**3GPP TSG-RAN WG4 Meeting #** **102-e *R4-2207126***

**Electronic meeting, February 21 – March 3, 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.133** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.4.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | Big CR: RRM requirements for Rel-17 Further Multi-RAT Dual-Connectivity enhancements (TS 36.133) |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | LTE\_NR\_DC\_enh2-Core |  | ***Date:*** | 2022-3-7 |
|  |  |  |  |  |
| ***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 draft CRs endorsed in RAN4#101-bis-e and RAN4#102-e meetings. The reasons for change in the endorsed draft CR are copied below.* R4-2202693/ R4-2207010: Interruption due to SCG activation/deactivation are agreed to be specifed.
* R4-2202697/ R4-2207012: The requirements for SCG Activation and deactivation delay are agreed to be specified;
 |
|  |  |
| ***Summary of change:*** | The following requirements are specified:* Interruption due to SCG activation/deactivation;
* The requirements for SCG Activation and deactivation delay.
 |
|  |  |
| ***Consequences if not approved:*** | No R17 further Multi-RAT Dual-Connectivity enhancements related RRM requirements. |
|  |  |
| ***Clauses affected:*** | 7.32.2.17(new), 7.x(new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 36.521-3 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of Change 1>

#### 7.32.2.17 Interruptions at SCG activation/deactivation

The UE is allowed an interruption of up to X1 subframes (synchronous EN-DC) or X1+1 subframes (asynchronous EN-DC) on PCell and activated SCells in MCG if configured during the RRC reconfiguration procedure of SCG activation/deactivation in intraband EN-DC. This interruption is for both uplink and downlink of PCell and the activated SCells. For PSCell activation X1 is equal to TBD. For PSCell deactivation X1 is equal to TBD. The interruption is based on assumption that the cell specific reference signals from both cells are available in the same slot.

The UE is allowed an interruption of up to TBD on PCell and activated SCells in MCG if configured during the RRC reconfiguration procedure of SCG deactivation in interband EN-DC. This interruption is for both uplink and downlink of PCell and activated SCells.

<End of Change 1>

<Start of Change 2>

## 7.x SCG Activation and Deactivation Delay

### **7.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 in EN-DC. The requirements are applicable to an E-UTRA-FDD – NR and E-UTRA-TDD – NR dual connectivity capable UE.

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

The requirements in this clause shall apply for the UE configured with one deactivated SCG in EN-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 is the SW processing time needed by UE, including RF warm up period. When PSCell is activated from deactivated state, if any PSCell parameter is modified, Tprocessing = [20ms]. Otherwise, Tprocessing = [5 or 10ms].

 Tsearch is the time for AGC settling and PSS/SSS detection.

For RACH based PSCell activation, if the target cell is a known NR FR1 or FR2 PScell, Tsearch = 0 ms. If the target cell is an unknown FR1 PScell and Es/Iot ≥ -2 dB, Tsearch = 3\* Trs ms. If the target cell is an unknown FR2 PScell and Es/Iot ≥ -2 dB, then Tsearch = 24\* Trs ms.

For RACH-less based PSCell activation, if RLM and BFD are configured and no failure is detected, Tsearch = 0 ms if the target cell is a known FR2 PScell. There are no requirements if PSCell is unknown.

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

 TIU: When RACH based PSCell activation is configured, it is the delay uncertainty in acquiring the first available PRACH occasion in the PSCell. TIU 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].

When RACH-less based PSCell activation is configured, it is the uncertainty in acquiring the first PUSCH transmission occasion [or SR on PUCCH]. TIU is up to the summation of SSB to PUSCH [or PUCCH] occasion association period and 10 ms. SSB to PUSCH [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 activation 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].

### **7.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 SCG deactivation command in subframe n, the UE shall accomplish the deactivation actions 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 2>