**3GPP TSG-RAN4 Meeting #116 *R4-251xxxx***

**Bengaluru, India, 25 – 29 August, 2025**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | 5904 | **rev** | 1 | **Current version:** | **18.10.0** |  |
|  | | | | | | | | |
| *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:*** | (NR\_NTN\_enh-Perf) CR on RRM test cases for Rel-18 NTN | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_NTN\_enh-Perf | | | | |  | ***Date:*** | | | 2025-08-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. In NTN to TN cell reselection test cases (A.14.1.11 and A.14.1.12), TN to NTN cell reselection is also tested in the same test case. This is due to re-use of existing NTN-NTN cell reselection test case with 3 time periods where both reselection from Cell1 to Cell2 and from Cell2 to Cell1 are tested. However, RAN4#109 R4-2321362 has agreed not to test TN to NTN cell reselection. 2. The test configuration does not differentiate GSO and NGSO. In addition, the test configuration for the TN target cell is incomplete compared to other RRM test cases for TN, and this would limit the applicability of the test case. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. In NTN to TN cell reselection test cases (A.14.1.11 and A.14.1.12), remove time period T3 where TN to NTN cell reselection is expected. The test description, parameters and test requirements are updated accordlingly. 2. Define separate test configurations for GSO and NGSO. Add missing test configurations for TN target cell. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Test case is not aligned with agreed test scope and applicability is limited. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.14.1.11, A.14.1.12 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

<Start of Change 1>

A.14.1.11 Cell reselection to FR1 inter-RAT for NR NTN carrier

A.14.1.11.1Test purpose and Environment

This test is to verify the requirement for the NR NTN to E-UTRAN TN inter-RAT cell reselection requirements specified in clause 4.2C.2.11 when the E-UTRAN cell is of higher priority.

A.14.1.11.2Test parameters

The test scenario comprises of one NR cell and one E-UTRAN cell as given in tables A.14.1.11.2-1, A.14.1.11.2-2, A.14.1.11.2-3 and A.14.1.11.2-4. The test consists of two successive time periods, with time duration of T1 and T2, 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.

**A.14.1.11.2-1: Supported test configurations**

|  |  |  |
| --- | --- | --- |
| **Configuration** | **Description of serving cell** | **Description of target cell** |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | LTE 10 MHz bandwidth, TDD duplex mode |
| 2 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | LTE 10 MHz bandwidth, TDD duplex mode |
| 3 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | LTE 10 MHz bandwidth, FDD duplex mode |
| 4 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | LTE 10 MHz bandwidth, FDD duplex mode |
| NOTE: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases, and the UE is only required to be tested in one of the supported test configurations of the applicable scenario (GSO or NGSO). | | |

**Table A.14.1.11.2-2: General test parameters for NR to E-UTRAN cell re-selection test case**

| **Parameter** | | **Unit** | **Test configuration** | **Value** | **Comment** |
| --- | --- | --- | --- | --- | --- |
| Initial condition | Active cell |  | 1-4 | Cell 1 | The UE camps on Cell 1 in the initial phase and during T2 period the UE reselects to Cell 2. |
| T2 end | Active cell |  | 1-4 | Cell 2 | The UE shall perform reselection to cell |
| condition | Neighbour cell |  | 1-4 | Cell 1 | 2 during T2. |
| Access Barring Information | | - | 1-4 | Not Sent | No additional delays in random access procedure. |
| DRX cycle length | | s | 1-4 | 1.28 | The value shall be used for all cells in the test. |
| NR PRACH configuration index | |  | 1-4 | 102 | The detailed configuration is specified in TS 38.211 [6] clause 6.3.3.2 |
| E-UTRAN PRACH configuration index | |  | 1-4 | 53 | As specified in table 5.7.1-2 in TS 36.211 [23] |
| T1 | | s | 1-4 | >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 | 1-4 | 70 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |

