**3GPP TSG-RAN WG4 Meeting #111 R4-2407514**

**Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  |
| *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:***  | (Con-NCSG TC2) DraftCR on FR2 inter-frequency with concurrent gap and NCSG |
|  |  |
| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_MG\_enh2-Perf |  | ***Date:*** |  |
|  |  |  |  |  |
| ***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 canbe 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:*** | The requirements for FR2 inter-frequency measurement with concurrent gaps and NCSG are defined and the corresponding test case should be introduced.  |
|  |  |
| ***Summary of change:*** | Introduce test case for FR2 inter-frequency measurement with concurrent gaps and NCSG. **This draft CR is based on the endorsed draft CR R4-2404395 with additional changes.**  |
|  |  |
| ***Consequences if not approved:*** | The test case for FR2 inter-frequency measurement with concurrent gaps and NCSG is missing. |
|  |  |
| ***Clauses affected:*** | New A.7.6.x |
|  |  |
|  | **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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

# <Start of Change 1>

### A.7.6.x SA event triggered reporting tests with concurrent gaps and NCSG

#### A.7.6.x.y SA event triggered reporting tests For FR2 with concurrent measurement gaps and NCSG without SSB time index detection when DRX is not used (PCell in FR2)

##### A.7.6.x.y.1 Test Purpose and Environment

The purpose of this test is to verify that the UE makes correct reporting of an event for each neighbour cell. This test will partly verify the SA inter-frequency NR cell search requirements and collision handling between partially-partial overlapped concurrent gaps and NCSG in clause 9.1.13.

In this test, there are three cells: NR cell 1 as PCell in FR2 on NR RF channel 1, NR cell 2 as neighbour cell in FR2 on NR RF channel 2 and NR cell 3 as another neighbour cell in FR2 on NR RF channel 3. The test parameters and configurations are given in Tables A.7.6.x.y.1-1, A.7.6.x.y.1-2, and A.7.6.x.y.1-3.

During T2, the UE is continuously scheduled with data on the PCell when measuring within NCSG.

One measurement gap and one NCSG are configured to UE with measurement gap pattern #13 and NCSG pattern #14 respectively. Measurement gap with pattern #13 is associated with inter-frequency measurement on NR cell 2, and NCSG with pattern #14 is associated with inter-frequency measurement on NR cell 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 and NR cell 3.

Supported test configurations are shown in table A.7.6.x.y.1-1.

Table A.7.6.x.y.1-1 SA event triggered reporting tests without SSB index reading for FR2-FR2

|  |  |
| --- | --- |
| Config | Description |
| 1 | 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
|  |

Table A.7.6.x.y.1-2: General test parameters for SA inter-frequency event triggered reporting for FR2 partially overlapped concurrent gap and NCSG for SSB-based measurements without SSB time index detection

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Value | Comment |
| NR RF Channel Number |  | Config 1 | 1, 2, 3 | Three FR2 NR carrier frequencies are used. |
| Active cell |  | Config 1 | NR cell 1 (PCell) | NR Cell 1 is on NR RF channel number 1. |
| 1st Neighbour cell |  | Config 1 | NR cell 2 | NR cell 2 is on NR RF channel number 2. |
| 2nd Neighbour cell |  | Config 1 | NR cell 3 | NR cell 3 is on NR RF channel number 3. |
| Measurement Gap Pattern Id |  | Config 1 | 13 | As specified in table 9.1.2-1. |
| NCSG Pattern Id |  | Config 1 | 14 | As specified in table 9.1.9.3-1. |
| Measurement Gap offset | ms | Config 1 | 39 |  |
| NCSG offset | ms | Config 1 | 4 |  |
| Measurement Gap priority |  | Config 1 | 2 | Second level priority |
| NCSG priority |  | Config 1 | 1 | Highest priority  |
| SMTC-SSB parameters |  | Config 1 | SSB.3 FR2 | As specified in clause A.3.10.2 |
| offsetMO | dB | Config 1 | 16 | Applied to NR Cell 2 and NR Cell 3 measurement objects |
| A3-Offset | dB | Config 1 | -11 |  |
| Hysteresis | dB | Config 1 | 0 |  |
| CP length |  | Config 1 | Normal |  |
| TimeToTrigger | s | Config 1 | 0 |  |
| Filter coefficient |  | Config 1 | 0 | L3 filtering is not used |
| DRX |  | Config 1 | OFF | DRX is not used |
| Time offset between serving and neighbour cells |  | Config 1 | 3μs | Synchronous cells. |
| T1 | s | Config 1 | 5 |  |
| T2 | s | Config 1 | 5.2 for PC1 and PC5; 3.5 for other PC |  |

