**3GPP TSG- Meeting # *R4-2510696***

**Bengaluru, India, - 29th August 2025**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **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:*** | DraftCR for LBCA SCell activation | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | -Core | | | | |  | ***Date:*** | | | -08-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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:*** | | Capturing LBCA agreements related to SCell activation. | | | | | | | | |
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| ***Summary of change:*** | | Introduction of SCell activation and deactivation delay requirements for LBCA SCell. | | | | | | | | |
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| ***Consequences if not approved:*** | | Feature is not specified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 8.3.2, 8.3.3, 8.3.4, new clause 8.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:*** | |  | | | | | | | | |

**Change 1**

8.3.2 SCell Activation Delay Requirement for Deactivated SCell

The requirements in this clause shall apply for the UE configured with at least one downlink SCell in EN-DC, or in standalone NR carrier aggregation or in NE-DC or in NR-DC and when one SCell is being activated.

The requirements in this clause apply in standalone NR carrier aggregation for activation of one SDL SCell configured with *LBCA-SwitchingPattern* in FR1, provided that all SDL SCell reference signals to be measured for SCell activation fully overlap with the SDL SCell active periods in the *LBCA-SwitchingPattern*.

The delay within which the UE shall be able to activate the deactivated SCell depends upon the specified conditions.

Upon receiving SCell activation command in slot *n*, 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 , where:

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

TLBCA:

- If the UE supports LBCA via switching and the SCell to be activated is an SDL SCell configured with *LBCA-SwitchingPattern*, TLBCA is the UE processing delay for activating the *LBCA-SwitchingPattern*.

- Otherwise, TLBCA = 0.

When the SCell to be activated is an SDL SCell configured with *LBCA-SwitchingPattern*, the UE shall activate the configured *LBCA-SwitchingPattern* no later than at slot .

Tactivation\_time is the SCell activation delay in milliseconds.

If the SCell is known and belongs to FR1, Tactivation\_time is:

- TFirstSSB+ T∆ + 5 ms, if the measurement period of the SCell being activated is equal to or smaller than 2400 ms.

- TFirstSSB\_MAX + Trs+ T∆ + 5 ms, if the measurement period of the SCell being activated is larger than 2400 ms.

If the SCell is unknown and belongs to FR1, and if one 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,

provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, Tactivation\_time is:

- If UE supports *shortMeasInterval-r18*, then

- TFirstSSB\_MAX, enhanced + TSMTC\_MAX, enhanced + Trs, enhanced + 5 ms, if the following conditions are met,

- the SCell is contiguous to an active serving cell in the same band, and

- its *ssb-PositionInBurst* is same as the one of contiguous FR1 active serving cell, and

- its SMTC offset is same as the one of contiguous FR1 active serving cell, and

- its RTD with contiguous FR1 active serving cell is smaller than or equal to 260 ns with respect to the to-be-activated SCell’s SSB numerology, and its reception power difference with contiguous FR1 active serving cell is smaller than or equal to 6 dB;

- TFirstSSB\_MAX, enhanced + TSMTC\_MAX, enhanced + 2\*Trs, enhanced + 5 ms, otherwise.

- Otherwise

- TFirstSSB\_MAX + TSMTC\_MAX + Trs + 5 ms, if the following conditions are met,

- the SCell is contiguous to an active serving cell in the same band, and

- its *ssb-PositionInBurst* is same as the one of contiguous FR1 active serving cell, and

- its SMTC offset is same as the one of contiguous FR1 active serving cell, and

- its RTD with contiguous FR1 active serving cell is smaller than or equal to 260 ns, and its reception power difference with contiguous FR1 active serving cell is smaller than or equal to 6 dB;

- TFirstSSB\_MAX + TSMTC\_MAX + 2\*Trs + T∆ + 5 ms, otherwise.

Otherwise, provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, Tactivation\_time is:

- If UE supports *shortMeasInterval-r18*, then

- 6 ms + TFirstSSB\_MAX, enhanced + TSMTC\_MAX, enhanced + Trs, enhanced + TL1-RSRP, enhanced\_measure + TL1-RSRP, report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP), if semi-persistent CSI-RS is used for CSI reporting,

- 3 ms + TFirstSSB\_MAX, enhanced + TSMTC\_MAX, enhanced + Trs, enhanced + TL1-RSRP, enhanced\_measure + TL1-RSRP ,report + max(THARQ + Tuncertainty\_MAC + 5 ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay), if periodic CSI-RS is used for CSI reporting.

