**3GPP TSG-RAN4 Meeting #116 *R4-2510663***

**Bengaluru, India, 25 – 29 August, 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **38.133** | **CR** | xxxx | **rev** | - | **Current version:** | **19.1.0** |  |
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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 RRC re-establishement requirements for Rel-19 NTN |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_NTN\_Ph3-Core |  | ***Date:*** | 2025-08-05 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-19 |
|  | *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:*** | According to CR work split in WF R4-2508288, RRC re-establishement requirements need to be updated for SSB periodicity extension in R19 NTN. |
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| ***Summary of change:*** | Update RRC re-establishement requirements for SSB periodicity extension in R19 NTN. |
|  |  |
| ***Consequences if not approved:*** | Essential requirements for SSB periodicity extension in R19 NTN are missing. |
|  |  |
| ***Clauses affected:*** | 6.2C.1 |
|  |  |
|  | **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>

6.2C.1 SA: RRC Re-establishment for Satellite Access

6.2C.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 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, which is served by satellite access node (SAN).

6.2C.1.2 Requirements

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

$$T\_{re-establish\\_delay}=T\_{UE\\_re-establish\\_delay}+T\_{UL\\_grant}$$

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

The UE re-establishment delay (TUE\_re-establish\_delay) is specified in clause 6.2C.1.2.1.

6.2C.1.2.1 UE Re-establishment delay requirement

The UE re-establishment delay (TUE\_re-establish\_delay) is the time between the moments when any of the conditions requiring RRC re-establishment 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. The UE re-establishment delay (TUE\_re-establish\_delay) requirement shall be less than:

$$T\_{UE\\_re-establish\\_delay}=50 ms+T\_{identify\\_intra\\_NR}+\sum\_{i=1}^{N\_{freq}-1}T\_{identify\\_inter\\_NR,i}+T\_{SI-NR}+T\_{PRACH}$$

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

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

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.17 for a corresponding NR Band are fulfilled.

The inter-frequency target NR cell shall be considered detectable when for each relevant SSB:

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

- the conditions of SSB\_RP and SSB Ês/Iot according to Annex B.2.18 for a corresponding NR Band are fulfilled.

Tidentify\_intra\_NR: It is the time to identify the target intra-frequency NR cell and it depends on whether the target NR cell is known cell or unknown cell. If the UE is not configured with intra-frequency NR carrier for RRC re-establishment then Tidentify\_intra\_NR=0; otherwise Tidentify\_intra\_NR shall not exceed the values defined in table 6.2C.1.2.1-1 for UE that does not support 160 ms SSB periodicity assumed during initial access, and in table 6.2C.1.2.1-1a for UE that supports 160 ms SSB periodicity assumed during initial access.

Tidentify\_inter\_NR,i: It is the time to identify the target inter-frequency NR cell on inter-frequency carrier *i* configured for RRC re-establishment and it depends on whether the target NR cell is known cell or unknown cell. Tidentify\_inter\_NR,i shall not exceed the values defined in table 6.2C.1.2.1-2 for UE that does not support 160 ms SSB periodicity assumed during initial access, and in table 6.2C.1.2.1-2a for UE that supports 160 ms SSB periodicity assumed during initial access.

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] signalling 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: 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.

TPRACH: It is the delay uncertainty in acquiring the first available PRACH occasion in the target NR cell. TPRACH can be 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].

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 is known, else Nfreq = 2 and Tidentify\_intra\_NR = 0 if the target inter-frequency NR cell is known.’

Tsearch: It is the periodicity with which UE searches for the intra-frequency carrier. Tsearch equals to the periodicity of the SMTC occasion if single SMTC periodicity is configured, and equals to the maximum of the periodicities of the SMTC occasions if multiple SMTC periodicities are configured.

Tsearch,i: It is the periodicity with which UE searches for inter-frequency carrier *i*. Tsearch,i equals to the periodicity of the SMTC occasion if single SMTC periodicity is configured, and equals to the maximum of the periodicities of the SMTC occasions if multiple SMTC periodicities are configured. If no SMTC is configured for inter-frequency carrier *i*, Tsearch,i equals to 160ms.

There is no requirement if the target cell does not contain the UE context.

In the requirement defined in the below tables, the target FR1 cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown.

The requirements in this clause apply provided that the ephemeris information provided by the serving cell for the target cell is valid during UE re-establishment delay (TUE\_re-establish\_delay).

