**3GPP TSG-RAN WG4 Meeting #** **101-bis-e *R4-2202689***

**Electronic meeting, January 17-25, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.4.0** |  |
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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:***  | Draft Big CR: RRM requirements for Rel-17 further Multi-RAT Dual-Connectivity enhancements |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | LTE\_NR\_DC\_enh2-Core |  | ***Date:*** | 2022-1-26 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | This big CR merge the endorsed draft CR R4-2202690, R4-2202691, R4-2202692, R4-2202694, R4-2202778, R4-2202696, R4-2202699. The reason for change in the endorsed draft CR is copied below.* R4-2202690:Interruption due to A-TRS based fast SCell activation are agreed to be specifed.
* R4-2202691: A-TRS based fast SCell activation delay are agreed to be specified;
* R4-2202692: Interruption due to SCG activation/deactivation are agreed to be specified;
* R4-2202694: Interruption requirements due to RRM measurements on deactivated SCG for NR-DC are agreed to be specified;
* R4-2202778: Interruption requirementds due to RLM/BFD measurement during de-activated PScell are agreed to be specified;
* R4-2202696:The requirements for SCG Activation and deactivation delay are agreed to be introduced;
* R4-2202699: the requirements for Conditional PSCell addition delay are agreed to be specified.
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|  |  |
| ***Summary of change:*** | The following requirements are specified:* R4-2202690:Interruption due to A-TRS based fast SCell activation
* R4-2202691: A-TRS based fast SCell activation delay;
* R4-2202692: Interruption due to SCG activation/deactivation;
* R4-2202694: Interruption requirements due to RRM measurements on deactivated SCG for NR-DC;
* R4-2202778: Interruption requirementds due to RLM/BFD measurement during de-activated PScell;
* R4-2202696:The requirements for SCG Activation and deactivation delay;
* R4-2202699: the requirements for Conditional PSCell addition delay.
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|  |  |
| ***Consequences if not approved:*** | No R17 further Multi-RAT Dual-Connectivity enhancements related RRM requirements. |
|  |  |
| ***Clauses affected:*** | 8.2.1.2.x(new), 8.2.2.2.x(new), 8.2.3.2.x(new), 8.2.4.1, 8.2.4.2.w(new), 8.2.4.2.x(new), 8.2.4.2.y(new), 8.2.4.2.z(new), 8.3.12(new), 8.9A(new), 8.x(new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-3 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of Change 1>

##### 8.2.1.2.x Interruptions at fast SCell activation

The requirements in this clause shall apply for the UE configured with PSCell and one SCell when aperiodic CSI-RS resources is configured for fast SCell activation.

When one SCell in SCG is activated:

- an interruption on any serving cell in SCG:

- of up to X2 slot, if the active serving cell and the SCell being activated are in a FR1 band pair or in a FR1+FR2 band pair.

- of up to X2 slot, if the active serving cells and the SCells being activated are in a FR2 band pair and UE is capable of independent beam management on this FR2 band pair.

or

- of up to Y2 slot +TATRS\_duration if the active serving cells are in the same band as any of the SCells being activated, when

* + SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is larger than [2400ms], or
	+ SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band

Where

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

- X2 and Y2 are specified in Table 8.2.1.2.4-2.

<End of Change 1>

<Start of Change 2>

##### 8.2.2.2.x Interruptions at fast SCell activation

When a SCell is activated and when aperiodic CSI-RS resources is configured for fast SCell activation, the UE is allowed

- an interruption on any active serving cell:

- of up to X2 slot, if the active serving cell and the SCell being activated are in a FR1 band pair or in a FR1+FR2 band pair.

- of up to X2 slot, if the active serving cell and the SCell being activated are in a FR2 band pair and UE is capable of independent beam management on this FR2 band pair.

Where X2 is specified in Table 8.2.2.2.2-1.

or

- of up to Y2 slot +TATRS\_duration, if the active serving cells are in the same band as any of the SCells being activated, when

* + SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is larger than [2400ms], or
	+ SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band

Where

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

- Y2 are specified in Table 8.2.1.2.4-2.