**Table A.14.1.11.2-3: Cell specific test parameters for NR Cell 1**

| **Parameter** | **Unit** | **Test configuration** | **Cell 1** | |
| --- | --- | --- | --- | --- |
|  |  |  | **T1** | **T2** |
| Satellite information |  | 1,3 | SSC.1 | |
|  |  | 2,4 | SSC.2 | |
| TDD configuration |  | 1-4 | N/A | |
| PDSCH parameters |  | 1-4 | SR.1.1 FDD | |
| RMSI CORESET parameters |  | 1-4 | CR.1.1 FDD | |
| Dedicated CORESET parameters |  | 1-4 | CCR.1.1 FDD | |
| SSB parameters |  | 1-4 | SSB.1 FR1 | |
| NR SMTC parameters |  | 1-4 | SMTC.2 | |
| OCNG Pattern |  | 1-4 | OP.1 defined in A.3.2.1 | |
| Initial DL BWP configuration |  | 1-4 | DLBWP.0.1 | |
| Initial UL BWP configuration |  | 1-4 | ULBWP.0.1 | |
| RLM-RS |  | 1-4 | SSB | |
| Qrxlevmin | dBm/SCS | 1-4 | -140 | |
|  | dBm/SCS | 1-4 | -98 | |
|  | dBm/15 kHz | 1-4 | -98 | |
| SS-RSRP | dBm/SCS | 1-4 | -84 | -84 |
|  | dB | 1-4 | 14 | 14 |
|  | dB | 1-4 | 14 | 14 |
| Io | dBm/9.36 MHz | 1-4 | -55.88 | -55.88 |
| Treselection | s | 1-4 | 0 | |
| SnonintrasearchP | dB | 1-4 | 50 | |
| Threshx, highP (Note 2) | dB | 1-4 | 48 | |
| Threshserving, lowP | dB | 1-4 | 44 | |
| Threshx, lowP | dB | 1-4 | 50 | |
| Propagation Condition |  | 1-4 | 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.14.1.11.2-4: 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  OP.2 FDD for test configuration 3, 4 | |
| 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 |
|  | dB | -infinity | 12 |
|  | dB | -infinity | 12 |
| TreselectionEUTRAN | s | 0 | |
| SnonintrasearchP | dB | Not sent | |
| Threshx, highP | dB | 48 | |
| Threshserving, lowP | dB | 44 | |
| Threshx, lowP (Note 2) | 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, Low** which is included in E-UTRA system information, and is a threshold for the NR target cell | | | |



A.14.1.11.3 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 4.2C.2.9

Tevaluate, NR\_ inter See clause 4.2C.2.11

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.14.1.12 Cell re-selection to FR1 inter-frequency NR case with TN carrier

A.14.1.12.1Test purpose and Environment

This test is to verify the requirement for the inter frequency NR NTN to TN cell re-selection requirements specified in clause 4.2C.2.11.

A.14.1.12.2Test parameters

The test scenario comprises of 2 cells on 2 different NR carriers, including NR NTN cell 1 on RF channel 1 and NR TN cell 2 on RF channel 2, respectively as given in tables A.14.1.12.2-1, A.14.1.12.2-2 and A.14.1.12.3-3. The test consists of two successive time periods, with time duration of T1 and T2, respectively. 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 and Cell 2 is of higher priority than Cell 1.

**Table A.14.1.12.2-1: Supported test configurations**

|  |  |  |
| --- | --- | --- |
| Configuration | Description of serving cell | Description of target cell |
| 1 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | GSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| 4 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 5 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 6 | NGSO, NR FDD, SSB SCS 15 kHz, data SCS 15 kHz, BW 10 MHz | 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| NOTE: If UE supports both NGSO and GSO, the GSO-based test cases can be skipped if the UE passes NGSO-based test cases, and the UE is only required to be tested in one of the supported test configurations of the applicable scenario (GSO or NGSO). | | |



**TableA.14.1.12.2-2: General test parameters for inter frequency NR cell re-selection test case**

| **Parameter** | | **Unit** | **Test configuration** | **Value** | **Comment** |
| --- | --- | --- | --- | --- | --- |
|  | |  |
| Initial condition | Active cell |  | 1-6 | Cell 1 |  |
| T2 end condition | Active cell |  | 1-6 | Cell 2 |  |
| Neighbour cells |  | 1-6 | Cell 1 |  |
| RF Channel Number | |  | 1-6 | 1,2 | Cell 1 is on RF channel 1  Cell 2 is on RF channel 2 |
| Time offset between cells | |  | 1-6 | 3 ms | Asynchronous cells |
| Access Barring Information | | - | 1-6 | Not Sent | No additional delays in random access procedure. |
| SSB configuration | |  | 1-6 | SSB.1 FR1 |  |
| SMTC configuration | |  | 1-6 | SMTC.6 | Configured in SIB4 for Cell 1 and Cell 2 |
| DRX cycle length | | s | 1-6 | 1.28 | The value shall be used for all cells in the test. |
| PRACH configuration index | |  | 1-6 | 102 | The detailed configuration is specified in TS 38.211 [6] clause 6.3.3.2 |
| rangeToBestCell | |  | 1-6 | Not configured |  |
| Ephemeris information | |  | 1-6 | Note 1 | The detailed configuration is specified in SIB19 |
| T1 | | s | 1-6 | >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 | 1-6 | 70 | T2 needs to be defined so that cell re-selection reaction time is taken into account. |
| Note 1: Detailed ephemeris information is provided in TS 38.508-1 [38] | | | | | |

