**3GPP TSG-RAN WG4 Meeting #113 R4-241XXX**

**Orlando, US, 18th – 22nd November, 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.133** | **CR** | **5003** | **rev** | **1** | **Current version:** | **17.15.0** |  |
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| *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:*** | (NR\_RRM\_enh2-Core) CR on PUCCH SCell activation and deactivation delay requirements with Multiple SCells | | | | | | | | | |
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| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RRM\_enh2-Core | | | | |  | ***Date:*** | | | 2024-10-31 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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)* | |
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| ***Reason for change:*** | | 1. There is duplicated formula in PUCCH SCell activation delay requirements with Multiple SCells in 8.3.13. 2. Tactivation\_time\_multiple\_scells definition for PUCCH SCell in 8.3.13 is not clear. 3. PUCCH SCell Deactivation Delay Requirement with Multiple Downlink SCells in 8.3.15 is incorrect since it should refer to single PUCCH Cell deactivation delay in 8.3.14 rather than the PUCCH SCell activation delay in 8.3.12. | | | | | | | | |
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| ***Summary of change:*** | | 1. Correct the PUCCH SCell activation and deactivation delay requirements with Multiple SCells. 2. Remove the brackets. 3. Some typo corrections. | | | | | | | | |
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| ***Consequences if not approved:*** | | The PUCCH SCell activation and deactivation delay requirements with Multiple SCells are incomplete. | | | | | | | | |
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| ***Clauses affected:*** | | 8.3.13, 8.3.15 | | | | | | | | |
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|  | | **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>

### 8.3.13 SCell activation delay Requirement for Deactivated PUCCH SCell with Multiple SCells

The requirements in this clause shall apply for the UE configured with multiple deactivated downlink SCells and PUCCH is configured for a SCell, and when PUCCH SCell with downlink SCell(s) are activated by one MAC command.

For EN-DC, NE-DC, and standalone NR, the requirements in this clause shall apply when the following conditions are met:

- UE only receives one single MAC command for multiple SCell activation within the activation period defined in this clause

- in each single CG, there are no other SCell activation, deactivation, addition or release before activation is completed for all the SCells activated by the single MAC CE in this clause, and

- in EN-DC and NE-DC, there are no E-UTRAN SCell activation, deactivation, addition or release before multiple SCell activation is completed in this clause, and

- any to-be-activated unknown non-PUCCH SCell in a different band from to-be-activated PUCCH SCell has active serving cell(s) or known to-be-activated non-PUCCH SCell(s) on the same band.

- All DL SCells being activated in the secondary PUCCH group are unknown if PUCCH SCell being activated is unknown.

- If the to-be-activated FR2 PUCCH SCell is unknown, and there is no to-be-activated FR1 SCell which is counted in N1 as defined in 8.3.7.

Upon receiving SCell activation command in slot *n* for more than one SCell and one among the multiple SCells is PUCCH SCell, the UE shall be able to transmit valid CSI report on PUCCH SCell and apply actions related to the SCell activation command as specified in [7] for the PUCCH SCell being activated no later than in slot *n*+ Tactivate\_total\_PUCCH\_SCell. The UE shall be capable to transmit valid CSI report of other SCell no later than in slot n+ Tactivate\_total\_other\_SCell.

Where:

- Tactivate\_total\_PUCCH\_SCell is ,

- Tactivate\_total\_other\_SCell is

Where:

Tdelay\_multiple\_SCells\_other\_SCell is the SCell activation delay for other SCell when PUCCH SCell is activated with multiple SCells and is given by Tactivation\_time\_multiple\_scells +TCSI\_Reporting.

Tdelay\_multiple\_SCells\_PUCCH\_SCell is the SCell activation delay for PUCCH SCell when it is activated with multiple SCells and is given as below.

If UE has a Valid TA for transmitting on PUCCH SCell,

- A TA is considered to be valid provided that the *TimeAlignmentTimer* [2] associated with the TAG containing the PUCCH SCell is running.

Tdelay\_multiple\_SCells\_PUCCH\_SCell = Tactivation\_time\_multiple\_scells + max ((TFirst\_available\_CSI + TCSI\_processing), 3\*Ttarget\_PL-RS) + TCSI\_reporting\_after

If UE does not have valid TA for PUCCH SCell,

Tdelay\_multiple\_SCells\_PUCCH\_SCell = Tactivation\_time\_multiple\_scells + max ((TFirst\_available\_CSI + TCSI\_processing), (T1+T2+T3), 3\*Ttarget\_PL-RS) + TCSI\_reporting\_after

Where:

- For UE which is capable of *l3-MeasUnknownSCellActivation-r18*, Tactivation\_time\_multiple\_scells is equal to Tactivation\_time which is the SCell activation delay in millisecond as specified in section 8.3.18 except the definition of Tuncertainty\_MAC and Tuncertainty\_RRC are replaced with:

- Tuncertainty\_MAC is the time period between reception of the last activation command for PDCCH TCI, PDSCH TCI (when applicable), UL spatial relation (for FR2) relative to

- First valid L3-RSRP reporting of a to-be-activated SCell within the same band for unknown case, when UE reports valid L3-RSRP.

- Tuncertainty\_RRC is the time period between reception of the RRC configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) relative to

- First valid L3-RSRP reporting of a to-be-activated SCell within the same band for unknown case, when UE reports valid L3-RSRP.

Otherwise, when the to-be-activated PUCCH SCell is FR2 unknown SCell, Tactivation\_time\_multiple\_scells is equal to Tactivation\_time as defined in 8.3.12; otherwise, Tactivation\_time\_multiple\_scells is the target SCell activation delay in millisecond in multiple SCell activation scenario as specified in section 8.3.7.

