**3GPP TSG-RAN4 Meeting #113 *R4-2419281***

**Orlando, US, 18th – 22nd November, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **5186** | **rev** |  | **Current version:** | **18.7.0** |  |
|  | | | | | | | | |
| *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:*** | CR on test case of R18 NFG enhancement | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE Corporation, Sanechips, Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-11-08 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | 1st Change: The two test casesin .6.6.24.1 and 6.6.24.2 aim to verify the event triggered reporting and interruption requirements for the UE indicating ‘no-gap-with-interruption’. Some errors conflict with this intention. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1st Change: Revise the errors to guarantee the two test caes are under the no-gap-with-interruption measurement and report.  Change from merged CR R4-2418885   1. Correction of measurement delay 2. Removal of square brackets and minor editorial corrections   Calculation of the interruption ratio and measurement cycle in accordance to the configuration parameters:   * SMTC period = 20 ms * Tcycle = max(80, SMTC period)\*CSSF = 80 * D = 2 ms / 80 ms = 2.5 % interruption ratio * From Table 9.2.5.1-17:   + TPSS/SSS\_sync\_intra = max( 600ms, 5 x max (80ms, SMTC period )) x CSSFintra = max(600, 5 x 80) = 600 ms * From Table 9.2.5.2-10:   + T SSB\_measurement\_period\_intra = max(200ms, 5 x (80ms, SMTC period )) x CSSFintra = max(200, 5 x 80) = 400 ms   The UE is not required to read the neighbour cell SSB index in this test, and the resulting reporting delay is TPSS/SSS\_sync\_intra + TPSS/SSS\_sync\_intra = 1000 ms | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The spec is not correct. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.6.24.1.1, A.6.6.24.1.2, A.6.6.24.2.1, A.6.6.24.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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.6.6.24.1 SA event triggered reporting tests without gaps, with interruptions, under non-DRX

##### A.6.6.24.1.1 Test purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event, and to verify that the interruption ratio does not exceed the limits for the NR PCell during the measurement without gaps and with interruptions. This test will partly verify the cell search requirements in clauses 9.2.5.1 and 9.2.5.2 for measurements performed without gaps and with interruptions. This test will also verify the interruption ratio for PCell in standalone NR specified in clause 8.2.2.2.19. The test will measure that the measurement delay is within the specified boundaries.

The serving frequency should be selected for which UE reports ‘no-gap’ in NeedForGapsIntraFreq-r16 and ‘no-gap-with-interruption’ in interruptionIndication-r18.

##### A.6.6.24.1.2 Test parameters

Two cells are deployed in the test, which are FR1 PCell (Cell 1) and a FR1 neighbour cell (Cell 2) on the same frequency as the PCell. The test parameters for PCell are given in Table A.6.6.24.1.2-1, A.6.6.24.1.2-2 and A.6.6.24.1.2-3 below. In the measurement control information, a measurement object is configured for the frequency of the PCell, and it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of Cell 2.

The UE is capable of measurements without gaps with interruption and report ‘no-gap’ through NeedForGapsIntraFreq-r16 and ‘no-gap-with-interruption’ in interruptionIndication-r18 for PCell. UE needs to be provided with new Timing Advance Command MAC control element at least once during each time alignment timer period to maintain uplink time alignment.

Table A.6.6.24.1.2-1: Supported test configurations

|  |  |
| --- | --- |
| Configuration | Description |
| 1 | 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | 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.6.6.24.1.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 without DRX

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 |  |
|  |  | 2 | SMTC.1 |  |
|  |  | 3 | SMTC.1 |  |
| A3-Offset | dB | 1, 2, 3 | -4.5 |  |
| CP length |  | 1, 2, 3 | Normal |  |
| Hysteresis | dB | 1, 2, 3 | 0 |  |
| Time To Trigger | s | 1, 2, 3 | 0 |  |
| Filter coefficient |  | 1, 2, 3 | 0 | L3 filtering is not used |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  |  | 2 | 3 μs | Synchronous cells |
|  |  | 3 | 3 μs | Synchronous cells |
| T1 | s | 1, 2, 3 | 5 |  |
| T2 | s | 1, 2, 3 | 10 |  |

