**3GPP TSG-RAN WG4 Meeting #98bis-e *R4-210xxxx***

**Electronic Meeting, April 12 - 20, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **draftCR** | **rev** | **1** | **Current version:** | **16.7.0** |  |
|  |
| *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:***  | Introduction of NR-U cell reselection tests |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** | 2 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe 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:*** | RRM test cases for verifying NR-U cell reselection requirements for following cases are missing: between NR and NR-U, from NR-U to E-UTRAN |
|  |  |
| ***Summary of change:*** | Change #1: Reselection to NR cells when serving cell is subject to CCAChange #2: Reselection to NR cells when target cell is subject to CCAChange #3: Reselection to Inter-RAT E-UTRAN reselection when serving cell is subject to CCAChange #4: Reselection to lower priority E-UTRAN when serving cell is subject to CCA*New changes compared to the original one are shown in yellow.* *Changes which will be made during the meeting depending on the progress in test configuration are marked in cyan.* |
|  |  |
| ***Consequences if not approved:*** | Core cell reselection requirements are not tested |
|  |  |
| ***Clauses affected:*** | New clauses introduced: A.11.1.5, A.11.1.6 and A.11.1.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS 38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

Change 1

### A.11.1.5 Cell re-selection to NR cells when serving cell is subject to CCA

#### A.11.1.5.1 Cell reselection to FR1 inter-frequency NR case when serving cell is subject to CCA

##### A.11.1.5.1.1 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.11.1.5.1.2-1.

##### A.11.1.5.1.2 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.11.1.5.1.2-1, A.11.1.5.1.2-2 and A.11.1.5.1.2-3. 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.11.1.5.1.2-1: 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 |

Table A.11.1.5.1.2-2: 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 FR1Cell 2: SSB.1 CCA for semi-static channel;Cell 2: SSB.2 CCA for dynamic channel;SSB.2 CCA |  |
|  |  | 2 | Cell 1: SSB.1 FR1Cell 2: SSB.1 CCA for semi-static channel;Cell 2: SSB.2 CCA for dynamic channel;SSB.2 CCA |  |
|  |  | 3 | Cell 1: SSB.2 FR1Cell 2: SSB.1 CCA for semi-static channel;Cell 2: SSB.2 CCA for dynamic channel;SSB.2 CCA |  |
| SMTCconfiguration |  | 1 | Cell 1: SMTC pattern 2Cell 2: N/A |  |
|  |  | 2 | Cell 1: SMTC pattern 1Cell 2: N/A |  |
|  |  | 3 | Cell 1: SMTC pattern 1Cell 2: N/A |  |
| DBT Window Configuration |  | 1, 2, 3 | Cell 1: N/ACell 2: TBD | As specified in clause A.3.21.1. |
| DL CCA model |  | 1, 2, 3 | Cell 1: N/ACell 2: TBD |  |
| UL CCA model |  | 1, 2, 3 | Cell 1: N/ACell 2: As specified in clause A.3.20.2.2 |  |
| 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 | TBD | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | s | 1, 2, 3 | TBD | 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 | TBD | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.5.2.2-3: 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 PCCA\_DL |  | 1, 2, 3 | N/A | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | N/A | TBD |
| 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 | -86 |
|  |  | 2 | -84 | -84 | -84 | -102 | -infinity | -86 |
|  |  | 3 | -81 | -81 | -81 | -99 | -infinity | -83 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -55.88 | -68.60 | -infinity | -57.78 |
|  | dBm/9.36 MHz | 2 | -55.88 | -55.88 | -55.88 | -68.60 | -infinity | -57.78 |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -49.79 | -62.50 | -infinity | -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. |

##### A.11.1.5.1.3 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.

Change 2

### A.11.1.6 Cell re-selection to NR cells when target cell is subject to CCA

#### A.11.1.6.1 Cell reselection to FR1 inter-frequency NR case when target cell is subject to CCA

##### A.11.1.6.1.1 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.11.1.6.1.2 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.11.1.6.1.2-1, A.11.1.6.1.2-2 and A.11.1.6.1.2-3. 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.11.1.6.1.2-1: 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 |

