**3GPP TSG-RAN WG4 Meeting #111 R4-2407739**

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

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.133** | **CR** | draftCR | **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:*** | Correction on TCs for FR2 unknown SCell activation with FG31-1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RRM\_enh3-Perf | | | | |  | ***Date:*** | | | 2024-5-13 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | This CR is based on the endorsed draft BigCR R4-2406508.   1. The TC in A7.5.3.16 is EN-DC scenario but with section 7 which is SA with FR2 SCells. The section number is wrong. 2. At RAN4#110 meeting, we agreed to define FG31-1 TCs for the EN-DC mode “LTE PCell + FR1 PSCell + FR2 target SCell”. But A7.5.3.16 is PCell + FR2 PSCell + FR2 SCell which is not aligned with the agreements. 3. The L3 reporting shall not be impacted by L1-RSRP reporting as discussed in our paper R4-2407738. 4. During online discussion, it was agreed TE sends TCI activation command after L3 report in the test case. The procedure needs to be clarified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Section number is changed to A.5 which is EN-DC with FR2 SCell. 2. Change PSCell from FR2 to FR1. 3. Remove the condition “UE does not send L1-RSRP reporting…” and the paragraph about having UE reporting of L1-RSRP as pass condition. 4. Adding TE sends TCI activation command after L3 reporting. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The TCs to verify the performance of FR2 unknown SCell activation for UEs supporting FG31-1 are not completely correct. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A7.5.3.16 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 changes 1>>

#### A.5.5.3.x SCell Activation of unknown SCell in FR2 in non-DRX for 160ms SCell measurement cycle with the L3 reporting during activation

##### A.5.5.3.x.1 Test Purpose and Environment

The purpose of this test is to verify that the SCell activation and deactivation times are within the requirements stated in clause 8.3.17, when the SCell in FR2 is unknown by the UE at the time of activation. In this test, UE shall perform two sub-tests where two different UL resource locations are configured.

The supported test configurations are shown in table A.5.5.3.x.1-1 below. The test parameters are given in Tables A.5.5.3.x.1-2 and cell-specific parameters in A.5.5.3.x.1-1 below. OTA related test parameters are shown in table A.5.5.3.x.1-3. The test consists of three successive time periods, with duration of T1, T2, and T3, respectively. There are three carriers and each with one cell. E-UTRA has one cell (Cell 1), NR has two cells, PSCell (Cell 2) in FR1 and SCell (Cell 3) in FR2. Cell 1 and Cell 2 have constant signal levels throughout the test. Before the test starts the UE is connected to Cell 1 (PCell) on E-UTRAN and Cell 2 (PSCell) on NR but is not aware of Cell 3 (SCell) on NR. The UE is only monitoring the Pcell and PSCell. The UE shall be continuously scheduled in the PCell throughout the whole test.

At the beginning of T1 the UE receives an RRC message by which the SCell (Cell 3) becomes configured on radio channel 2. In the measurement control information for Cell 3, it is indicated to the UE that event-triggered reporting with Event A2 and reportOnActivation is used. The UE now starts monitoring the SCC. The test equipment sends a MAC message for activation of the SCell activation.

The point in time at which the MAC message is received at the UE antenna connector, in slot # denoted n (where n mode 20=1), defines the start of time period T2. The UE shall be able to report valid CSI in PSCell for the activated SCell at latest in slot , as defined in clause 8.3.

In sub-test1, TE shall transmit DCI 0-1 to PSCell at slot . The UE shall be able to send L3 measurements report of the SCell at slot for sub-test 1.  
In sub-test2, TE shall transmit DCI 0-1 to PSCell at slot , The UE shall be able to send L3 measurements report of the SCell at slot for sub-test 2. TE will send TCI activation command after receiving L3 measurement report of the SCell.

The UE shall start reporting CSI in PSCell after at least one CSI-RS transmission occasion for channel measurement and reporting after slot and shall report CQI index 0 (out-of-range) until the SCell activation has been completed. Any PCell interruption due to activation of SCell shall occur in the slot to , as defined in clause 8.3, where is the interruption length given in clause 8.2.