<End of Change 2>

<Start of Change 3>

##### 8.2.3.2.x Interruptions at fast SCell activation

The requirements in this clause shall apply for the UE configured with E-UTRA PSCell and one SCell when aperiodic CSI-RS resources is configured for fast SCell activation.

When one SCell in MCG is activated:

- the UE is allowed an interruption on any serving cell in MCG:

- of up to X2 slots, if the active serving cell is not in the same band as any of the SCells being activated, or

- of up to Y2 slots + TATRS\_duration if the active serving cells are in the same band as any of the SCells being activated, when

* + SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is larger than [2400ms], or
	+ SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band

Where

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

- X2 and Y2 are specified in Table 8.2.3.2.4-2.

<End of Change 3>

<Start of Change 4>

#### 8.2.4.1 Introduction

This clause contains the requirements related to the interruptions on PCell, PSCell and activated SCell if configured, when

 up to 1 SCell in FR1 and up to 7 SCell(s) in FR2 are configured, deconfigured, activated or deactivated or,

 a supplementary UL carrier or an UL carrier is configured or de-configured, or

 measurements on SCC with deactivated SCell in NR SCG, or

 measurements on the deactivated PSCell in NR SCG, or

 UL/DL BWP is switched on PCell, PSCell or SCell.

 transitions between active and non-active during DRX, or

 transitions from non-DRX to DRX, or

 CGI reading of an NR neighbour cell with autonomous gaps, or

 CGI reading of an E-UTRA neighbour cell with autonomous gaps.

 NR SRS carrier based switching,

RLM/BFD Measurement on deactivatd NR PSCell

Note: interruptions at SCell addition/release, activation/deactivation and during measurements on SCC may not be required by all UEs.

The interruptions shall not interrupt RRC signalling or ACK/NACKs related to RRC reconfiguration procedure [2] for SCell addition/release or MAC control signalling [17] for SCell activation/deactivation command.

The requirements shall apply for NR-DC with an NR PCell, PSCell or SCell.

For a UE which does not support per-FR measurement gap, interruptions to the PCell and activated SCell may be caused by SCells on any frequency range. For a UE which supports per-FR gaps, interruptions to PCell, PSCell and activated SCell may be caused by SCells on the same frequency range as the victim cell.

<End of Change 4>

<Start of Change 5>

##### 8.2.4.2.w Interruptions at SCell activation

When a SCell is activated or deactivated as defined in TS 37.340 [17] and aperiodic CSI-RS resources is configured for fast SCell activation, the UE is allowed

- an interruption on any active serving cell:

- of up to the duration shown in table 8.2.4.2.2-1, if the active serving cell is not in the same band as the SCell being activated, where the requriements for Sync apply for synchronous NR-DC, and for asynchronous NR-DC if the active serving cell is in the same CG as the SCell being activated, and the requriements for Async apply for asynchronous NR-DC if the active serving cell is not in the same CG as the SCell being activated, or

- of up to Y2 slots + TATRS\_duration if the active serving cells are in the same band as the SCell being activated, when

* + SCell to be activated is known and belongs to FR1, if the measurement period of the SCell being activated is larger than [2400ms], or
	+ SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band

Where

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

- Y2 are specified in Table 8.2.3.2.4-2.

