**3GPP TSG-RAN WG4 Meeting #** **97-e R4-2017141**

**Electronic Meeting, 2-13 Nov., 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **33** | **CR** |  | **rev** | **3** | **Current version:** |  |  |
|  |
| *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:***  | Draft CR on Cell reselection Tests for UE configured with relaxed measurement criterion |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | RAN4 WG4 |
|  |  |
| ***Work item code:*** | NR\_UE\_pow\_sav-Perf |  | ***Date:*** | 22 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | No Cell Reselection tests are specified for UE configured with relaxed measurement criterion |
|  |  |
| ***Summary of change:*** | Two new tests are added for Cell reselection to FR1 inter-frequency NR case for UE configured with relaxed measurement criterion.One test will target UE configured with and that satisfy only the low mobility criteria for measurement relaxation.One test will target UE configured with and that satisfy only the not-at-cell edge criteria for measurement relaxation. |
|  |  |
| ***Consequences if not approved:*** | No test is defined for Cell reselection to FR1 inter-frequency NR case for UE configured with relaxed measurement criterion. |
|  |  |
| ***Clauses affected:*** | A.6.1.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.533 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<< Start of change 1 >>

#### A.6.1.1.5 Cell reselection to FR1 inter-frequency NR case for UE fulfilling low mobility relaxed measurement criterion

##### A.6.1.1.5.1 Test Purpose and Environment

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

##### A.6.1.1.5.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers respectively as given in tables A.6.1.1.5.2-1, A.6.1.1.5.2-2 and A.6.1.1.5.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

As specified in the Test Purpose, the UE is configured with the relaxed measurement criterion for UE with low mobility defined in clause 5.2.4.9.1 in [1]. So, Cell 2 configures the UE as follows:

* *lowMobilityEvalutation* [2] criterion is configured according to the parameters listed in Table A.6.1.1.5.2-3;
* *cellEdgeEvaluation* [2] criterion is not configured;
* *combineRelaxedMeasCondition* [2] is not configured or configured but set to FALSE;

Table A.6.1.1.5.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of serving cell | Description of target cell |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 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.6.1.1.5.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case for low mobility relaxed measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2, 3 | Cell2 | The UE camps on cell 2 in the initial phase, it fulfills Low Mobility relaxation measurements criterion, and during T1 period the UE reselects to 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 |
| T2 end condition | Active cell |  | 1, 2, 3 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T2 |
| 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. |
|  |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTCconfiguration |  | 1 | SMTC pattern 2 |  |
|  |  | 2 | SMTC pattern 1 |  |
|  |  | 3 | SMTC pattern 1 |  |
| DRX cycle length | s | 1, 2, 3 | 0.64 | 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 | 25 s | T1 is defined so that cell re-selection reaction time is taken into account. |
| T2 | s | 1, 2, 3 | >20 s | During T2, UE should perform reselection to cell 2 with higher priority |

Table A.6.1.1.5.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case for low mobility relaxed measurements in AWGN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 |
| T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | N/A | N/A |
|  |  | 2 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC  |  | 1 | SR.1.1 FDD | SR.1.1 FDD |
| configuration |  | 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET |  | 1 | CR.1.1 FDD | CR.1.1 FDD |
| RMC configuration |  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | CCR.1.1 FDD |
| RMC configuration |  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  |  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | OP.1 defined in A.3.2.1 |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | DLBWP.0.1 |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | ULBWP.0.1 |
| RLM-RS |  | 1, 2, 3 | SSB | SSB |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | -140 |
|  |  | 3 | -137 | -137 |
| Pcompensation | dB | 1, 2, 3 | 0 | 0 |
| Qhysts | dB | 1, 2, 3 | 0 | 0 |
| Qoffsets, n | dB | 1, 2, 3 | 0 | 0 |
| Cell\_selection\_and\_reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | SS-RSRP |
|  | dB | 1 | 14 | 14 | -4 | 12 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
|  Note2 | dBm/SCS | 1 | -98 |
|  |  | 2 | -98 |
|  |  | 3 | -95 |
|  Note2 | dBm/15 kHz | 1 | -98 |
|  |  | 2 |  |
|  |  | 3 |  |
|  | dB | 1 | 14 | 14 | -4 | 12 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -84 | -84 | -102 | -86 |
|  |  | 2 | -84 | -84 | -102 | -86 |
|  |  | 3 | -81 | -81 | -99 | -83 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -68.60 | -57.78 |
|  | dBm/9.36 MHz | 2 | -55.88 | -55.88 | -68.60 | -57.78 |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -62.50 | -51.69 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 |
| Snonintrasearch | dB | 1, 2, 3 | 50 | Not sent |
| Threshx, high | dB | 1, 2, 3 | 48 | 48 |
| Threshserving, low | dB | 1, 2, 3 | 44 | 44 |
| Threshx, low  | dB | 1, 2, 3 | 50 | 50 |
| SSearchDeltaP  | dB | 1, 2, 3 | 3 | 3 |
| TSearchDeltaP  | s | 1, 2, 3 | 5 | 5 |
| 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.6.1.1.5.3 Test Requirements

