**3GPP TSG-RAN4 Meeting #111R4-2409746**

Fukuoka, Japan, 20th – 24th, 2024

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** |  | **rev** |  | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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:*** | Draft CR for test case of event triggered reporting test on intra-frequency in FR1 with autonomous (de)activation of Pre-MG + Type-2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | MediaTek inc. | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-05-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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:*** | | In WF R4-2403542, the test cases for Con-Pre-MG | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The changes are:   * Event triggered reporting test on intra-frequency in FR1 with concurrent gap and autonomous activation/deactivation of Pre-MG + Type-2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There will be incomplete and missing test cases in TS 38.133 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | Added a new sub-clause A.6.6.x.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.x1 SA event triggered reporting tests for concurrent measurement gaps with Pre-MG

#### A.6.6.x1.1 SA event triggered reporting tests for FR1 concurrent gap with Pre-MG with partially partial overalpping scenario for SSB-based measurements in both intra-frequency and inter-frequency layers

##### A.6.6.x1.1.1 Test Purpose and Environment

The purpose of this test is to verify that the concurrent gap with Pre-MG capable UE makes correct reporting of events. This test will partly verify the SA intra-frequency and inter-frequency NR cell search requirements in clauses 9.2.6 and 9.3.4, respectively. Also, this test will also jointly verify pre-configured measurement gap activation/deactivation delay in clause 8.19.2.

In this test, there are three cells: NR cell 1 as PCell in FR1 on NR RF channel 1, NR cell 2 as intra-frequency neighbour cell in FR1 on the same frequency as the PCell, and NR cell 3 as neighbour cell in FR1on NR RF channel 3. There are two BWPs configured in Cell 1, BWP-1 which contains the cell defining SSB, and BWP-2 which does not contain any SSB of Cell 1. The test parameters are given in Tables A.6.6.x1.1.1-1, A.6.6.x1.1.1-2 and A.6.6.x1.1.1-3. The TE schedules continuous DL data on PCell throughout the test.

The test consists of four successive time periods, with time durations of T1, T2 and T3 respectively.

Before the test starts,

- For cell 1, the UE is configured with 2 different UE-specific bandwidth parts for Cell 1 (PCell), BWP-1 and BWP-2, before starting the test.

- BWP-1 includes bandwidth of the initial DL BWP and SSB with the Pre-MG status set to ‘deactivated’ (*preConfGapStatus* of the pre-MG on BWP-1 is set to ‘0’). UE is expected to deactivate the Pre-MG when this BWP is active.

- BWP-2 does not include bandwidth of the initial DL BWP and SSB with the Pre-MG status set to ‘activated’ (*preConfGapStatus* of the pre-MG on BWP-2 is set to ‘1’). UE is expected to activate the Pre-MG when this BWP is active.

- UE is indicated in *firstActiveDownlinkBWP-Id* that the active DL BWPis BWP-1 in PCell.

In the measurement control information, it is indicated to the UE that event-triggered reporting with Event A3 is used. The test consists of 2 successive time periods, with durations of T1 and T2, respectively. Before the test starts, the UE shall not have any timing information of NR Cell 2 or NR Cell 3.

During T1, UE active DL BWP is BWP-1, and the pre-configured gap (MeasGapId #1) is deactivated. Cell 3 is switched ON from the beginning of T1, and UE is expected to search for Cell 3 in MeasGapId #2.

At the start of time duration T2, the serving gNB can trigger Pre-MG activation starts when a DCI format 1\_1 command for PCell DL BWP switch, sent from the test equipment to the UE, is received at the UE side in PCell’s slot # denoted i. The UE shall switch its bandwidth part from BWP-1 to BWP-2. The UE is expected to complete the Pre-MG activation within T2. Cell 2 is switched ON from the beginning of T2, and UE is expected to search for Cell 2 in MeasGapId #1.

Two measurement gap patterns (MeasGapId #1 (Pre-MG) and MeasGapId #2) are configured with the gap pattern ID #0 and #1 as defined in Table A.6.6.x1.1.1-2. MeasGapId #1 is configured with a higher priority than MeasGapId #1. MeasGapId #1 and MeasGapId #2 are associated with the MOs for RF channel numbers #1 and #2, respectively.

Table A.6.6.x1.1.1-1: SA event triggered reporting tests for FR1-FR1

|  |  |
| --- | --- |
| 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 cells have the same SCS, BW and duplex mode as NR serving cells | |

Table A.6.6.x1.1.1-2: General test parameters for SA intra-frequency and inter-frequency event triggered reporting for FR1 concurrent gap with Pre-MG with partially partial overalpping scenario for SSB-based measurements in both intra-frequency and inter-frequency layers

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
|  |  |  |  |
| NR RF Channel Number |  | Config 1,2,3 | 1, 2 | Three 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 cells 2 and 3 | NR cell 2 is on NR RF channel number 1. NR cell 3 is on the NR RF channel 2. |
| Gap Pattern Id |  | Config 1,2,3 | 1 for MeasGapId #1 (80ms MGRP)  0 for MeasGapId #2 (40ms MGRP) | As specified in clause 9.1.2-1. |
| Measurement gap offset | ms | Config 1,2,3 | 79 for MeasGapId #1  4 for MeasGapId #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 cell |  | Config 1, 2, 3 | 3μs | The timing of Cell 3 is 3μs later than the timing of Cell 1. |
|  | Config 1, 2, 3 | 5ms | The timing of Cell 2 is 5ms later than the timing of Cell 1. |
| T1 | s | Config 1,2,3 | 2 |  |
| T2 | s | Config 1,2,3 | 2 |  |