- Otherwise

- 6 ms + TFirstSSB\_MAX + TSMTC\_MAX + Trs + T∆ + TL1-RSRP, measure + TL1-RSRP,report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP), if semi-persistent CSI-RS is used for CSI reporting,

- 3 ms + TFirstSSB\_MAX + TSMTC\_MAX + Trs + T∆ + TL1-RSRP, measure + TL1-RSRP,report + max(THARQ + Tuncertainty\_MAC + 5 ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay), if periodic CSI-RS is used for CSI reporting.

- However, when the following conditions are fulfilled, no activation requirement will be applied for this unknown SCell:

- the SCell is contiguous to an active serving cell in the same band, and

- A single SSB is used in the unknown SCell; or multiple SSBs are used in the SCell and TCI state indication for PDCCH is provided by the same MAC PDU used for SCell activation; and

- its *ssb-PositionInBurst* is same as the one of contiguous FR1 active serving cell, and

- its SMTC offset is same as the one of contiguous FR1 active serving cell

- its RTD with contiguous FR1 active serving cell is larger than 260 ns, or its reception power difference with contiguous FR1 active serving cell is larger than 6 dB;

If the SCell being activated belongs to FR1 and if there is at least one active serving cell contiguous to the SCell on that FR1 band, if the UE is not provided with SSB configuration (*absoluteFrequencySSB*) or SMTC configuration for the target SCell, Tactivation\_time is 3 ms for UE supporting *scellWithoutSSB*, provided

- The RTD between the target SCell and the contiguous active serving cell is within ±260ns, and

- The difference of the reception power with the contiguous active serving cell is <= 6 dB, and

- The RS(s) of SCell being activated is (are) QCL-TypeA with TRS(s) of the SCell being activated, and the TRS(s) of the SCell being activated is (are) further QCL-TypeC with SSB(s) of any active serving cell that is contiguous to the SCell being activated on that FR1 band.

For a UE supporting *scellWithoutSSB-InterBandCA-r18* if the SCell being activated belongs to FR1 and if the UE is not provided with SSB configuration (*absoluteFrequencySSB*) in the target SCell (FrequencyInfoDL) nor SMTC configuration for the target SCell, and if there is one collocated active reference serving cell on different FR1 band, when the following conditions are fulfilled,

- The RTD between the target SCell and the collocated reference serving cell is within CP where CP is corresponding to the SCS of SSB-less SCell, and

- The EPRE difference at the UE is smaller than or equal to 30 dB, where EPRE difference is the power difference between TRS/A-TRS symbol on the SSB-less SCell and SSB symbol on the reference serving cell normalized by SCSs of SSB of reference cell and A-TRS/P-TRS of SSB-less SCell, and

- The RS(s) of the SSB-less SCell being activated is (are) QCL-TypeA with TRS(s) of the SSB-less SCell being activated, and the TRS(s) of the SSB-less SCell being activated is (are) further QCL-TypeC with SSB(s) of an inter-band active serving cell, and the inter-band active serving cell shall be same as the reference serving cell.

where the reference serving cell can be indicated by higherlayer parameter *referenceCell-r18*. If UE is not indicated with *referenceCell-r18*, the reference serving cell is assumed to be the QCL-typeC source cell if there is only one active QCL-typeC source cell configured.

Tactivation\_time is

- Tfirst\_TRS + TTRS +5 ms, if aperiodic CSI-RS resources are not configured for SCell activation or UE do not support *aperiodicCSI-RS-FastScellActivation-r17*, when the the EPRE difference is smaller than or equal to 12 dB

- Tfirst\_ATRS + Tgap + TATRS + 5 ms if aperiodic CSI-RS resources are configured for SCell activation for UE supporting *aperiodicCSI-RS-FastScellActivation-r17*, when the the EPRE difference is smaller than or equal to 12 dB

- Tfirst\_TRS + 2\*TTRS +5 ms, when the EPRE difference is larger than 12 dB but smaller than or equal to 30 dB

For a UE supporting *scellWithoutSSB-InterBandCA-r18*, when UE receive SCell activation command for more than one SSB-less SCell, the SCell activation delay for each of the to-be-activated SSB-less SCell in FR1 is the same as the single SSB-less SCell activation delay, when

- SSB-less SCells being activated are on different bands, or

- all SCells being activated are SSB-less SCells, the SCells are contiguous on the same band, and all to-be-activated SCells have the same QCL-typeC QCL source cell.