**Table 6.2C.1.2.1-1: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell**

|  |  |  |
| --- | --- | --- |
| **Serving cell**  | **FR of target NR**  | **Tidentify\_intra\_NR [ms]** |
| **SSB Ês/Iot (dB)** | **cell** | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR1 | MAX (200 ms, 5 x TSMTC) | Kmulti\_SMTC \* MAX (800 ms, 10 x TSMTC) |
| < -8 | FR1 | N/A | k \* 800 ms Note1, 3 |
| NOTE 1: The UE is not required to successfullyidentify a cell on any NR frequency layer when TSMTC > 20 ms and serving cell SSB Ês/Iot < -8 dB.NOTE 2: Kmulti\_SMTC is defined in clause 9.2C.5.1.NOTE 3: k = 1 if the cells on the target frequency are served by GEO. k = (N+1) if the cells on the target frequency are served by LEO, where N is the number of different satellites associated to the list of configured neighbour cells in ntn-NeighCellConfigList and ntn-NeighCellConfigListExt. |

**Table 6.2C.1.2.1-1a: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell**

|  |  |  |
| --- | --- | --- |
| **Serving cell** **SSB Ês/Iot (dB)**  | **FR of target NR**  | **Tidentify\_intra\_NR [ms]** |
| **cell** | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR1 | MAX (200 ms, 5 x TSMTC) | Kmulti\_SMTC \* MAX (800 ms, 10 x TSMTC) |
| < -8 | FR1 | N/A | k \* MAX(800 ms, 22 x Tsearch) Note2 |
| NOTE 1: Kmulti\_SMTC is defined in clause 9.2C.5.1.NOTE 2: k = 1 if the cells on the target frequency are served by GEO. k = (N+1) if the cells on the target frequency are served by LEO, where N is the number of different satellites associated to the list of configured neighbour cells in ntn-NeighCellConfigList and ntn-NeighCellConfigListExt. |

**Table 6.2C.1.2.1-2: Time to identify target NR cell for RRC connection re-establishment to NR inter-frequency cell**

|  |  |  |
| --- | --- | --- |
| **Serving cell SSB Ês/Iot (dB)** | **FR of target NR cell** | **Tidentify\_inter\_NR, i [ms]** |
|  |  | **Known NR cell** | **Unknown NR cell** |
| ≥ -8 | FR1 | MAX (200 ms, 6 x TSMTC, i) | K\_satellite \* MAX (800 ms, 13 x TSMTC, i) |
| < -8 | FR1 | N/A | k \* 800 ms Note1, 3 |
| NOTE 1: The UE is not required to successfully identify a cell on any NR frequency layer when TSMTC,i > 20 ms and serving cell SSB Ês/Iot < -8 dB.NOTE 2: K\_satellite is defined in clause 9.3C.4.NOTE 3: k = 1 if the cells on the target frequency are served by GEO. k = (N+1) if the cells on the target frequency are served by LEO, where N is the number of different satellites associated to the list of configured neighbour cells in ntn-NeighCellConfigList and ntn-NeighCellConfigListExt. |

**Table 6.2C.1.2.1-2a: Time to identify target NR cell for RRC connection re-establishment to NR intra-frequency cell**

|  |  |  |
| --- | --- | --- |
| **Serving cell** **SSB Ês/Iot (dB) and SMTC configuration** | **FR of target NR cell** | **Tidentify\_inter\_NR, i [ms]** |
| **Known NR cell** | **Unknown NR cell** |
| ≥ -8 and SMTC is configured | FR1 | MAX (200 ms, 6 x TSMTC, i) | K\_satellite \* MAX (800 ms, 13 x TSMTC, i) |
| < -8 or SMTC is not configured | FR1 | N/A | k \* MAX(800 ms, 22 x Tsearch,i) Note2 |
| NOTE 1: K\_satellite is defined in clause 9.3C.4.NOTE 2: k = 1 if the cells on the target frequency are served by GEO. k = (N+1) if the cells on the target frequency are served by LEO, where N is the number of different satellites associated to the list of configured neighbour cells in ntn-NeighCellConfigList and ntn-NeighCellConfigListExt. |

6.2C.1.2.2 UE Re-establishment delay requirement for VSAT

The requirements in this clause are applicable to both intra-frequency and inter-frequency RRC Re-establishment.

The requirements in this clause are not applicable for VSAT indicating ‘mechanical’ via *ntn-VSAT-AntennaType-r18*, if the RRC Re-establishment is initiated due to failure in handover to a different satellite than the satellite which serves the source serving cell.

The requirements in clause 6.2C.1.2.1 shall apply, provided that the serving cell and the target cell are served by the same satellite, and UE is not configured to measure a different satellite for RRC Re-establishment.

<End of Change 1>