**3GPP TSG-WG4 Meeting #111  *R4-2409148***

**Fukuoka, Japan, 20th - 24th May 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.133** | **CR** | **DRAFT** | **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:*** | Draf CR TC for FR1 intra-freq measurments without gaps with interruptions | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | R4 | | | | | | | | | |
| ***Source to TSG:*** | Nokia | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MG\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-05-13 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | Addition of new test case for UE in LTE cell performing gapless NR inter-RAT measurements | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | New test case for interruption ratio verification  New test case for measurement delay without gaps | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No test cases for inter RAT NR measurements with interruptions are defined | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.6.5.2.x (new), A.6.6.1.y (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Calculation of the interruption ratio and measurement cycle in accordance to the configuration parameters:   * DRX configuration   + DRX cycle     - Test 1: 320     - Test 2: 20 * SMTC period = 20 ms * L = 1 ms   For test 1   * Tcycle = max(80, DRXcycle, SMTC period)\*CSSF = 320 * D = 2 ms / 320 ms = 0.625 % interruption ratio * TPSS/SSS\_sync\_intra = max( 600ms, ceil(M2 Note 2x 5) x [max(80ms, SMTC period,DRX cycle)]) x CSSFintra = max(600, ceil(1.5\*5) x 320) = 2560 * T SSB\_measurement\_period\_intra = max( 200ms, ceil(1.5x 5) x [max(80ms, SMTC period,DRX cycle)]) x CSSFintra = max(200, ceil(1.5\*5) x 320) = 2560   For test 2   * Tcycle = max(80, DRXcycle, SMTC period)\*CSSF = 80 * D = 2 ms / 80 ms = 2.5 % interruption ratio * TPSS/SSS\_sync\_intra = max( 600ms, ceil(M2 Note 2x 5) x [max(80ms, SMTC period,DRX cycle)]) x CSSFintra= max(600, ceil(1.5\*5) x 80) = 640 * T SSB\_measurement\_period\_intra = max( 200ms, ceil(M2 Note 2x 5) x [max(80ms, SMTC period,DRX cycle)]) x CSSFintra= max(200, ceil(1.5\*5) x 80) = 640 | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## <Start of Change #1>

#### A.6.6.1.y SA event triggered reporting tests without gaps, with interruptions, under DRX

##### A.6.6.1.y.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-no-interruption’ in interruptionIndication-r18.

##### A.6.6.1.y.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.6.6.1.y.2-1, A.6.6.1.y.2-2 and A.6.6.1.y.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-no-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. Furhtermore UE is allocated with PUSCH resource at every DRX cycle.

Table A.6.6.1.y.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.6.6.1.y.2-2: General test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 with DRX

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | | Comment |
|  |  |  | Test 1 | Test 2 |  |
| 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 |
| DRX |  | 1, 2, 3 | [DRX.8] | [DRX.11] | DRX.8  drx-onDurationTimer = 6 ms  drx-LongCycleStartOffset = 320 ms  DRX.11  drx-onDurationTimer = 6 ms  drx-LongCycleStartOffset = 20 ms |
| 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] | [10] | [10] |

Table A.6.6.1.y.2-3: NR Cell specific test parameters for SA intra-frequency event triggered reporting without gap for PCell in FR1 with 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.6.6.1.y.3 Test Requirements

The UE shall be continuously scheduled on PCell during the entire length of T1 and T2. During both time durations the interruption ratio should not exceed 0.625% for test 1 and 2.5% for test 2. For test 1 interruptions are only allowed outside of the DRX ON duration. For test 2 interruptions are allowed except for the last slot contained PDSCH within the DRX ON duration.

In test 1, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [5120] ms from the beginning of time period T2. The UE is not required to read the neighbour cell SSB index in this test.

In test 2, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than [1280] 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%.

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>