 |  | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 |
| T1 | | | s | 5 |  |
| T2 | | | s | ≥ Tconnection\_release\_redirect\_NR\_CCA | Tconnection\_release\_redirect\_NR\_CCA ­is defined in clause 6.2.3.2.3 |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic  channel occupancy only. | | | | | |

Table A.11.2.2.3.1.2-3: Cell specific test parameters for Redirection from NR to NR test case

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | | Unit | Cell 1 | | | | Cell 2 | | |
|  | | |  | T1 | | T2 | | T1 | | T2 |
| NR RF Channel Number | | |  | 1 | | | | 2 | | |
| PCCA\_DL for dynamic channel access Note 4,6 | | | - | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | | |
| PCCA\_DL for semi-static channel access Note 5,6 | | | - | PCCA\_DL=0.9375 | | | | PCCA\_DL=0.9375 | | |
| PCCA\_UL for dynamic channel access Note 4,6 | | | - | 1 | | | | 1 | | |
| PCCA\_UL for semi-static channel access Note 5,6 | | | - | 1 | | | | 1 | | |
| LCCA\_DL Note 7 | | |  | N/A | | | | 8 | | |
| WCCA\_DL Note 7 | | | ms | N/A | | | | Tidentify-NR\_CCA | | |
| TDD configuration | | Config 1 |  | TDDConf.1.1 CCA | | | | | | |
| BWchannel | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| BWP BW | | Config 1 |  | 40: NRB,c = 106 | | | | | | |
| DRX Cycle | | | ms | Not Applicable | | | | | | |
| PDSCH Reference | | Config 1 |  | SR.1.1 CCA | | | | | | |
| RMSI CORESET Reference Channel | | Config 1 |  | CR.1.1 CCA | | | | | | |
| Dedicated CORESET RMC configuration | | Config 1 |  | CCR.1.1 CCA | | | | | | |
| TRS configuration | | Config 1 |  | TRS.1.2 TDD | | | | | | |
| OCNG Patterns | | |  | OP.1 | | | | | | |
| SMTC Configuration | | |  | SMTC.1 | | | | | | |
| DBT configuration | | |  | DBT.1 | | | | | | |
| SSB configuration for semi-static channel access Note 4, 6 | | Config 1 |  | SSB.1 CCA | | | | | | |
| SSB configuration for dynamic channel access Note 5, 6 | | Config 1 |  | SSB.2 CCA | | | | | | |
| ssb-PositionQCL | | Config 1 |  | [1] | | | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1 | kHz | 30 kHz | | | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 under CCA | | | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | | | |
| Note2 | Config 1 | | dBm/SCS | -95 | | | | | | |
|  | | | dB | 4 | 4 | | -infinity | | 4 | |
|  | | | dB | 4 | 4 | | -infinity | | 4 | |
| IoNote3 | Config 1 | | dBm/  38.16MHz | -58.49 | -58.49 | | -63.94 | | -58.49 | |
| Propagation condition | | | - | AWGN | | | AWGN | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only.  Note 7: As defined in clause 6.2.3.2.3 for Trs ≤ 40 ms. | | | | | | | | | | |

A.11.2.2.3.1.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tconnection\_release\_redirect\_NR\_CCA ms from the beginning of time period T2, where Tconnection\_release\_redirect\_NR\_CCA is defined in clause 6.2.3.2.3.

The rate of correct RRC connection release redirection to NR observed during repeated tests shall be at least 90%.

NOTE: The redirection delay can be expressed as:

Tconnection\_release\_redirect\_NR\_CCA = TRRC\_procedure\_delay + Tidentify-NR\_CCA + TSI-NR\_CCA + TRACH\_CCA,

where:

TRRC\_procedure\_delay = 110 ms in the test.

Tidentify-NR\_CCA = MAX (680 ms, (L1+11) × 20 ms) in the test.

TSI-NR = 1280 ms, it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target NR cell.

TRACH\_CCA is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell.

L1 is the number of SMTC occasions not available at the UE due to DL CCA failures. The test equipment ensure that number of L1 in target cell does not exceed L1,max using the configured LCCA\_DL as in clause A.3.26.2.1;

### <End of Change (from R4-2114112)>

### <Start of Change (from R4-2114436)>

A.11.2.2.3.2 Redirection from NR FR1 carrier without CCA to NR FR1 carrier with CCA

A.11.2.2.3.2.1 Test Purpose and Environment

This test is to verify RRC connection release with redirection from NR FR1 carrier without CCA to NR FR1 carrier with CCA specified in clause 6.2.3.2.3.