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, then Tactivation\_time is TFirstSSB+ 5ms provided:

- the UE is provided with SMTC for the target SCell, and

- the SSBs in the serving cell(s) and the SSBs in the SCell fulfil the condition defined in clause 3.6.3, and

- the parameter ssb-PositionsInBurst is same for the serving cell(s) and the SCell, and

- SSB is in the same half-frame on the SCell and the contiguous FR2 active serving cell.

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, if the UE supporting *scellWithoutSSB* is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms, provided

- the RS (s) of SCell being activated is (are) QCL-TypeD with RS (s) of one active serving cell on that FR2 band.

If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, if *highSpeedMeasFlagFR2-r17* is configured for the FR2 power class 6 UE supporting *scellWithoutSSB* and *measEnhCAInterFreqFR2-r18*, Tactivation\_time is 3 ms , provided

- the RS (s) of SCell being activated is (are) QCL-TypeD with RS (s) of one active serving cell on that FR2 band.

If the SCell being activated belongs to FR2 and if there is no active serving cell on that FR2 band provided that PCell or PSCell is in FR1 or in FR2:

If the target SCell is known to UE and semi-persistent CSI-RS is used for CSI reporting, then Tactivation\_time is:

- 3 ms + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP), where Tuncertainty\_MAC=0 and Tuncertainty\_SP=0 if

- UE receives the SCell activation command, semi-persistent CSI-RS activation command and TCI state activation command at the same time, or

- Provided this is the initial activation after SCell addition, and

- TCI-ActivatedConfig is configured for the SCell, and UE receives the SCell activation command and semi-persistent CSI-RS activation command at the same time.

If the target SCell is known to UE and periodic CSI-RS is used for CSI reporting, then Tactivation\_time is:

- max(Tuncertainty\_MAC + 5 ms + TFineTiming, Tuncertainty\_RRC + TRRC\_delay-THARQ), where Tuncertainty\_MAC=0 if

- UE receives the SCell activation command and TCI state activation commands at the same time, or

- Provided this is the initial activation after SCell addition, and

- UE receives the SCell activation command and TCI-ActivatedConfig is configured for the SCell.

If the PCell/PSCell and the target SCell are configured as FR1-FR2-1 CA or if the PCell/PSCell and the target SCell are in a FR2-1 band pair with independent beam management, and the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, then Tactivation\_time is:

- 6 ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP), or

- 6 ms + TFirstSSB\_MAX,enhanced + 15\*TSMTC\_MAX, enhanced + X1\*Trs, enhanced + TL1-RSRP, enhanced\_measure + TL1-RSRP, report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP) if UE supports *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* and/or *shortMeasInterval-r18* capabilities, and when SCell activation triggered L3 report is not configured or SCell activation triggered L3 report is configured but not reported.

If the PCell/PSCell and the target SCell are configured as FR1-FR2-2 CA or if the PCell/PSCell and the target SCell are in a FR2-2 band pair with independent beam management, and the target SCell is unknown to UE and semi-persistent CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, then Tactivation\_time is:

- 6 ms + TFirstSSB\_MAX + 23\*TSMTC\_MAX + 12\*Trs + TL1-RSRP, measure + TL1-RSRP, report + THARQ + max(Tuncertainty\_MAC + TFineTiming + 2 ms, Tuncertainty\_SP).