Table A.6.6.24.1.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 without DRX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | Cell 2 | |
|  |  |  | T1 | T2 | T1 | T2 |
| TDD configuration |  | 1 | TN/A | | TN/A | |
|  |  | 2 | TDDConf.1.1 | | TDDConf.1.1 | |
|  |  | 3 | TDDConf.2.1 | | TDDConf.2.1 | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | N/A | |
|  |  | 2 | SR.1.1 TDD | |  | |
|  |  | 3 | SR.2.1 TDD | |  | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | N/A | |
|  |  | 2 | CR.1.1 TDD | | N/A | |
|  |  | 3 | CR.2.1 TDD | | N/A | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.1 FDD | | N/A | |
|  |  | 2 | CCR.1.1 TDD | | N/A | |
|  |  | 3 | CCR.2.1 TDD | | N/A | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | OP.1 | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | N/A | |
| 2 | TRS.1.1 TDD | | N/A | |
| 3 | TRS.1.2 TDD | | N/A | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | DLBWP.0.1 ULBWP.0.1 | |
| Active DL BWP configuration |  | 1, 2, 3 | DLBWP.1.2 | | DLBWP.1.2 | |
| Active UL BWP configuration |  | 1, 2, 3 | ULBWP.1.2 | | ULBWP.1.2 | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | SSB | |
| Note 2 | dBm/SCS | 1 | -98 | | | |
|  |  | 2 | -98 | | | |
|  |  | 3 | -95 | | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | |
|  |  | 2 |  | | | |
|  |  | 3 |  | | | |
|  | dB | 1 | 4 | -1.46 | -Infinity | -1.46 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
|  | dB | 1 | 4 | 4 | -Infinity | 4 |
|  |  | 2 |  |  |  |  |
|  |  | 3 |  |  |  |  |
| SS-RSRP Note 3 | dBm/SCS kHz | 1 | -94 | -94 | -Infinity | -94 |
|  |  | 2 | -94 | -94 | -Infinity | -94 |
|  |  | 3 | -91 | -91 | -Infinity | -91 |
| Io | dBm/9.36 MHz | 1 | -64.60 | -62.25 | --64.60 | -62.25 |
|  | dBm/9.36 MHz | 2 | -64.60 | -62.25 | --64.60 | -62.25 |
|  | dBm/38.16 MHz | 3 | -58.50 | -56.16 | --58.50 | -56.16 |
| Propagation Condition |  | 1, 2, 3 | AWGN | | | |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.  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.6.6.24.1.3 Test Requirements

The UE shall be continuously scheduled on PCell during the entire length of T1 and T2.

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1000 ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled.

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

During 1000 ms from the beginning of time period T2, the UE shall transmit ACK/NACK in PCell and the rate of missed ACK/NACK shall no more than 2.5%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

#### A.6.6.24.2 SA event triggered reporting tests for FR1 without gap with interruption for inter-frequency measurement with SSB time index detection when DRX is not used

##### A.6.6.24.2.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event. This test will partly verify the SA inter-frequency NR cell search requirements in clause 9.3.9 and interruption requirements during measurement without gap in clause 8.2.2.2.19.

The serving frequency and the target frequency should be selected such that UE reports ‘no-gap’ via needForGapsInfoNR-r16 and ‘no-gap-with-interruption’ via NeedForInterruptionNR-r18 for the target frequency given the serving frequency.

##### A.6.6.24.2.2 Test parameters

In this test, there are two cells: NR Cell 1 as PCell in FR1 on NR RF channel 1 and NR Cell 2 as neighbour cell in FR1 on NR RF channel 2. NR RF channel 1 and NR RF channel 2 should be selected such that UE reports ‘no-gap’ and ‘no-gap-with-interruption’ for the target frequency on NR RF channel 2. The test parameters are given in Tables A.6.6.24.2.2-1, A.6.6.24.2.2-2 and A.6.6.24.2.2-3.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of two successive time periods, with time duration of T1, and T2 respectively. During time duration T1, the UE shall not have any timing information of NR Cell 2.

During T2, the UE is continuously scheduled with data on the PCell.

Table A.6.6.24.2.2-1: SA event triggered reporting tests for FR1 for inter-frequency measurement without gap with interruption

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode |
| 2 | NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode |
| 3 | NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode |
| Note 1: The UE is only required to be tested in one of the supported test configurations  Note 2: target NR cell has the same SCS, BW and duplex mode as NR serving cell | |

Table A.6.6.24.2.2-2: General test parameters for SA event triggered reporting tests for FR1 for inter-frequency measurement without gap with interruption

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | Two FR1 NR carrier frequencies are used. |
| Active cell |  | Config 1,2,3 | NR Cell 1 (PCell) | NR Cell 1 is on NR RF channel number 1. |
| Neighbour cell |  | Config 1,2,3 | NR Cell 2 | NR Cell 2 is on NR RF channel number 2. |
| A3-Offset | dB | Config 1,2,3 | -6 |  |
| Hysteresis | dB | Config 1,2,3 | 0 |  |
| CP length |  | Config 1,2,3 | Normal |  |
| TimeToTrigger | s | Config 1,2,3 | 0 |  |
| Filter coefficient |  | Config 1,2,3 | 0 | L3 filtering is not used |
| DRX |  | Config 1,2,3 | OFF | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1 | 3ms | Asynchronous cells.  The timing of Cell 2 is 3ms later than the timing of Cell 1. |
|  | Config 2,3 | 3μs | Synchronous cells. |
| T1 | s | Config 1,2,3 | 5 |  |
| T2 | s | Config 1,2,3 | 2 |  |

