**3GPP TSG-RAN WG4 Meeting # 111 R4-2410253**

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

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.133** | **CR** | **Draft** | **rev** | **-** | **Current version:** | **18.5.0** |  |
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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:***  | DraftCR on maintenance for R18 eFeRRM |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
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| ***Work item code:*** | NR\_RRM\_enh3-Core |  | ***Date:*** | 2024-05-01 |
|  |  |  |  |  |
| ***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 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)* |
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| ***Reason for change:*** | In existing requirements for SCell Activation Delay Requirement for Deactivated SCell with Multiple Downlink SCells with L3 reporting, the activation delay is same as single SCell activation as defined in 8.3.17. However, the requirements are different for FR1 and FR2. * For FR2, according to the requirements in 8.3.7, if there is one SCell with valid L3 reporting, the requirements are almost same as single SCell.
* For FR1, according to the principle in 8.3.7, even the SCell is known, UE shall perform ACG using TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 unknown Scell, which is shown below:

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| Tactivation\_time\_multiple\_scells is the target SCell activation delay in millisecond in multiple SCell activation scenario.  If the SCell is known and belongs to FR1 and the measurement period of the SCell being activated is equal to or smaller than [2400ms], Tactivation\_time\_multiple\_scells is:- TFirstSSB\_MAX\_multiple\_scells + Trs + 5ms, if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 known Scell with the measurement period larger than [2400ms] but does not have any parallel to-be-activated SCell which is FR1 unknown SCell.- TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells + Trs + 5ms, if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 unknown Scell- otherwise, TFirstSSB\_MAX\_multiple\_scells + 5ms. If the SCell is known and belongs to FR1 and the measurement period of the SCell being activated is larger than [2400ms], Tactivation\_time\_multiple\_scells is:- TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells + Trs + 5ms, if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 unknown Scell- otherwise, TFirstSSB\_MAX\_multiple\_scells + Trs + 5ms If the SCell is unknown and belongs to FR1, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, Tactivation\_time\_multiple\_scells is:- TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells+Trs +5ms, if the SCell is not counted in N1 |

Considering that requirements are constrained to the case:

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| - Any to-be-activated SCell is unknown and in the same band, and- No any active serving cell(s) or known to-be-activated SCell(s) exists on the same band, and- UE reports valid L3 measurement results after receiving the multiple SCell activation command for unknown SCell. |

The requirements for FR1 SCell activation are defined as:* TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells is needed if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 unknown Scell without valid L3-RSRP report after Scell activation.
* Cell search is not needed for Cell with valid L3-RSRP reporting or the Cell is contiguous to a Cell with valid L3-RSRP reporting.
* Cell with valid L3-RSRP reporting or the Cell is contiguous to a Cell with valid L3-RSRP reporting will not be counted in N1.

The time order of the procedures during SCell activation are illustrated as follows: |
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| ***Summary of change:*** | Correct the requirements in 8.3.18 for FR1 and FR2 separately. |
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| ***Consequences if not approved:*** | The requirements are not correct. |
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| ***Clauses affected:*** | 8.3.18 |
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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 Change 1>

### 8.3.18 SCell Activation Delay Requirement for Deactivated SCell with Multiple Downlink SCells with L3 reporting

The requirements in this clause shall apply for the UE configured with more than one SCells and supporting *l3-MeasUnknownSCellActivation-r18*.

In EN-DC, NE-DC, standalone NR, or in one CG of NR-DC, 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, and

- 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

- all to-be-activated SCells are unknown on the same FR2 band, and there is no active serving cell(s) or known SCell(s) on the same band, or,

- all to-be-activated SCells are unknown on the same FR1 band, and there is no active serving cell contiguous to the SCell nor known SCell(s) contiguous to the to-be-activated SCell on the same band, and

- the UE reports valid L3 measurement results after receiving the SCell activation command for the to-be-activated SCell in FR1, or at least one unknown SCell in the same FR2 band

In two CGs of NR-DC, the requirements in this clause shall apply when the following conditions are met:

- UE receives one MAC command per CG for multiple SCell activation within the activation period defined in this clause, and

- UE supports per-FR measurement gap capability, and

- all to-be-activated SCells are unknown on the same FR2 band, and there is no active serving cell(s) or known SCell(s) on the same band, or,

- all to-be-activated SCells are unknown on the same FR1 band, and there is no active serving cell contiguous to the SCell nor known SCell(s) contiguous to the to-be-activated SCell on the same band, and

- the UE reports valid L3 measurement results after receiving the SCell activation command for the to-be-activated SCell in FR1, or at least one unknown SCell in the same FR2 band

Clause 8.3.7 is applied for the FR1 to-be-activated SCell without L3 measurement results after receiving SCell activation command or FR2 to-be-activated SCells without L3 measurement results after receiving SCell activation command for any SCell in the same band, except that the Cell with valid L3-RSRP reporting or the Cell is contiguous to a Cell with valid L3-RSRP reporting will not be counted in N1.

Upon receiving SCell activation command in slot *n* for more than one SCell, for each of the to-be-activated SCell, the UE shall be capable to transmit valid CSI report and apply actions related to the activation command for the SCell being activated no later than in slot $n+\frac{T\_{HARQ}+T\_{activation\\_time\\_multiple\\_scells}+T\_{CSI\\_Reporting}}{NR slot length}$, where:

 THARQ (in ms) is the timing between DL data transmission and acknowledgement as specified in TS 38.213 [3]

 Tactivation\_time\_multiple\_scells is the target SCell activation delay in millisecond in multiple SCell activation scenario.