<End of Change 5>

<Start of Change 6>

##### 8.2.4.2.x Interruptions at SCG activation/deactivation

When SCG is activated or deactivated using an *RRCConnectionReconfiguration* message as defined in TS 38.331 [2], the UE is allowed an interruption on any activated serving cell in MCG during the RRC reconfiguration procedure as follows:

- an interruption on any active serving cell in MCG:

- of up to the duration shown in table 8.2.4.2.x-1, if the active serving cell is not in the same band as any of the PSCell or SCells being activated or deactivated, where the requriements for Sync apply for synchronous NR-DC, and for asynchronous NR-DC if the active serving cell is in the same CG as all of the PSCell and SCells being added or released. The requriements for Async apply for asynchronous NR-DC if the active serving cell is not in the same CG as any of the PSCell or SCells being added or released, or

Table 8.2.4.2.x-1: Interruption duration for SCG activation/deactivation for inter-band DC/CA

|  |  |  |
| --- | --- | --- |
|  | NR Slot length (ms)  | Interruption length (slots) |
|  | of victim cell | Sync | Async |
| 0 | 1 | TBD | TBD |
| 1 | 0.5 | TBD | TBD |
| 2 | 0.25 | Both aggressor cell and victim cell are on FR2 | TBD | TBD |
|  |  | Either aggressor cell or victim cell is on FR1 | TBD |  |
| 3 | 0.125 | Aggressor cell is on FR2 | TBD | TBD |
|  |  | Aggressor cell is on FR1 | TBD |  |

<End of Change 6>

<Start of Change 7>

##### 8.2.4.2.y Interruptions due to RRM measurements on deactivated SCG

Interruptions on PCell or activated SCell(s) due to measurements on the deactivated PSCell are allowed with up to [TBD] probability of missed ACK/NACK feadback.

*Editor’s Note: whether the interruptions caused by measurements on deactivated PSCell follows SCell dormancy or deactivated SCC is FFS; whether to differentiate cases between either RLM/BM is configured on the deactivated PSCell or not is FFS; the rate of the ACK/NACK feedback loss is FFS in any of the mentioned cases.*

Interruptions on PCell or activated SCell(s) due to measurements on the deactivated SCell(s) other than PSCell within the deactivated SCG shall meet requirements in clause 8.2.2.2.3.

<End of Change 7>

<Start of Change 8>

##### 8.2.4.2.z Interruptions during RLM/BFD measurements on deactivated PScell

When NR PScell is deactivated, the UE is for the purpose RLM/BFD measurements on the deactivated PSCell allowed to cause interruptions to activated serving cell(s) which can either be Pcell or Scell in MCG.

The rate of ACK/NACK feedback loss on any activated serving cell resulting from RLM/BFD measurements on deactivated PSCell shall not exceed 0.5%.

<End of Change 8>

<Start of Change 9>

### 8.3.12 Fast SCell Activation Delay Requirement for Deactivated SCell

Aperiodic CSI-RS resources can be configured for fast SCell activation. The requirements in this clause shall apply for the UE configured with 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 shall apply for the UE provided with aperiodic CSI-RS resources for SCell activation for the target SCell.

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 $n+\frac{T\_{HARQ}+T\_{activation\\_time}+T\_{CSI\\_Reporting}}{NR slot length}$ , where:

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

 Tactivation\_time is the SCell activation delay in millisecond.

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

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

- TFirstATRS + Tgap + TATRS + 5ms, if the measurement period of the SCell being activated is larger than [2400ms].

- The RSs on the all activated serving cell in the same band are not required to be transmitted in the same slot as the temporary RS.

- UE may report inaccurate non-zero CQI for the being-activated SCell during the SCell activation procedure only if the RSs on the other activated serving cell in the same band are not transmitted in the same slot as the aperiodic CSI-RS for SCell activation.

If the SCell is unknown and belongs to FR1, and SCell is contiguous to an active serving cell in the same band, provided that the side condition Ês/Iot ≥ -2dB is fulfilled, Tactivation\_time is:

- TFirstATRS + Tgap + TATRS + 5ms, 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 260ns 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 6dB;

- The RSs on the all activated serving cell in the same band are not required to be transmitted in the same slot as the temporary RS.

- UE may report inaccurate non-zero CQI for the being-activated SCell during the SCell activation procedure only if the RSs on the other activated serving cell in the same band are not transmitted in the same slot as the aperiodic CSI-RS for SCell activation.