If the PCell/PSCell and the target SCell are configured as FR1-FR2-1 CA or if the PCell/PSCell and the target SCell are in a FR2-1 band pair with independent beam management, and the target SCell is unknown to UE and periodic CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, then Tactivation\_time is:

- 3 ms + TFirstSSB\_MAX + 15\*TSMTC\_MAX + 8\*Trs + TL1-RSRP, measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5 ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)}, or

- 3 ms + TFirstSSB\_MAX, enhanced + 15\*TSMTC\_MAX, enhanced + X1\*Trs, enhanced + TL1-RSRP, enhanced\_measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5 ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)} if UE supports *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* and/or *shortMeasInterval-r18* capabilities, and when SCell activation triggered L3 report is not configured or SCell activation triggered L3 report is configured but not reported.

If the PCell/PSCell and the target SCell are configured as FR1-FR2-2 CA or if the PCell/PSCell and the target SCell are in a FR2-2 band pair with independent beam management, and the target SCell is unknown to UE and periodic CSI-RS is used for CSI reporting, provided that the side condition Ês/Iot ≥ -2 dB is fulfilled, then Tactivation\_time is:

- 3 ms + TFirstSSB\_MAX + 23\*TSMTC\_MAX + 12\*Trs + TL1-RSRP, measure + TL1-RSRP, report + max {(THARQ + Tuncertainty\_MAC + 5 ms + TFineTiming), (Tuncertainty\_RRC + TRRC\_delay)}.

where,

TSMTC\_MAX:

- In FR1, in case of intra-band contiguous SCell activation or in case of intra-band non-contiguous SCell activation for UE not capable of *intraBandNR-CA-non-collocated-r18* or UE is capable of *intraBandNR-CA-non-collocated-r18* and *nonCollocatedTypeNR-CA-r18* is provided, TSMTC\_MAX is the longer SMTC periodicity between active serving cells and SCell being activated provided the cell specific reference signals from the active serving cells and the SCells being activated or released are available in the same slot; in case of intra-band non-contiguous SCell activation for UE capable of *intraBandNR-CA-non-collocated-r18* and *nonCollocatedTypeNR-CA-r18* is not provided or in case of inter-band SCell activation, TSMTC\_MAX is the SMTC periodicity of SCell being activated.

- In FR2, in case of intra-band SCell activation, TSMTC\_MAX is the longer SMTC periodicity between active serving cells and SCell being activated provided that in Rel-15 only support FR2 intra-band CA; in case of FR2 inter-band SCell activation, TSMTC\_MAX is the SMTC periodicity of SCell being activated.

- TSMTC\_MAX is bounded to a minimum value of 10 ms.

TSMTC\_MAX, enhanced:

- In FR1 or FR2-1, a UE supporting *shortMeasInterval-r18* if the SMTC for SCell being activated is only configured in measObjectNR, TSMTC\_MAX, enhanced is the SSB periodicity of SCell being activated. Otherwise, TSMTC\_MAX, enhanced = TSMTC\_MAX.

Trs is the SMTC periodicity of the SCell being activated if the UE has been provided with an SMTC configuration for the SCell in SCell addition message, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the measObjectNRs having the same SSB frequency and subcarrier spacing configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement which involves Trs is applied with Trs = 5 ms assuming the SSB transmission periodicity is 5 ms. There are no requirements if the SSB transmission periodicity is not 5 ms.

Trs, enhanced is the SSB periodicity of the SCell being activated for a UE supporting *shortMeasInterval-r18* in FR1 or FR2-1, if the SMTC for SCell being activated is only configured in the *measObjectNR*. Otherwise, Trs, enhanced = Trs

T∆ is the additional time for fine time tracking and acquiring full timing information of the SCell. T∆ = 2\*Trs ms for SCell operating with 12 PRB SSB BW. Otherwise, T∆ = 0 ms.

TFirstSSB: is the time to the end of the first complete SSB burst indicated by the SMTC, or within 5 ms if SMTC is not configured, after slot n + .

TFirstSSB\_MAX: Is the time to the end of the first complete SSB burst indicated by the SMTC, or within 5 ms if SMTC is not configured, after slot n + , further fulfilling:

- In FR1, in case of intra-band contiguous SCell activation or in case of intra-band non-contiguous SCell activation for UE not capable of *intraBandNR-CA-non-collocated-r18* or UE is capable of *intraBandNR-CA-non-collocated-r18* and *nonCollocatedTypeNR-CA-r18* is provided, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot; in case of intra-band non-contiguous SCell activation for UE capable of *intraBandNR-CA-non-collocated-r18* and *nonCollocatedTypeNR-CA-r18* is not provided or in case of inter-band SCell activation, the first occasion when the SCell being activated is transmitting SSB burst.