- Ttarget\_PL-RS is the periodicity of PL-RS resource when PL-RS of target PUCCH SCell is known

- Tfirst\_available\_CSI: the delay uncertainty in acquiring the first available downlink CSI reference resources for secondary PUCCH group.

- TCSI\_processing: the UE processing time for CSI reporting of secondary group PUCCH SCells.

- TCSI\_reporting\_after the delay uncertainty in acquiring the first available CSI reporting resource after end of max ((TFirst\_available\_CSI + TCSI\_processing), 3\*Ttarget\_PL-RS) if UE has a valid TA for PUCCH SCell or after end of max ((TFirst\_available\_CSI + TCSI\_processing), (T1+T2+T3), 3\*Ttarget\_PL-RS) if UE does not have a valid TA for PUCCH SCell.

- T1 is the delay uncertainty in acquiring the first available PDCCH triggered PRACH occasion in the PUCCH SCell after Tactivation\_time\_multiple\_scells.

- T1 is up to the summation of a delay uncertainty for reception of PDCCH order, SSB to PRACH occasion association period and 10 ms, where SSB to PRACH occasion association period is defined in the Table 8.1-1 of TS 38.213

- T2 is the delay from slot n + (THARQ + Tactivation\_time\_multiple\_scells + T1)/NR slot length until UE has obtained a valid TA command for the target PUCCH SCell being activated. Slot n is the slot where the UE receives PUCCH SCell activation command.

- T3 is the delay for applying the received TA for uplink transmission on target PUCCH SCell being activated, and greater than or equal to k+1 slot, where k is defined in clause 4.2 in TS 38.213. The starting point and the endpoint of an interruption window on PCell or any activated SCell in MCG for NR standalone mode, or on PSCell or any activated SCell in SCG for EN-DC mode is same as single SCell activation requirement in clause 8.3.2.

Starting from slot n + THARQ + 3 ms where n is the slot where SCell activation command is received (as specified in clause 4.3 of TS 38.213 [3]) and until the SCell activation completion at UE, after at least one CSI-RS transmission occasion for the channel measurement and reporting (specified in clause 5.2.2.5 of TS 38.214 [26]), the UE shall report out of range if the UE has available uplink resources to report CQI for the SCell.

In addition to the interruption due to RF retuning during multiple SCell activation, if the UE is not capable of *parallelTxPRACH-SRS-PUCCH-PUSCH* for inter-band CA, and PRACH on PUCCH SCell and PUCCH/PUSCH/SRS on other active serving cell are fully or partially overlapping in time, the UE shall transmit PRACH on PUCCH SCell and is allowed to drop or cause interruption to SRS or PUCCH or PUSCH transmission on the SpCell or on any activated SCell. Otherwise, UE is not allowed to drop or cause any interruption of SRS or PUCCH or PUSCH transmission on SpCell or on any activated SCell.

Upon receiving SCell activation command in slot *n,* if the start of the first complete SSB used in the *TX* in the different bands which have SCells being activated after *n*+ are not aligned on time domain among

- SCells in different bands being activated by the same MAC CE if UE does not support per FR gap, or

- SCells in different FR1 bands being activated by the same MAC CE if UE supports per FR gap,

additional interruptions may be expected for the activated serving cells, where

- The number of additional interruptions is no more than the number of FR1 bands which have both SCell being activated for which the activation requirements involve *TFirstSSB\_MAX* *multiple\_scells* with *Trs* and the active serving cell, and

- In each interruption occasion, the interruption length is defined in clause 8.2.2.2.2, and

- Longer activation delay may be expected for multiple SCell activation under one MAC CE with multiple interruptions, and

- *TX* is:

- TFirstSSB, for any scenario where Tactivation\_time multiple\_scells includes TFirstSSB;

- TFirstSSB\_MAX multiple\_scells, for any scenario where Tactivation\_time multiple\_scells includes TFirstSSB\_MAX multiple\_scells;

- Tuncertainty\_MAC+TFineTiming or Tuncertainty\_MAC multiple\_scells+TFineTiming, for any scenario where Tactivation\_time multiple\_scells includes TFineTiming.

Otherwise, no additional interruption is expected due to activation of multiple SCells.

Starting from the slot specified in clause 4.3 of TS 38.213 [3] (timing for secondary Cell activation/deactivation) and until the UE has completed a first L1-RSRP measurement, the UE shall report lowest valid L1 SS-RSRP range if the UE has available uplink resources to report L1-RSRP for the SCell.

# <End of Change 1>

# <Start of Change 2>

### 8.3.15 SCell Deactivation Delay Requirement for Activated PUCCH SCell with Multiple Downlink SCells

The requirements in this clause shall apply for the UE configured with multiple downlink SCells and one SCell configured with PUCCH in EN-DC, or in standalone NR carrier aggregation, or in NE-DC, provided that,

- in each single CG, there are no other SCell activation, deactivation, addition or release before deactivation is completed for all the SCells deactivated by the single MAC CE in this clause, and

- in EN-DC and NE-DC, there are no E-UTRAN SCell activation, deactivation, addition or release before multiple SCell deactivation is completed in this clause, and

- in EN-DC, NE-DC and standalone NR, UE only receives one single MAC command for multiple SCell deactivation within the deactivation period defined in this clause

Upon receiving SCell deactivation command in slot *n*, the UE shall accomplish the deactivation actions for the SCells (including one SCell configured with PUCCH) being deactivated within the same delay as specified in clause 8.3.14.

The starting point and the end-point of an interruption window on PCell or any activated SCell in MCG for NR standalone mode, or on PSCell or any activated SCell in SCG for EN-DC mode are same as single SCell activation requirement in clause 8.3.14.

# <End of Change 2>