Table A.6.6.24.2.2-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 without gap

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | | Unit | Test configuration | Cell 1 | | Cell 2 | |
| T1 | T2 | T1 | T2 |
| NR RF Channel Number | |  | Config 1,2,3 | 1 | | 2 | |
| Duplex mode | |  | Config 1 | FDD | | | |
|  | Config 2,3 | TDD | | | |
| TDD configuration | |  | Config 1 | Not Applicable | | | |
|  | Config 2 | TDDConf.1.1 | | | |
|  | Config 3 | TDDConf.2.1 | | | |
| BWchannel | | MHz | Config 1,2 | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | |
| BWP BW | | MHz | Config 1,2 | 10: NRB,c = 52 | | | |
| Config 3 | 40: NRB,c = 106 | | | |
| BWP configuration | Initial DL BWP |  | Config 1, 2, 3 | DLBWP.0.1 | | NA | |
| Initial UL BWP |  | ULBWP.0.1 | | NA | |
| Dedicated DL BWP |  | DLBWP.1.1 | | NA | |
| Dedicated UL BWP |  | ULBWP.1.1 | | NA | |
| TRS configuration | |  | Config 1 | TRS.1.1 FDD | | NA | |
| Config 2 | TRS.1.1 TDD | | NA | |
| Config 3 | TRS.1.2 TDD | | NA | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) | |  | Config 1,2,3 | OP.1 | | OP.1 | |
| PDSCH Reference measurement channel | |  | Config 1 | SR.1.1 FDD | |  | |
|  | Config 2 | SR.1.1 TDD | |  | |
|  | Config 3 | SR2.1 TDD | |  | |
| CORESET Reference Channel | |  | Config 1 | CR.1.1 FDD | |  | |
|  | Config 2 | CR.1.1 TDD | |  | |
|  | Config 3 | CR2.1 TDD | |  | |
| SSB parameters | |  | Config 1 | SSB.1 FR1 | | SSB.5 FR1 | |
|  | Config 2 | SSB.1 FR1 | | SSB.5 FR1 | |
|  | Config 3 | SSB.2 FR1 | | SSB.6 FR1 | |
| SMTC configuration defined in A.3.11 | |  | Config 1 | SMTC.2 | | SMTC.5 | |
|  | Config 2, 3 | SMTC.1 | | SMTC.4 | |
| PDSCH/PDCCH subcarrier spacing | | kHz | Config 1,2 | 15 | | | |
| Config 3 | 30 | | | |
| EPRE ratio of PSS to SSS | |  | Config 1,2,3 | 0 | | 0 | |
| EPRE ratio of PBCH DMRS to SSS | |  |
| EPRE ratio of PBCH to PBCH DMRS | |  |
| EPRE ratio of PDCCH DMRS to SSS | |  |
| EPRE ratio of PDCCH to PDCCH DMRS | |  |
| EPRE ratio of PDSCH DMRS to SSS | |  |
| EPRE ratio of PDSCH to PDSCH | |  |
| EPRE ratio of OCNG DMRS to SSS(Note 1) | |  |
| EPRE ratio of OCNG to OCNG DMRS (Note 1) | |  |
| Note2 | | dBm/15kHz |  | -98 | | -98 | |
| Note2 | | dBm/SCS | Config 1,2 | -98 | | -98 | |
| Config 3 | -95 | | -95 | |
| SS-RSRP Note 3 | | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 |
| Config 3 | -91 | -91 | -Infinity | -88 |
|  | | dB | Config 1,2,3,4,5,6 | 4 | 4 | -Infinity | 7 |
|  | | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 |
| IoNote3 | | dBm/9.36MHz | Config 1,2 | -64.59 | -64.59 | -70.05 | -62.26 |
| dBm/38.16MHz | Config 3 | -58.49 | -58.49 | -63.94 | -56.15 |
| Propagation Condition | |  | Config 1,2,3 | AWGN | | AWGN | |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols.  Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.  Note 3: SS-RSRP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 4: SS-RSRP minimum requirements are specified assuming independent interference and noise at each receiver antenna port. | | | | | | | |

##### A.6.6.24.2.3 Test Requirements

The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than 1520 ms from the beginning of time period T2. The UE shall not send event triggered measurement reports, as long as the reporting criteria are not fulfilled. The rate of correct events observed during repeated tests shall be at least 90%.

During 1520ms from the beginning of time period T2, the UE shall transmit ACK/NACK in PCell and the rate of missed ACK/NACKs shall no more than 2.5%.

NOTE: The actual overall delays measured in the test may be up to 2xTTIDCCH higher than the measurement reporting delays above because of TTI insertion uncertainty of the measurement report in DCCH.

# <End of Change #1>