Table A.6.6.x1.1.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR1 concurrent gap with Pre-MG with partially-partial overalpping scenario for SSB-based measurements in both inter-frequency layers

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | ell 2 | | Cell 3 | | |
|  |  |  | T1 | T2 | T1 | T2 | T1 | | T2 |
| NR RF Channel Number |  | Config 1,2,3 | 1 | | 2 | | 3 | | |
| 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 | | | | | | |
| Initial BWP  Configuration |  | Config 1, 2, 3 | DLBWP.0.1  ULBWP.0.1 | | NA | | NA | | |
| BWP-1 Configuration |  | Config 1, 2, 3 | DLBWP.1.3  ULBWP.1.3 | | NA | | NA | | |
| BWP-2 Configuration |  | Config 1, 2, 3 | DLBWP.1.2  ULBWP.1.2 | | NA | | NA | | |
| TRS configuration |  | Config 1 | TRS.1.1 FDD | | NA | | NA | | |
|  |  | Config 2 | TRS.1.1 TDD | | NA | | NA | | |
|  |  | Config 3 | TRS.1.2 TDD | | NA | | NA | | |
| OCNG Patterns defined in A.3.2.1.1 (OP.1) |  | Config 1,2,3 | OP.1 | | OP.1 | | OP.1 | | |
| PDSCH Reference measurement channel |  | Config 1 | SR.1.1 FDD | |  | |  | | |
|  |  | Config 2 | SR.1.1 TDD | |  | |  | | |
|  |  | Config 3 | SR.2.1 TDD | |  | |  | | |
| RMSI CORESET Reference Channel |  | Config 1 | CR.1.1 FDD | |  | |  | | |
|  |  | Config 2 | CR.1.1 TDD | |  | |  | | |
|  |  | Config 3 | CR.2.1 TDD | |  | |  | | |
| Dedicated CORESET Reference Channel |  | Config 1 | CCR.1.1 FDD | |  | |  | | |
|  | Config 2 | CCR.1.1 TDD | |  | |  | | |
|  | Config 3 | CCR.2.1 TDD | |  | |  | | |
| SSB parameters |  | Config 1,2 | SSB.1 FR1 | | | | | | |
| Config 3 | SSB.2 FR1 | | | | | | |
| SMTC configuration defined in A.3.11 |  | Config 1,2,3 | SMTC.2 | | SMTC.2 | | SMTC.7 | | |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1,2 | 15 | | | | | | |
|  |  | Config 3 | 30 | | | | | | |
| EPRE ratio of PSS to SSS |  | Config 1,2,3 | 0 | | 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 | | -98 | | |
| Note2 | dBm/SCS | Config 1,2 | -98 | | -98 | | -98 | | |
|  |  | Config 3 | -95 | | -95 | | -95 | | |
| SS-RSRP Note 3 | dBm/SCS | Config 1,2 | -94 | -94 | -Infinity | -91 | -Infinity | -94 | |
|  |  | Config 3 | -91 | -91 | -Infinity | -88 | -Infinity | -91 | |
|  | dB | Config 1,2,3 | 4 | -1.46 | -Infinity | 7 | -Infinity | -1.46 | |
|  | dB | Config 1,2,3 | 4 | 4 | -Infinity | 7 | -Infinity | 4 | |
| IoNote3 | dBm/9.36MHz | Config 1,2 | -64.59 | -62.25 | -70.05 | -62.26 | -64.59 | -62.25 | |
|  | dBm/38.16MHz | Config 3 | -58.49 | -56.16 | -63.94 | -56.15 | -58.49 | -56.16 | |
| Propagation Condition |  | Config 1,2,3 | AWGN | | 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.x1.1.2 Test Requirements

For UE supporting FG 32-2:

During T1, the UE shall report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots that are not overlapped with the MeasGapId#2 occasions. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [800] ms for cell 3 from the beginning of time period T1. The measurement reporting delay is derived based on the requirements for inter-frequency measurement in clause 9.3.4 and 9.3.5.

For UE not supporting FG 32-2:

During T1, the UE shall report corresponding valid ACK/NACK for those PDSCHs scheduled in the slots that are not overlapped with the non-dropped MeasGapId#2 occasions. The UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1600] ms for cell 3 from the beginning of time period T1. The measurement reporting delay is derived based on the requirements for inter-frequency measurement in clause 9.3.4 and 9.3.5.

For both UE supporting FG 32-2 and not supporting FG 32-2:

During T2, the UE shall report ACK/NACK for PDSCHs scheduled in the slots that are not overlapped with the MeasGapId #1 occasions or non-dropped MeasGapId #2 occasions after MeasGapId #1 is activated, i.e. starting from the 1st complete MeasGapId #1 occasion after the beginning of PCell’s DL slot (*i+TBWPswitchDelay*) + 5ms as defined in clause 8.19.2.

22The measurement reporting delay is derived based on the requirements for intra-frequency measurement in clause 9.2.6 plus 80ms, considering that the frist MeasGapId #1 occasion in T2 may collide with the pre-configured gap activation delay.

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%. UE is not required to report SSB time index.

NOTE 1: 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----------------------------**