Table A.7.6.x.y.1-3: Cell specific test parameters for SA inter-frequency event triggered reporting for FR2 without SSB time index detection

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Test configuration | Cell 1 | Cell 2 | Cell 3 |
|  |  |  | T1 | T2 | T1 | T2 | T1 | T2 |
| AoA setup |  | Config 1 | Setup 3 as specified in clause A.3.15 |
|  |  |  | AoA1 | AoA2 | AoA3 |
| Beam AssumptionNote 7 |  | 1,2 | Rough | Rough | Rough |
| NR RF Channel Number |  | Config 1 | 1 | 2 | 3 |
| Duplex mode |  | Config 1 | TDD | TDD | TDD |
| TDD configuration |  | Config 1 | TDDConf.3.1 | TDDConf.3.1 | TDDConf.3.1 |
| BWchannel | MHz | Config 1 | 100: NRB,c = 66 | 100: NRB,c = 66 | 100: NRB,c = 66 |
| Data RBs allocated |  | Config 1 | 66 | 66 | 66 |
| BWP BW | MHz | Config 1 | 100: NRB,c = 66 | 100: NRB,c = 66 | 100: NRB,c = 66 |
| BWP configuration | Initial DL BWP |  | Config 1 | DLBWP.0.1 | N/A | N/A |
|  | Initial UL BWP |  |  | ULBWP.0.1 | N/A | N/A |
|  | Dedicated DL BWP |  |  | DLBWP.1.1 | N/A | N/A |
|  | Dedicated UL BWP |  |  | ULBWP.1.1 | N/A | N/A |
| OCNG Patterns defined in A.3.2.1.1 (OP.1)  |  | Config 1 | OP.1  | OP.1 | OP.1 |
| PDSCH Reference measurement channel |  | Config 1 | SR.3.1 TDD | - | - |
| CORESET Reference Channel |  | Config 1 | CR.3.1 TDD | - | - |
| SMTC configuration defined in A.3.11.1 and A.3.11.7 |  | Config 1 | SMTC.1 | SMTC.1 | SMTC.7 |
| PDSCH/PDCCH subcarrier spacing | kHz | Config 1 | 120 | 120 | 120 |
| TRS configuration |  | Config 1 | TRS.2.1 TDD | N/A | N/A |
| PDSCH/PDCCH TCI state |  | Config 1 | TCI.State.2 | N/A | N/A |
| EPRE ratio of PSS to SSS |  |  |  |  |  |
| 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 |  | Config 1 | 0 | 0 | 0 |
| 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) |  |  |  |  |  |
| Ês | dBm/SCS | Config 1 | -87 | -87 | -Infinity | -87 | -Infinity | -87 |
| SSBRP Note 3 | dBm/SCS Note5 | Config 1 | -87 | -87 | -Infinity | -87 | -Infinity | -87 |
|  BB Note 8 | dB | Config 1 | 1.89 | 1.89 | -Infinity | 1.89 | -Infinity | 1.89 |
| IoNote3 | dBm/95.04 MHz Note5 | Config 1 | -58.01 | -58.01 | -Infinity | -58.01 | -Infinity | -58.01 |
| Propagation Condition  |  | Config 1 | 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: VoidNote 3: SSBRP, Es/Iot and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: VoidNote 5: Equivalent power received by an antenna with 0 dBi gain at the centre of the quiet zoneNote 6: As observed with 0 dBi gain antenna at the centre of the quiet zoneNote 7: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementationNote 8: Calculation of Es/IotBB includes the effect of UE internal noise up to the value assumed for the associated Refsens requirement in clause 7.3.2 of TS 38.101-2 [19], and an allowance of 1dB for UE multi-band relaxation factor ΔMBS from TS 38.101-2 [19] Table 6.2.1.3-4. |

##### A.7.6.x.y.2 Test Requirements

For both NR cell 2 and NR cell 3, the UE shall send one Event A3 triggered measurement report, with a measurement reporting delay less than X ms from the beginning of time period T2, where X is

10240 for UE supporting power class 1 and 5, or

6400 for UE supporting other power class.

The UE is not required to report SSB time index. 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 the T1 and T2, UE shall be able to report ACK/NACK for all slots with PDCCH/PDSCH on PCell excluding those slots overlapped with

VIL1 and VIL2 of NCSG

Measurement gap

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>