A.11.2.2.3.2.2 Test Parameters

Supported test configurations are shown in table A.11.2.2.3.2.2-1. The time delay is tested by using the parameters in table A.11.2.2.3.2.2-2, and A.11.2.2.3.2.2-3.

The test consists of two successive time periods, with time duration of T1, and T2 respectively. The *RRCRelease* message shall be sent to the UE during period T1 and the start of T2 is the instant when the last TTI containing the RRC message is sent to the UE. Prior to time duration T2, the UE shall not have any timing information of Cell 2. Cell 2 is powered up at the beginning of the T2.

**Table A.11.2.2.3.2.2-1: Redirection from NR to NR test configurations**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **Source cell without CCA** | **Target cell with CCA** |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| 3 | 30 kHz SSB SCS, 40 MHz bandwidth, TDD | 30 kHz SSB SCS, 40 MHz bandwidth, TDD |
| Note: The UE is only required to be tested in one of the supported test configurations | | |

**Table A.11.2.2.3.2.2-2: General test parameters for Redirection from NR to NR test case**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | **Unit** | **Value** | **Comment** |
| Initial conditions | Active cell |  | Cell 1 | On the carrier without CCA |
|  | Neighbouring cell |  | Cell 2 | On the carrier under CCA |
| Final condition | Active cell |  | Cell 2 | On the carrier under CCA |
| Filter coefficient | |  | 0 | L3 filtering is not used |
| Access Barring Information | | - | Not Sent | No additional delays in random access procedure. |
| Time offset between cells | |  | 3 ms | Synchronous cells |
| DL CCA model | Dynamic channel accessNote 1, 3 |  | As specified in clause A.3.26.2.1 |  |
| Semi-static channel access Note 2, 3 |
| UL CCA model | Dynamic channel access Note 1, 3 |  | As specified in clause A.3.26.2.2 |  |
| Semi-static channel access Note 2,3 |
| T1 | | s | 5 |  |
| T2 | | s | ≥ Tconnection\_release\_redirect\_NR\_CCA | Tconnection\_release\_redirect\_NR\_CCA ­is defined in clause 6.2.3.2.3 |
| NOTE 1: For a UE supporting dynamic channel access and network configuring dynamic channel occupancy.  NOTE 2: For a UE supporting semi-static channel access and network configuring semi-static channel occupancy.  NOTE 3: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic  channel occupancy only. | | | | |

