**3GPP TSG-RAN WG4 Meeting #95-e R4-2006563**

**Electronic Meeting, 25 May – 5 June, 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **38.133** | **CR** | 0676 | **rev** | **-** | **Current version:** | **16.3.0** |  |
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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:***  | CR to TS 38.133: RRC re-establishment with CCA |
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| ***Source to WG:*** | Intel  |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_unlic-Core |  | ***Date:*** | 5/15/2020 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | Introduction of RRC re-establishment requirements to NR-U. |
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| ***Summary of change:*** | The CR introduces a new clause, 6.2.1A, to capture agreements made at previous meetings.  |
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| ***Consequences if not approved:*** | The specification is incomplete.  |
|  |  |
| ***Clauses affected:*** | 6.2.1 and 6.2.1A |
|  |  |
|  | **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:*** |  |

<Start of Change 1>

### 6.2.1 SA: RRC Re-establishment

#### 6.2.1.1 Introduction

This clause contains requirements on the UE regarding RRC connection re-establishment procedure. RRC connection re-establishment is initiated when a UE in RRC\_CONNECTED state on the carrier w/o CCA and the carrier with CCA loses RRC connection due to any of failure cases, including radio link failure, handover failure, and RRC connection reconfiguration failure. The RRC connection re-establishment procedure is specified in clause 5.3.7 of TS 38.331 [2].

The requirements in this clause are applicable for RRC connection re-establishment to NR cell.

<End of Change 1>

<Start of Change 2>

### 6.2.1A RRC Re-establishment with CCA

#### 6.2.1A.1 Introduction

This clause contains requirements on the UE regarding RRC connection re-establishment procedure on the carrier with CCA. RRC connection re-establishment on the carrier with CCA is initiated when a UE in RRC\_CONNECTED state on the carrier w/o or with CCA loses RRC connection due to any of failure cases, including radio link failure, handover failure, and RRC connection reconfiguration failure. The RRC connection re-establishment procedure is specified in clause 5.3.7 of TS 38.331 [2].

The requirements in this clause are applicable for RRC connection re-establishment to NR cell on the carrier with CCA.

#### 6.2.1A.2 Requirements

In RRC\_CONNECTED state on the carrier with CCA the UE shall be capable of sending *RRCReestablishmentRequest* message within Tre-establish\_delay\_CCA seconds from the moment it detects a loss in RRC connection. The total RRC connection delay (Tre-establish\_delay\_CCA) shall be less than:

TUL\_grant: It is the time required to acquire and process uplink grant from the target PCell with CCA. The uplink grant is required to transmit *RRCReestablishmentRequest* message.

The UE re-establishment delay (TUE\_re-establish\_delay\_CCA) is specified in clause 6.2.1A.2.1.

##### 6.2.1A.2.1 UE Re-establishment with CCA delay requirement

The UE re-establishment on the carrier with CCA delay (TUE\_re-establish\_delay\_CCA) is the time between the moments when any of the conditions requiring RRC re-establishment on the carrier with CCA as defined in clause 5.3.7 in TS 38.331 [2] is detected by the UE and when the UE sends PRACH to the target PCell on the carrier with CCA . The UE re-establishment on the carrier with CCA delay (TUE\_re-establish\_delay\_CCA) requirement shall be less than:

The intra-frequency target NR cell with CCA shall be considered detectable if each relevant SSB can satisfy that:

- SS-RSRP related side conditions given in clause 10.1.2 are fulfilled for a corresponding NR Band for FR1, and

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.3 for a corresponding NR Band are fulfilled.

The inter-frequency target NR cell on the carrier with CCA shall be considered detectable when for each relevant SSB:

- SS-RSRP related side conditions given in clause 10.1.4 are fulfilled for a corresponding NR Band for FR1, and

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.2 for a corresponding NR Band are fulfilled.

Tidentify\_intra\_NR\_CCA: It is the time to identify the target intra-frequency NR cell on the carrier with CCA and it depends on whether the target NR cell on the carrier with CCA is known cell or unknown cell and on the frequency range (FR) of the target NR cell on the carrier with CCA . If the UE is not configured with intra-frequency NR carrier with CCA for RRC re-establishment then Tidentify\_intra\_NR\_CCA=0; otherwise Tidentify\_intra\_NR\_CCA shall not exceed the values defined in Table 6.2.1A.2.1-1.