 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 TFirstATRS+ 5ms provided:

- The UE is provided with aperiodic CSI-RS resources for SCell activation 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,

- The parameter *ssb-PositionsInBurst* is same for the serving cell(s) and the SCell.

- 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 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:

- [TBD]

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

- [TBD]

 where,

[TFirstATRS: is the time to the end of the first complete CSI-RS burst for SCell activation after slot n + $\frac{T\_{HARQ}+3ms}{NR slot length}$, 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, where one CSI-RS burst is defined as four CSI-RS resources in two consecutive slots.

 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].]

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 4s for UE supporting power class 1/5 and 3s 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

- 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.

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+$\frac{T\_{HARQ}}{NR slot length}$ and not occur after slot slot n+1+$\frac{T\_{HARQ}+3ms+T\_{X}}{NR slot length}$, where NR slot length is with respect to the numerology used in the SCell being activated, and TX is:

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

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 requriements on interruption due to SCell activation in clause 8.x apply provided that the SSB and A-TRS 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.

<End of Change 9>

<Start of Change 10>

## 8.9A Conditional PSCell Addition Delay

### 8.9A.1 Introduction

This clause defines requirements for the delay within which the UE shall be able to perform conditional PSCell addition in EN-DC or NR-DC. The requirements in this clause are applicable to EN-DC and NR-DC.

### 8.9A.2 Conditional PSCell Addition Delay Requirement

The requirements in this clause shall apply for the UE configured with only PCell in FR1.

Upon receiving conditional PSCell addition in subframe *n*, the UE shall be capable to transmit PRACH preamble towards PSCell no later than in subframe *n* + Tconfig\_PSCell\_Addition\_Conditional:

Where:

 Tconfig\_PSCell\_Addition\_Conditional = TRRC\_delay + TEvent\_DU + Tmeasure + TUE\_preparation + Tprocessing + T∆ + TPSCell\_ DU + 2 ms

 TRRC\_delay is the RRC procedure delay defined in clause 12 in TS 38.331 [2] for processing the conditional PSCell addition command.

 TEvent\_DU is the delay uncertainty which is the time from when the UE successfully decodes a conditional PSCell addition command until a condition exists at the measurement reference point which will trigger the conditional PSCell addition.

 Tmeasure is the measurements time stated in clause 8.9A.2.1.

 TUE\_preparation is the UE preparation time for conditional PSCell addition, and starts after UE realizes the condition of PSCell addition is met and identity of the PSCell is determined. TUE\_preparation is up to 10 ms.

 Tprocessing is the SW processing time needed by UE, including RF warm up period. Tprocessing = 20 ms when PSCell is in FR1, and Tprocessing = 40 ms when PSCell is in FR2.

 T∆ is time for fine time tracking and acquiring full timing information of the target cell. T∆ = 1\*Trs ms.

 TPSCell\_ DU is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell. TPSCell\_ DU is up to the summation of SSB to PRACH occasion association period and 10 ms. SSB to PRACH occasion associated period is defined in Table 8.1-1 of TS 38.213 [3].

 Trs is the SMTC periodicity of the target cell if the UE has been provided with an SMTC configuration for the target cell in PSCell addition message, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs = 5 ms assuming the SSB transmission periodicity is 5 ms. There is no requirement if the SSB transmission periodicity is not 5 ms.

The PCell interruption specified in clause 8.2 is allowed only after the UE starts to execute a conditional PSCell addition.

#### 8.9A.2.1 Measurement time

The measurement time delay is defined from the end of TEvent\_DU until UE executes a PSCell addition and interruption time starts.

The measurement time delay measured without Time To Trigger (TTT) and L3 filtering shall be less than Tidentify\_inter\_without\_index or Tidentify\_inter\_with\_index defined in clause 9.3.4. When TTT or L3 filtering is used an additional delay can be expected.

