**3GPP TSG-RAN4 Meeting #112  *R4-2411985***

Maastricht, Netherlands, 19th – 23rd August, 2024

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **4735** | **rev** | **1** | **Current version:** | **18.6.0** |  |
|  | | | | | | | | |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <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 concurrent gap with Pre-MG and network-controlled activation/deactivation (A.6.6.22.2) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CMCC | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-08-06 |
|  |  | | | |  | |  | | |  |
| ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | * A.6.6.22.2 cover both intra-frequency and inter-frequency layers, while in the test purpose part, only intra-frequency requirements are refer to * For cell 3 (inter-frequency layer) , the measurement reporting delay shall be less than 1280 ms, since UE is not required to read the neighbour cell SSB index in this test | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Update the test purpose part to cover both intra-frequency and inter-frequency * For cell 3 (inter-frequency layer) , the measurement reporting delay is updated from 1520ms to 1280 ms | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The spec are not correct. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.6.22.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 1st change >>

#### A.6.6.22.2 SA event triggered reporting tests for concurrent gap with pre-configured gaps and network-controlled activation/deactivation

##### A.6.6.22.2.1 Test purpose and Environment

The purpose of this test is to verify that the UE correctly activates and deactivates the pre-MGs and makes correct measurement and reporting of an event with activated and deactivated pre-MG. This test will partly verify the multiple Pre-MG activation/deactivation delay in clause 8.19.5.2, the intra-frequency cell search requirements in clause 9.2.6 and inter-frequency cell search requirements in clause 9.3.4 and 9.3.5..

##### A.6.6.22.2.2 Test parameters

Three cells are deployed in the test, which are FR1 PCell (Cell 1) in FR1 on NR RF channel 1 and a neighbour cell (Cell 2) in FR1 on NR RF channel 1 and a neighbour cell (Cell 3) in FR1 on NR RF channel 2. The supported test configurations are listed in Table A.6.6.22.2.2-1, general test parameters are listed in Table A.6.6.22.2.2-2, and cell specific test parameters are listed in Table A.6.6.22.2.2-3.

Two Pre-MG gaps (MeasGapId #1 and MeasGapId #2) are configured with the Pre-MG gap pattern ID #0 and #1 as defined in Table A.6.6.22.2.2-2. MeasGapId #2 is configured with a higher priority than MeasGapId #1.

In the measurement control information, two measurement objects (MOs) are configured, the measurement object #1 (MO1) for NR RF channel 1 is associated with MeasGapId #1, and measurement object #2 (MO2) for NR RF channel 2 is associated with MeasGapId #2. And it is indicated to the UE that event-triggered reporting with Event A3 is used.

Before the test, UE is connected to Cell 1 (PCell) on radio channel 1. The UE is configured with two dedicated BWPs for Cell 1 (PCell), BWP-1 and BWP-2. BWP-1 includes bandwidth of the SSB, and *preConfGapStatus* of the pre-MG (MeasGapId #1) for measurements on BWP-1 is set to ‘0’, *preConfGapStatus* of the pre-MG (MeasGapId #2) for measurements on BWP-1 is set to ‘1’; BWP-2 does not include bandwidth of the SSB, and *preConfGapStatus* of the pre-MG (MeasGapId #1) for measurements on BWP-2 is set to ‘1’, *preConfGapStatus* of the pre-MG (MeasGapId #2) for measurements on BWP-2 is set to ‘0’.

The test consists of three successive time periods, with time duration of T1, T2, and T3 respectively.

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

The time period T2 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 DL active BWP from BWP-1 to BWP-2, and the pre-configured gap (MeasGapId #1) is activated and pre-configured gap (MeasGapId #2) is deactivated.

At the beginning of T3, Cell 2 is switched ON, and UE is supposed to search Cell 2 in MeasGapId#1.

During T1, UE shall perform inter-frequency measurement with pre-MG (MeasGapId #2) activated.

During T3, UE shall perform intra-frequency measurement with pre-MG (MeasGapId #1) activated.

The TE schedules continuous DL data on PCell throughout the test.

Table A.6.6.22.2.2-1: 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.6.6.22.2.2-2: General test parameters for SA intra-frequency event triggered reporting with concurrent gap with pre-configured gaps and network-controlled activation/deactivation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| Active cell |  | 1, 2, 3 | Cell 1 |  |
| Neighbour cell |  | 1, 2, 3 | Cell 2, Cell 3 | Cell to be identified. |
| RF Channel Number |  | 1, 2, 3 | 1: Cell 1 and Cell 2, 2: Cell 3 |  |
| Measurement gap type |  | 1, 2, 3 | Per-UE Pre-MG gaps |  |
| Pre-MG Gap Pattern Id |  | 1, 2, 3 | 0 for MeasGapId #1  1 for MeasGapId #2 |  |
| Measurement gap offset |  | 1, 2, 3 | 39 for MeasGapId #1  19 for MeasGapId #2 |  |
| SSB configuration |  | 1 | SSB.1 FR1 |  |
|  |  | 2 | SSB.1 FR1 |  |
|  |  | 3 | SSB.2 FR1 |  |
| SMTC configuration |  | 1 | SMTC.2 | Same configuration for MO1 and MO2 |
|  |  | 2 | SMTC.1 | Same configuration for MO1 and MO2 |
|  |  | 3 | SMTC.1 | Same configuration for MO1 and MO2 |
| CSI-RS parameters |  | 1 | CSI-RS.1.2 FDD resource #0 |  |
|  |  | 2 | CSI-RS.1.2 TDD resource #0 |  |
|  |  | 3 | CSI-RS.2.2 TDD resource #0 |  |
| 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 |
| DRX | ms | 1, 2, 3 | OFF | DRX is not used |
| Time offset between serving and neighbour cells |  | 1 | 3 ms | Asynchronous cells.  The timing of Cell 2 and Cell 3 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 | 0.1 |  |
| T3 | s | 1, 2, 3 | 5 |  |