**Table A.14.1.12.3-3: Cell specific test parameters for inter frequency NR cell re-selection test case**

| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
| --- | --- | --- | --- | --- | --- | --- |
| T1 | T2 | T1 | T2 |
| Satellite information |  | 1,2,3 | SSC.1 | | N/A | |
|  |  | 4,5,6 | SSC.2 | |  | |
| TDD configuration |  | 1,4 | N/A | | N/A | |
|  |  | 2,5 |  | | TDDConf.1.1 | |
|  |  | 3,6 |  | | TDDConf.2.1 | |
| PDSCH RMC |  | 1,4 | SR.1.1 FDD | | SR.1.1 FDD | |
| configuration |  | 2,5 |  | | SR.1.1 TDD | |
|  |  | 3,6 |  | | SR.2.1 TDD | |
| RMSI CORESET |  | 1,4 | CR.1.1 FDD | | CR.1.1 FDD | |
| RMC configuration |  | 2,5 |  | | CR.1.1 TDD | |
|  |  | 3,6 |  | | CR.2.1 TDD | |
| Dedicated CORESET |  | 1,4 | CCR.1.1 FDD | | CCR.1.1 FDD | |
| RMC configuration |  | 2,5 |  | | CCR.1.1 TDD | |
|  |  | 3,6 |  | | CCR.2.1 TDD | |
| OCNG Pattern |  | 1-6 | OP.1 defined in clause A.3.2.1 | | OP.1 defined in clause A.3.2.1 | |
| Initial DL BWP configuration |  | 1-6 | DLBWP.0.1 | | DLBWP.0.1 | |
| Initial UL BWP configuration |  | 1-6 | ULBWP.0.1 | | ULBWP.0.1 | |
| RLM-RS |  | 1-6 | SSB | | SSB | |
| Qrxlevmin | dBm/SCS | 1,2,4,5 | -140 | | -140 | |
|  |  | 3,6 |  | | -137 | |
| Pcompensation | dB | 1-6 | 0 | | 0 | |
| Cell\_selection\_and\_  reselection\_quality\_measurement |  | 1-6 | SS-RSRP | | SS-RSRP | |
|  | dB | 1-6 | 14 | 14 | -infinity | 12 |
| Note2 | dBm/SCS | 1,2,4,5 | -98 | | -98 | |
|  |  | 3,6 |  | | -95 | |
| Note2 | dBm/15 kHz | 1-6 | -98 | | | |
|  | dB | 1-6 | 14 | 14 | -infinity | 12 |
| SS-RSRP Note3 | dBm/SCS | 1,2,4,5 | -84 | -84 | -infinity | -86 |
|  |  | 3,6 |  |  | -infinity | -83 |
| Io | dBm/Ch BW | 1,2,4,5 | -55.88 | -55.88 | -70.05 | -57.78 |
|  |  | 3,6 |  |  | -63.96 | -51.69 |
| Treselection | s | 1-6 | 0 | 0 | 0 | 0 |
| SnonintrasearchP | dB | 1-6 | 50 | | 50 | |
| Threshx, highP | dB | 1-6 | 48 | | 48 | |
| Threshserving, lowP | dB | 1-6 | 44 | | 44 | |
| Threshx, lowP | dB | 1-6 | 50 | | 50 | |
| Propagation Condition |  | 1-6 | AWGN | | | |
| NOTE 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  NOTE 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  NOTE 3: SS-RSRP levels have been derived from other parameters for information purposes. They are not settable parameters themselves. | | | | | | |



A.14.1.12.3Test requirements

The cell reselection delay to a lower priority 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 Registration procedure for mobility and periodic registration update 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, NR\_ inter\_TN + TSI-NR

Where:

Thigher\_priority\_search See clause 4.2C.2.9

Tevaluate, NR\_ inter\_TN See clause 4.2C.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 67.68 s, allow 68 s for the cell re-selection delay to a higher priority

<End of Change 1>