For FR1 target SCell, Tactivation\_time\_multiple\_scells is:

- 3ms + max (4ms + [TL3 report]+ Tuncertainty\_SP + 3ms+ THARQ, max(TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells, 4ms + [TL3 report]+ Tuncertainty\_MAC + 3ms + THARQ) + TFineTiming + 2ms ), if the semi-persistent CSI-RS is used for CSI reporting

- 3ms + max (4ms + [TL3 report]+ Tuncertainty\_RRC + TRRC\_delay, max(TFirstSSB\_MAX\_multiple\_scells + TSMTC\_MAX\_multiple\_scells, 4ms + [TL3 report]+ Tuncertainty\_MAC + THARQ) + TFineTiming + 2ms), if the periodic CSI-RS is used for CSI reporting

if on the same band UE also has at least one parallel to-be-activated SCell which is FR1 unknown SCell without valid L3-RSRP report after SCell activation. TFirstSSB\_MAX\_multiple\_scells, TSMTC\_MAX\_multiple\_scells is defined in 8.3.7; if on the same band, UE does not have any parallel to-be-activated SCell which is FR1 unknown SCell without valid L3-RSRP report after SCell activation, requirements in 8.3.17 apply.

For FR2 target SCell, Tactivation\_time\_multiple\_scells is equal to Tactivation\_time which is the SCell activation delay in millisecond as specified in Clause 8.3.17 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), 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.

When the following conditions are met:

If the SCell being activated belongs to FR1 provided that the side condition Ês/Iot ≥ -2dB is fulfilled:

If the target SCell belongs to FR1 and none of the following conditions is met

- ‘ssb-PositionInBurst’ indicates only one SSB is being actually transmitted, or

- ‘ssb-PositionInBurst’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation;

If the SCell being activated belongs to FR2 and the PCell or PSCell is in FR1 or FR2-1 provided that the side condition Ês/Iot ≥ -2dB is fulfilled.

Otherwise, Tactivation\_time\_multiple\_scells in clause 8.3.7 is applied.

where,

TL3 report is the delay to acquire the first available UL resource for L3 measurement reporting from 7ms +THARQ after receiving the SCell activation command, or is the delay of L1-RSRP reporting if the first UL resource comes for L3 reporting is availabe after UE reports L1-RSRP.

- The L3 measurement reporting requirement is defined at clause 9.2.4.4

- UE is ready to report the L3 measurement result no later than 7ms + THARQ ms from receiving the SCell activation command,

- UE is not required to report the L3 measurement results after 3ms + THARQ+ M ms from receiving the SCell activation command where

For FR1,

- M=2\*TSSB + TL1-RSRP,report for UE supporting *shortMeasInterval-r18* capability,

- Otherwise, M =TSMTC+TSSB + TL1-RSRP,report,

For FR2-1,

- M=(X1+X2)\*TSSB + TL1-RSRP,report for UE supporting *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* and *shortMeasInterval-r18* capability,

- M=X1\*TSMTC +X2\*TSSB + TL1-RSRP,report for UE supporting *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* without supporting *shortMeasInterval-r18* capability,

- M=16\*TSSB + TL1-RSRP,report for UE supporting *shortMeasInterval-r18* without supporting *reduceForCellDetection* and *reduceForSSB-L1-RSRP-Meas* capability,

- Otherwise,M=8\*TSMTC +8\*TSSB + TL1-RSRP,report

Where, X1 and X2 are the values indicated by *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* in UE capability.

TSMTC is the same as TSMTC\_MAX\_multiple\_scells in case of intra-band SCell activation as specified in 8.3.7.

 TFineTiming is the time period between UE finish processing the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and the timing of first complete available SSB corresponding to the TCI state.

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

- First valid L3 measurement report for unknown case, when UE reports valid L3 measurement report and L3 measurement report is earlier than TCI command

- First valid L1-RSRP reporting for unknown case, when UE does not report L3 mmeasurement results

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

- First valid L3-RSRP reporting for unknown case, when UE reports valid L3-RSRP and L3 report is earlier than TCI command

- First valid L1-RSRP reporting for unknown case, when UE does not report L3 measurement results

 Tuncertainty\_SP is the time period between reception of the activation command for semi-persistent CSI-RS resource set for CQI reporting relative to

- SCell activation command for known case;

- First valid L3 reporting for unknown case, when UE reports valid L3 measurement results

- First valid L1-RSRP reporting for unknown case, when UE does not report L3 measurement results

 TRRC\_delay is the RRC procedure delay as specified in TS38.331 [2].

 TSMTC is the same as TSMTC\_MAX\_multiple\_scells in case of intra-band SCell activation as specified in 8.3.7.

 When *absoluteFrequencySSB* is not configured in *DownlinkConfigCommon* for target SCell but SMTC for target SCell is configured, no requirement would be applied.

TCSI\_reporting is the delay (in ms) including uncertainty in acquiring the first available downlink CSI reference resource, UE processing time for CSI reporting and uncertainty in acquiring the first available CSI reporting resources as specified in TS 38.331 [2].

The condition of known SCell in FR1 or FR2 is defined in clause 8.3.2.

The requirement for unknown SCells applies provided that the activation commands for PDCCH TCI, PDSCH TCI (when applicable), semi-persistent CSI-RS for CQI reporting (when applicable), and configuration message for TCI of periodic CSI-RS for CQI reporting (when applicable) are based on the latest valid L3 measurement reporting or either L1-RSRP reporting or L3 measurement reporting when UE report both L3 measurement reporting and L1-RSRP reporting before receiving TCI activation command

If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*prior to the activation command, TSMTC\_MAX follows *smtc1* or *smtc2* according to the physical cell IDs of the target cells being activated and the active serving cells.

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 is same as single SCell activation requirement in clause 8.3.2.

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 the SCell activation, the UE shall report out of range if the UE has available uplink resources to report CQI for the 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 slot *n* + THARQ + 3 ms where slot *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.

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>