Table A.6.6.22.2.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting with concurrent gap with pre-configured gaps and network-controlled activation/deactivation

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | | | Cell 2 | | | Cell 3 | | |
|  |  |  | T1 | T2 | T3 | T1 | T2 | T3 | T1 | T2 | T3 |
| TDD configuration |  | 1 | N/A | | | N/A | | | N/A | | |
|  |  | 2 | TDDConf.1.1 | | | TDDConf.1.1 | | | TDDConf.1.1 | | |
|  |  | 3 | TDDConf.2.1 | | | TDDConf.2.1 | | | TDDConf.2.1 | | |
| PDSCH RMC configuration |  | 1 | SR.1.1 FDD | | | N/A | | | N/A | | |
|  |  | 2 | SR.1.1 TDD | | |  | | |  | | |
|  |  | 3 | SR.2.1 TDD | | |  | | |  | | |
| RMSI CORESET RMC configuration |  | 1 | CR.1.1 FDD | | | N/A | | | N/A | | |
|  |  | 2 | CR.1.1 TDD | | | N/A | | | N/A | | |
|  |  | 3 | CR.2.1 TDD | | | N/A | | | N/A | | |
| Dedicated CORESET RMC configuration |  | 1 | CCR.1.2 FDD | | | N/A | | | N/A | | |
|  |  | 2 | CCR.1.2 TDD | | | N/A | | | N/A | | |
|  |  | 3 | CCR.2.1 TDD | | | N/A | | | N/A | | |
| OCNG Patterns |  | 1, 2, 3 | OP.1 | | | OP.1 | | | OP.1 | | |
| TRS configuration |  | 1 | TRS.1.1 FDD | | | N/A | | | N/A | | |
|  |  | 2 | TRS.1.1 TDD | | | N/A | | | N/A | | |
|  |  | 3 | TRS.1.2 TDD | | | N/A | | | N/A | | |
| Initial BWP configuration |  | 1, 2, 3 | DLBWP.0.1 ULBWP.0.1 | | | N/A | | | N/A | | |
| Active DL BWP configuration for BWP-1 |  | 1, 2, 3 | DLBWP.1.3 | | | N/A | | | N/A | | |
| Active UL BWP configuration for BWP-1 |  | 1, 2, 3 | ULBWP.1.3 | | | N/A | | | N/A | | |
| Active DL BWP configuration for BWP-2 |  | 1, 2, 3 | DLBWP.1.2 | | | N/A | | | N/A | | |
| Active UL BWP configuration for BWP-2 |  | 1, 2, 3 | ULBWP.1.2 | | | N/A | | | N/A | | |
| RLM-RS |  | 1, 2, 3 | CSI-RS | | | N/A | | | N/A | | |
| Note 2 | dBm/SCS | 1 | -98 | | | -98 | | | -98 | | |
| 2 | -98 | | | -98 | | | -98 | | |
| 3 | -95 | | | -95 | | | -95 | | |
| Note 2 | dBm/15 kHz | 1 | -98 | | | -98 | | | -98 | | |
| 2 | -98 | | | -98 | | | -98 | | |
| 3 | -95 | | | -95 | | | -95 | | |
|  | dB | 1,2,3 | 4 | | -1.46 | -Infinity | | -1.46 | 4 | -Infinity | |
|  | dB | 1,2,3 | 4 | | 4 | -Infinity | | 4 | 4 | -Infinity | |
| SS-RSRP Note 3 | dBm/SCS kHz | 1,2 | -94 | | -94 | -Infinity | | -94 | -94 | -Infinity | |
|  |  | 3 | -91 | | -91 | -Infinity | | -91 | -91 | -Infinity | |
| Io | dBm/9.36 MHz | 1,2 | -64.60 | | -62.25 | -Infinity | | -62.25 | -64.60 | -Infinity | |
|  | dBm/38.16 MHz | 3 | -58.50 | | -56.16 | -Infinity | | -56.16 | -58.50 | -Infinity | |
| 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 and T4.  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.6.6.22.2.3 Test Requirements

During T1, UE shall report corresponding HARQ-ACK/NACK for those PDSCHs scheduled in the slots that are not overlapped with the pre-MG occasions of MeasGapId #2; and

The UE shall send one Event A3 triggered measurement report of cell 3 on RF channel 2, with a measurement reporting delay less than 1280 ms from the beginning of time period T1.

During T2 and starting from the 1st complete Pre-MG occasion after the beginning of PCell’s DL slot (*i+TBWPswitchDelay*) + 5ms + 2ms as defined in clause 8.19.5.2, the UE shall report corresponding HARQ-ACK/NACK for those PDSCHs scheduled in the slots that are not overlapped with the pre-MG occasions of MeasGapId #1.

The UE shall send one Event A3 triggered measurement report of cell 2 on RF channel 1, with a measurement reporting delay less than 800 ms from the beginning of time period T3.

During T3, the UE shall report corresponding HARQ-ACK/NACK for those PDSCHs scheduled in the slots that are not overlapped with the pre-MG occasions of MeasGapId #1.

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%.

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 1st change >>