A cell is detectable only if at least one SSB measured from the cell being configured remains detectable during the time period Tidentify\_inter\_without\_index or Tidentify\_inter\_with\_index for PSCell addition. If a cell, which has been detectable at least for the time period Tidentify\_inter\_without\_index or Tidentify\_inter\_with\_index for PSCell addition, becomes undetectable for a period and then the cell becomes detectable again and triggers a PSCell addition, the measurement time delay shall be less than TSSB\_measurement\_period\_inter provided the timing to that cell has not changed more than ± 3200/$2^{µ}$ Tc while the measurement gap has not been available and the L3 filter has not been used, where *µ* is the SCS configuration as defined in clause 4.2 of TS 38.211 [3]. When L3 filtering is used, an additional delay can be expected.

<End of Change 10>

<Start of Change 11>

## 8.x SCG Activation and Deactivation Delay

### **8.x.1 Introduction**

This clause defines requirements for the delay within which the UE shall be able to activate one SCG and deactivate on SCG.

The requirements shall apply for NR-DC with an NR PCell, PSCell or SCell..

### **8.x.2 SCG Activation Delay Requirement**

The requirements in this clause shall apply for the UE configured with one deactivated SCG in NR-DC and when PScell in one SCG is being activated.

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

Upon receiving SCG activation command in slot *n*, the UE shall be capable to transmit PRACH preamble or PUCCH towards PSCell no later than in slot $n+\frac{T\_{activation\\_time}}{NR slot length}$ ,

where:

 Tactivation\_time = TRRC\_delay + Tprocessing + Tsearch + T∆ + TIU + 2 ms

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

 Tprocessing : FFS.

Tsearch is the time for AGC settling and PSS/SSS detection. For NR PSCell in FR1 or FR2, if the target cell is a known cell, Tsearch = 0 ms; If the PSCell is an unknown FR1 cell and the PSCell Es/Iot ≥ -2 dB, then Tsearch = 3\* Trs ms. If the PSCell is an unknown FR2 cell and the target PSCell Es/Iot ≥ -2 dB, then Tsearch = 24\* Trs ms. [FFS Tsearch apply when UE is configured with RACH-less SCG.]

 T∆: FFS

 TIU is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell when RACH based PSCell activation is configured, or TIU is the uncertainty in acquiring the first PUSCH transmission occasion /[SR on PUCCH] when UE is configured with RACH-less SCG. TIU is up to the summation of SSB to PRACH or PUCCH occasion association period and 10 ms. SSB to PRACH or PUCCH occasion associated period is defined in Table 8.1-1 of TS 38.213 [3].

Trs is the SMTC periodicity of the PSCell if the UE has been provided with an SMTC configuration for the target cell in PSCell addition message, otherwise Trs is the SMTC configured in the measObjectNR having the same SSB frequency and subcarrier spacing. If the UE is not provided SMTC configuration or measurement object on this frequency, the requirement in this clause is applied with Trs = 5 ms assuming the SSB transmission periodicity is 5 ms. There is no requirement if the SSB transmission periodicity is not 5

In FR1 and FR2, the PSCell is known if it has been meeting the following conditions:

- During the last 5 seconds before the reception of the SCG activation command:

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

- One of the SSBs measured from the PSCell being activated remains detectable according to the cell identification conditions specified in clause 9.3.

- One of the SSBs measured from PSCell being activated also remains detectable during the PSCell configuration delay Tconfig\_PSCell according to the cell identification conditions specified in clause 9.3.

otherwise it is unknown.

The PCell interruption specified in clause 8.2 is allowed only during the RRC reconfiguration procedure [2].

### **8.x.2 SCG Deactivation Delay Requirement**

The requirements in this clause shall apply for a UE which is configured with at least PCell and PScell.

Upon receiving RRC-based SCG deactivation command in subframe *n*, the UE shall accomplish the deactivationactions specified in TS 38.331 [2] no later than in slot $n+\frac{T\_{RRC\\_delay}}{NR slot length}$:

where

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

The PCell interruption specified in clause 8.2 is allowed only during the RRC reconfiguration procedure [2].

FFS: MAC CE based SCG deactivation delay requirements.

<End of Change 11>