- In FR2, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot.

TFirstSSB\_MAX, enhanced: For a UE supporting *shortMeasInterval-r18* in FR1 or FR2-1, if the SMTC for SCell being activated is only configured in the measObjectNR, TFirstSSB\_MAX, enhanced is the time to the end of the first complete SSB burst indicated by the SSB periodicity of the SCell being activated, after slot n + . Otherwise, TFirstSSB\_MAX, enhanced = TFirstSSB\_MAX

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.

X1 is equal to the reported value in *reduceForCellDetection* in FR2-1. Otherwise, if *reduceForCellDetection* is absent, X1 is 8.

TL1-RSRP, measure is L1-RSRP measurement delay TL1-RSRP\_Measurement\_Period\_SSB or TL1-RSRP\_Measurement\_Period\_CSI-RS based on applicability as defined in clause 9.5 assuming M=1 and TReport=0.

TL1-RSRP, enhanced\_measure is

- SSB based L1-RSRP measurement delay TL1-RSRP\_Measurement\_Period\_SSB based on applicability as defined in clause 9.5 assuming M=1 and TReport=0; N is equal to the value reported by the UE in *reduceForSSB-L1-RSRP-Meas*. Otherwise, if *reduceForSSB-L1-RSRP-Meas* is absent, N= 8. Or,

- CSI-RS based L1-RSRP measurement delay TL1-RSRP\_Measurement\_Period\_CSI-RS based on applicability as defined in clause 9.5 assuming M=1 and TReport=0.

- If UE supports *shortMeasInterval-r18* capability, L1-RSRP measurement for TL1-RSRP, enhanced\_measure can be performed based on non-DRX mode even if DRX is configured.

TL1-RSRP, report is delay of acquiring CSI reporting resources.

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

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

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

- SCell activation command for known case;

- First valid L1-RSRP reporting for unknown case.

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 L1-RSRP reporting for unknown case.

TRRC\_delay is the RRC procedure delay as specified in TS 38.331 [2].

Longer delays for RRM measurement requirements, and in case of FR2 also SSB based RLM/BFD/CBD/L1-RSRP measurement requirements, can be expected during the cell detection time for unknown SCell activation.

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].

TFirstTRS: is the time to the end of the first complete periodic CSI-RS burst for SCell activation after slot n + .

TTRS is the periodicity of periodic CSI-RS burst for SCell activation.

TFirstATRS: is the time to the end of the first complete CSI-RS burst for SCell activation after slot n + , where the CSI-RS burst is defined as four CSI-RS resources in two consecutive slots.

TATRS is the CSI-RS burst for SCell activation where the CSI-RS burst is defined as four CSI-RS resources in two consecutive slots.

Tgap is a gap length between two aperiodic CSI-RS bursts,

- at least 2 slots for 15 kHz and 30 kHz

- at least 3 slots for 60 kHz

SCell in FR1 is known if it has been meeting the following conditions:

- During the period equal to max(5\*measCycleSCell,  5\*DRX cycles) for FR1 before the reception of the SCell activation command:

- the UE has sent a valid measurement report for the SCell being activated and

- the SSB measured remains detectable according to the cell identification conditions specified in clause 9.2 and 9.3.

- the SSB measured during the period equal to max(5\*measCycleSCell, 5\*DRX cycles) also remains detectable during the SCell activation delay according to the cell identification conditions specified in clause 9.2 and 9.3.

Otherwise SCell in FR1 is unknown.

For the first SCell activation in FR2 bands, the SCell is known if it has been meeting the following conditions:

- During the period equal to 4 s for UE supporting power class 1/5 and 3 s for UE supporting power class 2/3/4 before UE receives the last activation command for PDCCH TCI, PDSCH TCI (when applicable) and semi-persistent CSI-RS for CQI reporting (when applicable):

- the UE has sent a valid L3-RSRP measurement report with SSB index, and

- SCell activation command is received after L3-RSRP reporting and no later than the time when UE receives MAC-CE command for TCI activation

- During the period from L3-RSRP reporting to the valid CQI reporting, the reported SSBs with indexes remain detectable according to the cell identification conditions specified in clauses 9.2 and 9.3, and the TCI state is selected based on one of the latest reported SSB indexes.