**Table A.11.2.2.3.2.2-3: Cell specific test parameters for Redirection from NR to NR test case**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Cell 1** | | **Cell 2** | | |
|  | | |  | **T1** | **T2** | **T1** | | **T2** |
| NR RF Channel Number | | |  | 1 | | 2 | | |
| PCCA\_DL for dynamic channel access Note 4,6 | | |  | N/A | | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | PCCA\_DL\_1=0.75  PCCA\_DL\_2=0.75 | |
| PCCA\_DL for semi-static channel access Note 5,6 | | |  | N/A | | PCCA\_DL=0.9375 | PCCA\_DL=0.9375 | |
| PCCA\_UL for dynamic channel access Note 4,6 | | |  | N/A | | 1 | 1 | |
| PCCA\_UL for semi-static channel access Note 5,6 | | |  | N/A | | 1 | 1 | |
| LCCA\_DL Note 7 | | |  | N/A | | 8 | | |
| WCCA\_DL Note 7 | | | ms | N/A | | Tidentify-NR\_CCA | | |
| Duplex mode | | Config 1 |  | FDD | | TDD | | |
|  | | Config 2,3 |  | TDD | | | | |
| TDD configuration | | Config 1 |  | Not Applicable | | TDDConf.1.1 CCA | | |
|  | | Config 2 |  | TDDConf.1.1 | | TDDConf.1.1 CCA | | |
|  | | Config 3 |  | TDDConf.2.1 | | TDDConf.1.1 CCA | | |
| BWchannel | | Config 1 | MHz | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | |
| BWP BW | | Config 1 | MHz | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | | Config 2 |  | 10: NRB,c = 52 | | 40: NRB,c = 106 | | |
|  | | Config 3 |  | 40: NRB,c = 106 | | | | |
| DRX Cycle | | | ms | Not Applicable | | | | |
| 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 | | |
| RMSI CORESET RMC configuration | | 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 | | |
| Dedicated CORESET RMC configuration | | Config 1 |  | CCR.1.1 FDD | | CCR.1.1 CCA | | |
| Config 2 | CCR.1.1 TDD | | CCR.1.1 CCA | | |
| Config 3 | CCR.2.1 TDD | | CCR.1.1 CCA | | |
| OCNG Patterns | | |  | OCNG pattern 1 | | | | |
| SSB Configuration | Semi-static channel acces | Config 1,2 |  | SSB.1 FR1 | | SSB.1 CCA | | |
| Dymamic channel acces | Config 3 |  | SSB.2 FR1 | | SSB.2 CCA | | |
| Semi-static channel acces | Config 1,2 |  | SSB.1 FR1 | | SSB.1 CCA | | |
| Dymamic channel acces | Config 3 |  | SSB.2 FR1 | | SSB.2 CCA | | |
| SMTC configuration | | Config 1,2 |  | SMTC.1 FR1 | | SMTC.2 FR1 | | |
|  | | Config 3 |  | SMTC.2 FR1 | | | | |
| PDSCH/PDCCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | 30 kHz | | |
| Config 3 |  | 30 kHz | | | | |
| PUCCH/PUSCH subcarrier spacing | | Config 1,2 | kHz | 15 kHz | | 30 kHz | | |
| Config 3 |  | 30 kHz | | | | |
| PRACH configuration | | |  | FR1 PRACH configuration 1 under CCA in Table A.3.8A.2.1-1 | | | | |
| BWP configuration | | Initial DL BWP |  | DLBWP.0.1 | | | | |
|  | | Dedicated DL BWP |  | DLBWP.1.1 | | | | |
|  | | Initial UL BWP |  | ULBWP.0.1 | | | | |
|  | | Dedicated UL BWP |  | ULBWP.1.1 | | | | |
| EPRE ratio of PSS to SSS | | | dB | 0 | | | | |
| EPRE ratio of PBCH DMRS to SSS | | |
| EPRE ratio of PBCH to PBCH DMRS | | |
| EPRE ratio of PDCCH DMRS to SSS | | |
| EPRE ratio of PDCCH to PDCCH DMRS | | |
| EPRE ratio of PDSCH DMRS to SSS | | |
| EPRE ratio of PDSCH to PDSCH | | |
| EPRE ratio of OCNG DMRS to SSS (Note 1) | | |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | | |
| Note2 | | | dBm/15kHz | -98 | | | | |
| Note2 | | Config 1,2 | dBm/SCS | -98 | | -95 | | |
| Config 3 |  | -95 | | | | |
|  | | | dB | 4 | 4 | -infinity | | 4 |
|  | | | dB | 4 | 4 | -infinity | | 4 |
| IoNote3 | | Config 1,2 | dBm/9.36MHz | -64.59 | -64.59 | N/A | | N/A |
| Config 3 | dBm/38.16MHz | -58.49 | -58.49 | -63.94 | | -58.49 |
| Propagation condition | | | - | AWGN | | | | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: For UE supporting semi-static channel access and network configuring semi-static channel occupancy.  Note 5: For UE supporting dynamic channel access and network configuring dynamic channel occupancy.  Note 6: For a UE supporting both semi-static and dynamic channel access, the UE can be tested under dynamic channel occupancy only.  Note 7: As defined in clause 6.2.3.2.3 for Trs ≤ 40 ms. | | | | | | | | |

A.11.2.2.3.2.3 Test Requirements

The UE shall start to transmit the PRACH to Cell 2 less than Tconnection\_release\_redirect\_NR\_CCA ms from the beginning of time period T2, where Tconnection\_release\_redirect\_NR\_CCA is defined in clause 6.2.3.2.3.

The rate of correct RRC connection release redirection to NR observed during repeated tests shall be at least 90%.

NOTE: The redirection delay can be expressed as:

Tconnection\_release\_redirect\_NR\_CCA = TRRC\_procedure\_delay + Tidentify-NR\_CCA + TSI-NR\_CCA + TRACH\_CCA,

where:

TRRC\_procedure\_delay = 110 ms in the test.

Tidentify-NR\_CCA = MAX (680 ms, (L1+11) ´ 20 ms) in the test.

TSI-NR\_CCA = 1280 ms, it is the time required for receiving all the relevant system information as defined in TS 38.331 for the target NR cell.

TRACH\_CCA is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell. TRACH\_CCA = (1+L2)´TSSB,RO + 10 ms; where TSSB,RO = 10 ms for FR1 PRACH configuration 1.

L1 is the number of SMTC occasions not available at the UE due to DL CCA failures. The test equipment shall ensure that L1 does not exceed L1,max. In the test L1,max= LCCA\_DL which is defined in clause A.3.26.2.1.

L2 is the consecutive number of SSB to PRACH occasion association periods during which no PRACH occasion is available for PRACH transmission due to UL CCA failures. L2 = 0 in the test.

The total delay, Tconnection\_release\_redirect\_NR\_CCA, shall be less than 1410 + MAX (680, (L1+11)´20) ms.

<End of Change (from R4-2114436)>