Time period T3 starts when a MAC message for deactivation of the SCell, sent from the test equipment to the UE in a slot # denoted m, is received at the UE antenna connector.

The test equipment verifies that potential interruption is carried out in the correct time span by monitoring ACK/NACK sent in PCell and PSCell during activation and deactivation of SCell, respectively.

The test equipment verifies the activation time by counting the slots from the time when the SCell activation command is sent until a CSI report with other than CQI index 0 is received.

The test equipment verifies the deactivation time by counting the slots from the time when the SCell deactivation command is sent until CSI reporting for SCell is discontinued.

Table A.5.5.3.x.1-1: Supported test configurations for FR2 SCell activation case

|  |  |
| --- | --- |
| **Configuration** | **Description** |
| 1 | LTE FDD PCell, Cell 2 NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | LTE FDD PCell, Cell 2 NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 3 | LTE FDD PCell, Cell 2 NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 4 | LTE TDD PCell, Cell 2 NR 15 kHz SSB SCS, 10 MHz bandwidth, FDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 5 | LTE TDD PCell, Cell 2 NR 15 kHz SSB SCS, 10 MHz bandwidth, TDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 6 | LTE TDD PCell, Cell 2 NR 30 kHz SSB SCS, 40 MHz bandwidth, TDD duplex mode  Cell 3 NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations | |

Table A.5.5.3.x.1-2: General test parameters for FR2 SCell activation case

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Value | Comment |
| LTE RF Channel Number |  | 1 | Cell 1 use LTE RF channel 1 |
| NR RF Channel Number |  | 2,3 | Cell2 and Cell 3 use NR RF channel 2 and 3, respectively. |
| Active PCell |  | Cell 1 | Primary cell on LTE RF channel number 1. |
| Configured deactivated SCell |  | Cell 3 | Configured deactivated secondary cell on NR RF channel number 3 |
| CP length |  | Normal |  |
| DRX |  | OFF | Continuous monitoring of primary cell |
| Cell-individual offset for cells on NR channel number | dB | 0 | Individual offset for cells on primary component carrier. |
| SCell measurement cycle (measCycleSCell) | ms | 160 |  |
| Cell2 timing offset to cell1 | μs | 0 |  |
| Time alignment error between cell2 and cell1 | μs | ≤ Time alignment error as specified in TS 38.104 [13] clause 6.5.3.1. | The value of time alignment error depends upon the type of carrier aggregation. |
| T1 | s | 16 | During this time SCell is configured and detected. |
| T2 | s | 1 | During this time the UE shall activate the SCell. |
| T3 | s | 1 | During this time the UE shall deactivate the SCell. |
| Hysteresis | dB | 0 |  |
| a2-Threshold | dBm | -100 |  |
| THARQ | ms | k1NR slot length | k1 is a number of slots and is indicated by the PDSCH-to-HARQ-timing-indicator field in the DCI format, if present, or provided by *dl-DataToUL-ACK*, the value of k should be the minimum value defined in TS 38.213 [3] depends on UE’s capability |
| TCSI\_Reporting | ms | 15 | the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting (clause 5.2.2.5 in TS 38.214) and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2] |