The cell reselection delay to a lower priority cell for UE fulfilling low mobility relaxed measurements 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 for UE fulfilling low mobility relaxed measurements shall be less than 17 s.

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

NOTE: The cell re-selection delay to a known lower priority cell can be expressed as: Tevaluate, NR\_ inter + TSI-NR,

Where:

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

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

This gives a total of 16.64 s for the cell re-selection delay to a lower priority cell for UE fulfilling low mobility relaxed measurements, for which we allow 17 s.

#### A.6.1.1.6 Cell reselection to FR1 inter-frequency NR case for UE fulfilling not-at-cell edge relaxed measurement criterion

##### A.6.1.1.6.1 Test Purpose and Environment

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

##### A.6.1.1.6.2 Test Parameters

The test scenario comprises of 2 cells on 2 different NR carriers respectively as given in tables A.6.1.1.6.2-1, A.6.1.1.6.2-2 and A.6.1.1.6.2-3. The test consists of two successive time periods, with time duration of T1 and T2 respectively. Both cell 1 and cell 2 are already identified by the UE prior to the start of the test. Cell 1 and cell 2 belong to different tracking areas and cell 2 is of higher priority than cell 1.

As specified in the Test Purpose, the UE is configured with the relaxed measurement criterion for UE not-at-cell edge as defined in clause 5.2.4.9.2 in [1]. So, Cell 2 configures the UE as follows:

* *cellEdgeEvaluation* [2] criterion is configured according to the parameters listed in Table A.6.1.1.5.2-3;
* *lowMobilityEvalutation* [2] criterion is not configured;
* *combineRelaxedMeasCondition* [2] is not configured or configured but set to FALSE;

Table A.6.1.1.6.2-1: Supported test configurations

|  |  |  |
| --- | --- | --- |
| Configuration | Description of serving cell | Description of target cell |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 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.6.1.1.6.2-2: General test parameters for FR1 inter frequency NR cell re-selection test case for not-at-cell edge relaxed measurements

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Initial condition | Active cell |  | 1, 2, 3 | Cell2 | The UE camps on cell 2 in the initial phase, it fulfills Not-at-cell edge relaxation measurements criterion, and during T1 period the UE reselects to 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 |
| T2 end condition | Active cell |  | 1, 2, 3 | Cell2 | The UE shall perform reselection to cell 2 with higher priority during T2 |
| 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. |
|  |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTCconfiguration |  | 1 | SMTC pattern 2 |  |
|  |  | 2 | SMTC pattern 1 |  |
|  |  | 3 | SMTC pattern 1 |  |
| DRX cycle length | s | 1, 2, 3 | 0.64 | 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 | 25 s | T1 is defined so that cell re-selection reaction time is taken into account. |
| T2 | s | 1, 2, 3 | >20 s | During T2, UE should perform reselection to cell 2 with higher priority |

Table A.6.1.1.6.2-3: Cell specific test parameters for FR1 inter frequency NR cell re-selection test case for not-at-cell edge relaxed measurements in AWGN

