**3GPP TSG-RAN WG4 Meeting #112 R4-2413887**

**Maastricht, Netherland, Aug 19-23, 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** | 4749 | **rev** | 1 | **Current version:** |  |  |
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| *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:***  | (NR\_RRM\_enh2-Core) Correction CR to multiple SCell activation with PUCCH SCell |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_RRM\_enh2-Core |  | ***Date:*** | 2024-8-22 |
|  |  |  |  |  |
| ***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 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | In PUCCH SCell activation in TS38.133 clause 8.3.12, the parallel measurements for PL-RS, CSI reporting are assumed if there is valid TA. *If the UE has a valid TA for transmitting on an SCell then the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated on the PUCCH SCell no later than in slot n+*$\frac{T\_{HARQ}+T\_{activation\\_time}+max ((T\_{First\\_available\\_CSI} +T\_{CSI\\_processing}), 3\*T\_{target\\_PL-RS})+T\_{CSI\\_Reporting\\_after}}{NR slot length}$, In multiple SCell activation with PUCCH SCell in 8.3.13, it is not aligned with the assumption above. This needs to be corrected. |
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| ***Summary of change:*** | 1. Change the multiple SCell activation delay with PUCCH SCell to be aligned with the assumption for single PUCCH SCell activation above, when UE has valid TA on PUCCH SCell.
2. Some editorial changes.
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| ***Consequences if not approved:*** | The multiple SCell activation delay with PUCCH SCell is not correct. |
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| ***Clauses affected:*** | 8.3.13 |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## << Start of changes>>

### 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.

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 $\frac{T\_{HARQ}+T\_{delay\\_multiple\\_SCells\\_PUCCH\\_SCell}}{NR slot length}$,

- Tactivate\_total\_other\_SCell is $\frac{T\_{HARQ}+T\_{delay\\_multiple\\_SCells\\_other\\_SCell}}{NR slot length}$

Where:

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

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

- 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:

- 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*+$\frac{T\_{HARQ}+3ms}{NR slot length}$ 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 changes>>