Tidentify\_inter\_NR\_CCA,i: It is the time to identify the target inter-frequency NR cell on the carrier with CCA on inter-frequency carrier *i* configured for RRC re-establishment and it depends on whether the target NR cell on the carrier with CCA is known cell or unknown cell and on the frequency range (FR) of the target NR cell wtihc CCA . Tidentify\_inter\_NR\_CCA,i shall not exceed the values defined in Table 6.2.1A.2.1-2.

TSMTC: It is the periodicity of the SMTC occasion configured for the intra-frequency carrier. If the UE has been provided with higher layer in TS 38.331 [2] signaling of *smtc2*, Tsmtc follows *smtc1* or *smtc2* according to the physical cell ID of the target cell.

TSMTC,i: It is the periodicity of the SMTC occasion configured for the inter-frequency carrier *i*. If it is not configured, the UE may assume that the target SSB periodicity is no larger than 20 ms.

TSI-NR\_CCA: It is the time required for receiving all the relevant system information according to the reception procedure and the RRC procedure delay of system information blocks defined in TS 38.331 [2] for the target NR cell on the carrier with CCA .

*Editor’s note: The actual value for TSI-NR\_CCA is to be discussed in the performance part, considering LBT failures and receiver assumptions, etc.*

TPRACH\_CCA: It is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell on the carrier with CCA , which can up to (1+K3)\*TPRACH . K3 is the number of PRACH occasions that are unavailable for PRACH transmission due to UL LBT failure. K3 = 0 for Type 2C channel access procedure as defined in TS 37.213. TPRACH is defined in 6.2.1.2.1 of TS38.133.

Nfreq: It is the total number of NR frequencies to be monitored for RRC re-establishment; Nfreq = 1 if the target intra-frequency NR cell on the carrier with CCA is known, else Nfreq = 2 and Tidentify\_intra\_NR\_CCA = 0 if the target inter-frequency NR cell on the carrier with CCA is known.

There is no requirement if the target cell on the carrier with CCA does not contain the UE context.

In the requirement defined in the below tables, the target FR1 cell on the carrier with CCA is known if it has been meeting the relevant cell identification requirement during the last 8 seconds otherwise it is unknown.

Table 6.2.1A.2.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell with CCA

|  |  |  |
| --- | --- | --- |
| Serving cell SSB Ês/Iot (dB) | Frequency range (FR) of target NR cell | Tidentify\_intra\_NR\_CCA [ms] |
| Known NR cell | Unknown NR cell |
| ≥ -8 | FR1 | MAX (200 ms, (5+K1) x TSMTC) | MAX (800 ms, (10+ K1) x TSMTC) |
| < -8 | FR1 | N/A | (800+TBD x K1)Note1 |
| Note 1: The UE is not required to successfullyidentify a cell on the carrier with CCA on any NR frequency layer when TSMTC > 20 ms and serving cell SSB Ês/Iot < -8 dB.Note 2: K1 is the number of SMTC occasions not available at the UE during RRC re-establishment period on the carrier with CCA, |

Table 6.2.1A.2.1-2: Time to identify target NR cell for RRC connection re-establishment to NR inter-frequency cell on the carrier with CCA

|  |  |  |
| --- | --- | --- |
| Serving cell SSB Ês/Iot (dB) | Frequency range (FR) of target NR cell | Tidentify\_inter\_NR\_CCA, i [ms] |
| Known NR cell | Unknown NR cell |
| ≥ -8 | FR1 | MAX (200 ms, ([6]+K2,i) x TSMTC, i) | MAX (800 ms, ([13]+K2,i) x TSMTC, i) |
| < -8 | FR1 | N/A | (800+TBD \* K2,i) Note1 |
| Note 1: The UE is not required to successfully identify a cell with CCA on any NR frequency layer when TSMTC,i > 20 ms and serving cell SSB Ês/Iot < -8 dB.Note 2: K2,i is the number of SMTC occasions not available at the UE during RRC re-establishment period on the “i” th carrier with CCA, |

<End of Change 2>