Table A.11.1.6.1.2-2: 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;Cell 1: SSB.2 CCA for dynamic channel;SSB.2 CCA Cell 2: SSB.1 FR1 |  |
|  |  | 2 | Cell 1: SSB.1 CCA for semi-static channel;Cell 1: SSB.2 CCA for dynamic channel;SSB.2 CCA Cell 2: SSB.1 FR1 |  |
|  |  | 3 | Cell 1: SSB.1 CCA for semi-static channel;Cell 1: SSB.2 CCA for dynamic channel;SSB.2 CCA Cell 2: SSB.2 FR1 |  |
| SMTCconfiguration |  | 1 | Cell 1: TBDCell 2: SMTC.2 |  |
|  |  | 2 | Cell 1: TBDCell 2: SMTC.1 |  |
|  |  | 3 | Cell 1: TBDCell 2: SMTC.1 |  |
| DBT Window Configuration |  | 1, 2, 3 | Cell 1: TBDCell 2: N/A | As specified in clause A.3.21.1. |
| DL CCA model |  | 1, 2, 3 | Cell 1: TBDCell 2: N/A |  |
| UL CCA model |  | 1, 2, 3 | Cell 1: TBDCell 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 | TBD | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | s | 1, 2, 3 | TBD | 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 | TBD | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.6.2.2-3: 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 PCCA\_DL |  | 1, 2, 3 | TBD | N/A |
| UL CCA probability PCCA\_UL |  | 1, 2, 3 | TBD | 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 | TBD | TBD | TBD | -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 | -84 | -84 | -84 | -102 | -infinity | -86 |
|  |  | 2 | -84 | -84 | -84 | -102 | -infinity | -86 |
|  |  | 3 | -81 | -81 | -81 | -99 | -infinity | -83 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -55.88 | -68.60 | -infinity | -57.78 |
|  | dBm/9.36 MHz | 2 | -55.88 | -55.88 | -55.88 | -68.60 | -infinity | -57.78 |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -49.79 | -62.50 | -infinity | -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. |

##### A.11.1.6.1.3 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.

Change 3

### A.11.1.7 Inter-RAT E-UTRAN cell reselection when serving cell is subject to CCA

#### A.11.1.7.1 Cell reselection to higher priority E-UTRAN when serving cell is subject to CCA

##### A.11.1.7.1.1 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.11.1.7.1.2 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.11.1.7.1.2-1, A.11.1.7.1.2-2, A.11.1.7.1.2-3 and A.11.1.7.1.2-4. 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.11.1.7.1.2-1: 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.11.1.7.1.2-2: 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 | TBD |  |
| DBT Window Configuration |  | 1, 2 | TBD | As specified in clause A.3.21.1. |
| SSB configuration |  |  | Cell 1: SSB.1 CCA for semi-static channel;Cell 1: SSB.2 CCA for dynamic channel;SSB.2 CCA |  |
| DL CCA model |  | 1, 2 | TBD |  |
| UL CCA model |  | 1, 2 | TBD |  |
| 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 | TBD | 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 | TBD | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| T3 | s | 1, 2 | TBD | T3 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.7.1.2-3: 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 PCCA\_DL |  | 1, 2 | TBD |
| UL CCA probability PCCA\_UL |  | 1, 2 | TBD |
| 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 | TBD |
| NR SMTC parameters |  | 1, 2 | TBD |
| 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 |

Table A.11.1.7.1.2-4: 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 | Not sent |
| 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.11.1.7.1.3 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.

Change 4

####  A.11.1.7.2 Cell reselection to lower priority E-UTRAN when serving cell is subject to CCA

##### A.11.1.7.2.1 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.11.1.7.2.1-1, A.11.1.7.2.1-2, A.11.1.7.2.1-3 and A.11.1.7.2.1-4. 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.11.1.7.2.1-1: 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.11.1.7.2.1-2: 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 | TBD |  |
| DBT Window Configuration |  | 1, 2 | TBD | As specified in clause A.3.21.1. |
| DL CCA model |  | 1, 2 | TBD |  |
| UL CCA model |  | 1, 2 | TBD |  |
| 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 | TBD | T1 needs to be defined so that cell re-selection reaction time is taken into account. |
| T2 | s | 1, 2 | TBD | T2 needs to be defined so that cell re-selection reaction time is taken into account. |

Table A.11.1.7.2.1-3: 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 PCCA\_DL |  | 1, 2 | TDDConf.1.1.CCA |
| UL CCA probability PCCA\_UL |  | 1, 2 | TDDConf.1.1.CCA |
| 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;SSB.2 CCA for dynamic channel |
|  |
| SMTC configuration |  | 1, 2 | TBD |
|  |
|  |
| 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 |

Table A.11.1.7.2.1-4: 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 | Not sent |
| 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.11.1.7.2.2 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.