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | **Cell 2** |
| **T1** | **T2** | **T1** | **T2** |
| TDD configuration |  | 1 | N/A | N/A |
|  |  | 2 | TDDConf.1.1 | TDDConf.1.1 |
|  |  | 3 | TDDConf.2.1 | TDDConf.2.1 |
| PDSCH RMC  |  | 1 | SR.1.1 FDD | SR.1.1 FDD |
| configuration |  | 2 | SR.1.1 TDD | SR.1.1 TDD |
|  |  | 3 | SR.2.1 TDD | SR.2.1 TDD |
| RMSI CORESET |  | 1 | CR.1.1 FDD | CR.1.1 FDD |
| RMC configuration |  | 2 | CR.1.1 TDD | CR.1.1 TDD |
|  |  | 3 | CR.2.1 TDD | CR.2.1 TDD |
| Dedicated CORESET |  | 1 | CCR.1.1 FDD | CCR.1.1 FDD |
| RMC configuration |  | 2 | CCR.1.1 TDD | CCR.1.1 TDD |
|  |  | 3 | CCR.2.1 TDD | CCR.2.1 TDD |
| OCNG Pattern |  | 1, 2, 3 | OP.1 defined in A.3.2.1 | OP.1 defined in A.3.2.1 |
| Initial DL BWP configuration |  | 1, 2, 3 | DLBWP.0.1 | DLBWP.0.1 |
| Initial UL BWP configuration |  | 1, 2, 3 | ULBWP.0.1 | ULBWP.0.1 |
| RLM-RS |  | 1, 2, 3 | SSB | SSB |
| Qrxlevmin | dBm/SCS | 1, 2 | -140 | -140 |
|  |  | 3 | -137 | -137 |
| Pcompensation | dB | 1, 2, 3 | 0 | 0 |
| Qhysts | dB | 1, 2, 3 | 0 | 0 |
| Qoffsets, n | dB | 1, 2, 3 | 0 | 0 |
| Cell\_selection\_and\_reselection\_quality\_measurement |  | 1, 2, 3 | SS-RSRP | SS-RSRP |
|  | dB | 1 | 14 | 14 | -4 | 12 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
|  Note2 | dBm/SCS | 1 | -98 |
|  |  | 2 | -98 |
|  |  | 3 | -95 |
|  Note2 | dBm/15 kHz | 1 | -98 |
|  |  | 2 |  |
|  |  | 3 |  |
|  | dB | 1 | 14 | 14 | -4 | 12 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| SS-RSRP Note3 | dBm/SCS | 1 | -84 | -84 | -102 | -86 |
|  |  | 2 | -84 | -84 | -102 | -86 |
|  |  | 3 | -81 | -81 | -99 | -83 |
| Io | dBm/9.36 MHz | 1 | -55.88 | -55.88 | -68.60 | -57.78 |
|  | dBm/9.36 MHz | 2 | -55.88 | -55.88 | -68.60 | -57.78 |
|  | dBm/38.16 MHz | 3 | -49.79 | -49.79 | -62.50 | -51.69 |
| Treselection | s | 1, 2, 3 | 0 | 0 | 0 | 0 |
| Snonintrasearch | dB | 1, 2, 3 | 50 | Not sent |
| Threshx, high | dB | 1, 2, 3 | 48 | 48 |
| Threshserving, low | dB | 1, 2, 3 | 44 | 44 |
| Threshx, low  | dB | 1, 2, 3 | 50 | 50 |
| SSearchThresholdP | dB | 1, 2, 3 | 50 | 50 |
| SSearchThresholdQ | s | 1, 2, 3 | Not Configured |
| 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.6.1.1.6.3 Test Requirements

The cell reselection delay to a lower priority cell for UE fulfilling not-at-cell edge relaxed measurements 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 for UE fulfilling not-at-cell edge relaxed measurements shall be less than 17 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, NR\_ inter + TSI-NR,

Where:

Tevaluate, NR\_ inter See Table 4.2.2.10.3-1 in clause 4.2.2.10

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

This gives a total of 16.64 s for the cell re-selection delay to a lower priority cell for UE fulfilling not-at-cell edge relaxed measurements in the test case, which we allow 17 s.

<< End of change 1 >>