Otherwise, the first SCell in FR2 band is unknown. The requirement for unknown SCell 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 L1-RSRP reporting.

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

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in TS 38.331 [2] for a SCell at the first opportunities for the corresponding actions once the SCell is activated.

The starting point of an interruption window on SpCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot slot n+1+, where NR slot length is with respect to the numerology used in the SCell being activated, and TX is:

- 0, if Tactivation\_time is 3 ms;

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

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

- Tuncertainty\_MAC +TFineTiming, for any scenario where Tactivation\_time includes only TFineTiming and no TFirstSSB\_MAX;

- Tfirst\_TRS, for FR1 inter-band SSB-less SCell activation scenario where Tactivation\_time includes Tfirst\_TRS;

- Tfirst\_ATRS, for FR1 inter-band SSB-less SCell activation scenario where Tactivation\_time includes Tfirst\_ATRS.

The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

The requirements in this clause and requirements on interruption due to SCell activation in clause 8.2 apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of 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 the SCell activation, 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.

8.3.3 SCell Deactivation Delay Requirement for Activated SCell

The requirements in this clause shall apply for the UE configured with at least one downlink SCell in EN-DC, or in standalone NR carrier aggregation or in NE-DC or in NR-DC and when one SCell is being deactivated.

Upon receiving SCell deactivation command in slot *n*, the UE shall accomplish the deactivation actions for the SCell being deactivated no later than in slot *n +*.

Where

TLBCA:

- If the UE supports LBCA via switching and the SCell to be deactivated is an SDL SCell configured with *LBCA-SwitchingPattern*, TLBCA is the UE processing delay for deactivating the *LBCA-SwitchingPattern*.

- Otherwise, TLBCA = 0.

When the SCell to be deactivated is an SDL SCell configured with *LBCA-SwitchingPattern*, the UE shall deactivate the configured *LBCA-SwitchingPattern* no later than at slot .

The starting point of an interruption window on SpCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1+ and not occur after slot n+1+, where NR slot length is with respect to the numerology used in the SCell being deactivated.

Upon expiry of the *sCellDeactivationTimer* in slot *n*, the UE shall accomplish the deactivation actions for the SCell being deactivated no later than in slot *n +*. The starting point of an interruption window on SpCell or any activated SCell, as specified in clause 8.2, shall not occur before slot n+1 and not occur after slot n+1+, where NR slot length is with respect to the numerology used in the SCell being deactivated.

The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

8.3.4 Direct SCell Activation at SCell addition

The requirements in this clause apply for UE being configured in the RRC reconfiguration message, TS 38.331 [2], with one SCell for which the parameter *sCellState* is set to *activated*. If the RRC reconfiguration message for direct SCell activation also configures PSCell addition or PSCell change, the direct SCell activation delay may be longer than the requirements defined in this clause.

The requirements in this clause apply in standalone NR carrier aggregation for direct activation of one SDL SCell configured with *LBCA-SwitchingPattern* in FR1, provided that all SDL SCell reference signals to be measured for SDL SCell activation fully overlap with the SDL SCell active periods in the *LBCA-SwitchingPattern*.

If the RRC reconfiguration message for direct SCell activation also configures TCI state information, the requirements in clause 8.3.2 based on that TCI state activation command is received at the same time as SCell activation command shall apply.

The UE shall configure the SCell in activated state upon successful completion of the RRC reconfiguration procedure within the specified delay. The UE shall be capable to transmit valid CSI report and apply actions for the directly activated SCell no later than in slot ,

where:

- Slot n is the last slot overlapping with the PDSCH containing the RRC reconfiguration message,

- Ndirect = TRRC\_Process + TLBCA +T1 + Tactivation\_time + TCSI\_Reporting - 3 ms for the cases specified in clause 8.3.2 that TCI state is not indicated within Tactivation\_time; otherwise, Ndirect = TRRC\_Process + TLBCA + T1 + THARQ + Tactivation\_time + TCSI\_Reporting

*-* TRRC\_Process: RRC procedure delay as specified in clause 11.2 of TS 36.331 [16] if the corresponding RRC message is embedded in E-UTRA RRC message, otherwise it is the RRC procedure delay defined in clause 12 of TS 38.331 [2],

*-* TLBCA:

- If the UE supports LBCA via switching and the SCell to be activated is an SDL SCell configured with *LBCA-SwitchingPattern*, TLBCA is the UE processing delay for activating the *LBCA-SwitchingPattern*.