Table A.5.5.3.x.1-3: Cell specific test parameters for FR2 SCell activation case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ParameterNote 5 | Unit | Cell 2 | | | Cell 3 | | |
| T1 | T2 | T3 | T1 | T2 | T3 |
| SSB ARFCN |  | freq1 | | | freq2 | | |
| Duplex mode |  | TDD | | | | | |
| TDD configuration |  | TDDConf.3.1 | | | | | |
| Downlink initial BWP Configuration |  | DLBWP.0.1 | | | | | |
| Downlink dedicated BWP Configuration |  | DLBWP.1.1 | | | | | |
| Uplink initial BWP configuration |  | ULBWP.0.1 | | | | | |
| Uplink dedicated BWP configuration |  | ULBWP.1.1 | | | | | |
| TRS configuration |  | TRS.2.1 TDD | | | | | |
| TCI state |  | TCI.State.0 | | | | | |
| BWchannel | MHz | 100: NRB,c = 66 | | | | | |
| Data RBs allocated |  | 66 | | 66 | | 66 | |
| PDSCH Reference measurement channel |  | SR.3.1 TDD | | | - | | |
| RMSI CORESET Parameters |  | CR.3.1 TDD | | | - | | |
| Dedicated CORESET Parameters |  | CCR.3.1 TDD | | | - | | |
| OCNG Patterns |  | OP.1 | | | | | |
| SSB Configuration |  | SSB.1 FR2 | | | | | |
| SMTC Configuration |  | SMTC.1 | | | | | |
| CSI-RS configuration for CSI reporting |  | CSI-RS.3.1 TDD | | | | | |
| reportConfigType |  | periodic | | | N/A | | |
| reportQuantity |  | cri-RI-PMI-CQI | | | N/A | | |
| CSI reporting periodicity | slot | N/A | | | 10 | | |
| CSI reporting offset | slot | N/A | | | 4 | | |
| EPRE ratio of PSS to SSS | dB | 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\_DMRS |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |
| Propagation conditions |  | 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: Void  Note 3: Void  Note 4: Void  Note 5: Void |  |  | | | | | |

Table A.5.5.3.x.1-4: OTA related test parameters for FR2 SCell activation case

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit |  | | | Cell 3 | | |
|  |  |  |  |  | T1 | T2 | T3 |
| Angle of arrival configuration |  |  | | | Setup 1 according to table A.3.15.1 | | |
| Assumption for UE beams Note 7 |  |  | | | Rough | | |
| Note1 | dBm/15kHzNote4 |  | | | -104.7 | | |
| Note1 | dBm/SCSNote3 |  | | | -95.7 | | |
|  | dB |  | | | 7 | | |
| SSB\_RPNote2 | dBm/SCS Note4 |  | | | -88.7 | | |
|  | dB |  | | | 7 | | |
| IoNote2 | dBm/95.04 MHz Note4 |  | | | -58.92 | | |
| Note 1: 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 2: Es/Iot, SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.  Note 3: Void  Note 4: Equivalent power received by an antenna with 0dBi gain at the centre of the quiet zone  Note 5: Void  Note 6: Void  Note 7: Information about types of UE beam is given in B.2.1.3 and does not limit UE implementation or test system implementation. | | | | | | | |

##### A.5.5.3.x.2 Test Requirements

During T2, the UE shall be able to send a valid L3-RSRP report for the SCell in the configured slots for CSI reporting at slot for sub-test 1. For sub-test2, the UE shall be able to send a valid L3-RSRP for the SCell at slot . The UE is not required to send L3-RSRP report after slot , where M is defined in 8.3.17.

During T2, the UE shall start sending CSI reports for the SCell with non-zero CQI index in the configured slots for CSI reporting no later than slot , where

- THARQ and TCSI\_Reporting are defined in Table A.7.5.3.16.1-2.

- In this case, TSSB=TSMTC = 20ms and TL1-RSRP,report = 5ms.

- For sub-test1, Tactivation\_time = 7ms + 0.125ms + max(THARQ + Tuncertainty\_MAC + 5ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay).

- For sub-test2, Tactivation\_time = 3ms + M+ max (THARQ + Tuncertainty\_MAC + 5ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay)

- NR slot length is 0.125ms for this test case.

During T3 the UE shall stop sending CSI reports for SCell no later than slot , as defined in clause 8.3.

During T2 interruption of PCell / PSCell during SCell activation shall not happen outside the slot to , as defined in clause 8.3, where TX =20ms.

During T3 interruption of PCell / PSCell during SCell activation shall not happen outside the slot to , as defined in clause 8.3.

The interruption on any activated serving cell shall not be more than the values specified for SA in clause 8.2.2.2.2.

All of the above test requirements shall be fulfilled in order for the observed SCell activation delay and SCell deactivation delay to be counted as correct. The rate of correct observed SCell activation delay during repeated tests shall be at least 90%.

NOTE: During T2 if there are no uplink resources for reporting the valid CSI in a slot as defined in clause 8.3 then the UE shall use the next available uplink resource for reporting the corresponding valid CSI.

## << End of changes 1>>