- Otherwise, TLBCA = 0.

When the SCell to be activated is an SDL SCell configured with *LBCA-SwitchingPattern*, the UE shall activate the configured *LBCA-SwitchingPattern* no later than at slot .

*-* T1: Delay from slot until the transmission of *RRCReconfigurationComplete* message,

NOTE: *T1* is UE implementation dependent.

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

If the SCell is known and belongs to FR1, *TCSI\_Reporting* is specified in clause 8.3.2 and *Tactivation\_time* is defined as:

- TFirstSSB+ 5 ms, if the measurement period of the SCell being activated is equal to or smaller than 2400 ms.

- TFirstSSB\_MAX + Trs + 5 ms, if measurement period of the SCell being activated is larger than 2400 ms.

where,

the measurement period in table 9.2.5.2-1 applies if the target SCell was in an intra-frequency layer corresponding to an activated SCell;

the measurement period in table 9.2.5.2-3 applies if the target SCell was in an intra-frequency layer corresponding to a deactivated SCell;

the measurement period in table 9.3.5-1 applies if the target SCell was in an inter-frequency layer.

*-* Otherwise, Tactivation\_time and TCSI\_Reporting are specified in clause 8.3.2, where the following definitions of TFirstSSB and TFirstSSB\_MAX shall override the existing ones:

- TFirstSSB: the time to the end of the first complete SSB burst indicated by the SMTC after slot n +

- TFirstSSB\_MAX: the time to the end of the first complete SSB burst indicated by the SMTC after slot n +

- In FR1, in case of intra-band SCell activation, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot; in case of inter-band SCell activation, the first occasion when the SCell being activated is transmitting SSB burst.

- In FR2, the occasion when all active serving cells and SCells being activated or released are transmitting SSB bursts in the same slot.

*-* If a UE supports, *reduceForCellDetection* and/or *reduceForSSB-L1-RSRP-Meas* and/or *shortMeasInterval-r18* capabilities*,* the reduced Tactivation\_time specified in clause 8.3.2 when UE supports these capabilities is applicable for Direct SCell activation at SCell addition also.

In addition to CSI reporting defined above, UE shall also apply other actions related to the activation command specified in TS 38.321 [7] for an SCell at the first opportunities for the corresponding actions once the SCell is activated.

The SCell in FR1 is known provided the following conditions are met for the SCell:

-During the last 5 seconds before the reception of the direct SCell configuration command:

-the UE has sent a valid measurement report for the SCell being directly activated, and

-the SSB measured remains detectable according to the cell identification conditions specified in clauses 9.2 and 9.3,

-the SSB measured during the period equal to [5] seconds also remains detectable during the SCell activation delay according to the cell identification conditions specified in clause 9.2 and 9.3.

Otherwise, the SCell is unknown.

The SCell in FR2 is known provided it meets the corresponding conditions as defined in clause 8.3.2. Otherwise, the SCell is unknown.

The UE may be allowed to cause interruptions to serving cells on other component carriers during an interruption window, as specified in clause 8.2. The starting point of an interruption window on SpCell or any activated SCell shall not occur before slot *n*+1, and shall not occur after slot *n+*1+, where NR slot length is with respect to the numerology of the SCell being activated, and *TX* is:

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

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

- *Tuncertainty\_MAC +TFineTiming*, for any scenario where *Tactivation\_time*includes *TFineTiming*.

The length of the interruption window may be different for different victim cells, and depends on the applicable scenario and on the frequency band relation between the aggressor cell and the victim cell.

Starting from the slot until the UE has completed the direct SCell activation, the UE shall report CQI index = 0 (out of range) if the UE has available uplink resources to report CQI for the SCell.

**End of changes**