**3GPP T****SG-RAN WG2 Meeting #126 draft R2-2406094**

**Fukuoka, Japan, May 20th – 24th, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **36.306** | **CR** | **1889** | **rev** | **1** | **Current version:** | **18.1.0** |  |
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| *For* [***HELP***](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 | **X** | Core Network |  |

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| ***Title:***  | Miscellaneous corrections for IoT NTN capabilities |
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| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | IoT\_NTN\_enh-Core |  | ***Date:*** | 2024-06-06 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *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:*** | To capture the agreements from RAN2#125bis:* change “fixed cell” and “moving cell” to “quasi-Earth fixed cell” and “Earth moving cell” respectively.
* Support location-based measurement initiation for earth fixed cell in TS 36.304 (in addition to quasi-earth fixed cell).

To capture the agreement from RAN2#126:* We modify the field description in 36.306 to indicate that if the feature (HARQ / GNSS enhancements) is supported, support for GSO is mandatory with capability signalling (IODT bit).

Note that the existing *ntn-ScenarioSupport-r17* is to differentiate the support of NTN features in GSO and NGSO. The *ntn-HarqEnhScenarioSupport-r18* and *ntn-GNSS-EnhScenarioSupport-r18* are to differentiate the support of Rel-18 HARQ and GNSS enhancements in GSO and NGSO scenarios. The field ntn-GNSS-EnhScenarioSupport-r18 is used to also indicate “UL transmission extension” enhancements in addition to GNSS measurement enhancements. However, “UL transmission extension” is missing in the field description.Other minor editorial corrections. |
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| ***Summary of change:*** | * “fixed cell” is changed to “(quasi-)earth fixed cell”.
* Update the field description of *ntn-HarqEnhScenarioSupport-r18* that it is mandatory with capability signalling in GSO scenario.
* Update the field description of *ntn-GNSS-EnhScenarioSupport-r18* that it is mandatory with capability signalling in GSO scenario. Also add “UL transmission extension”.
* Other minor editorial corrections.

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| ***Consequences if not approved:*** | New agreements on UE capabilities for Rel-18 IoT NTN features will not be captured.  |
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| ***Clauses affected:*** | 4.3.38.8, 4.3.38.11, 4.3.38.30, 4.3.38.34, 4.3.38.36, 6.19.6  |
|  |  |
|  | **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:*** | Rev ‘-‘ in R2-2405302. |

START OF CHANGE

#### 4.3.38.8 *ntn-LocationBasedCHO-EFC-r18*

This field indicates whether the UE supports location-based conditional handover for (quasi-)earth fixed cell, i.e., *CondEvent D1* as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *cho-r16* and *ntn-Connectivity-EPC-r17.*

#### 4.3.38.9 *ntn-LocationBasedCHO-EMC-r18*

This field indicates whether the UE supports location-based conditional handover for earth moving cell, i.e., *CondEvent D1* as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *cho-r16* and *ntn-Connectivity-EPC-r17.*

#### 4.3.38.10 *ntn-TimeBasedCHO-r18*

This field indicates whether the UE supports time-based conditional handover, i.e., *CondEvent T1* as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *cho-r16* and *ntn-Connectivity-EPC-r17.*

#### 4.3.38.11 *ntn-LocationBasedMeasTrigger-EFC-r18*

This field indicates whether the UE supports location-based measurement trigger in RRC\_CONNECTED in (quasi-)earth fixed cell as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.12 *ntn-LocationBasedMeasTrigger-EMC-r18*

This field indicates whether the UE supports location-based measurement trigger in RRC\_CONNECTED in earth moving cell as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.13 *ntn-TimeBasedMeasTrigger-r18*

This field indicates whether the UE supports time-based measurement trigger in RRC\_CONNECTED as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.14 *ntn-RRC-HarqDisableSingleTB-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration. This feature is only applicable if the UE supports *ue-category-NB.* A UE supporting this feature shall also indicate the support of *ue-category-NB* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.15 *ntn-OverriddenHarqDisableSingleTB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission by overriding the RRC configuration. A UE supporting this feature shall also indicate the support of *ntn-RRC-HarqDisableSingleTB-r18*.

#### 4.3.38.16 *ntn-DCI-HarqDisableSingleTB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission when HARQ feedback disabling per HARQ process for downlink transmission is not configured by RRC. This feature is only applicable if the UE supports *ue-category-NB.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.17 *ntn-RRC-HarqDisableMultiTB-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration when scheduled with downlink transmission of multiple TBs. This feature is only applicable if the UE supports *ue-category-NB.* A UE supporting this feature shall also indicate the support of *npdsch-MultiTB-r16* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.18 *ntn-OverriddenHarqDisableMultiTB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission by overriding the RRC configuration when scheduled with downlink transmission of multiple TBs. A UE supporting this feature shall also indicate the support of *ntn-RRC-HarqDisableMultiTB-r18*.

#### 4.3.38.19 *ntn-DCI-HarqDisableMultiTB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission when HARQ feedback disabling per HARQ process for downlink transmission is not configured by RRC and when scheduled with downlink transmission of multiple TBs. This feature is only applicable if the UE supports *ue-category-NB.* A UE supporting this feature shall also indicate the support of *npdsch-MultiTB-r16* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.20 *ntn-RRC-HarqDisableSingleTB-CE-ModeA-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration when operating in coverage enhancement mode A. This feature is only applicable if the UE supports *ce-ModeA-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.21 *ntn-RRC-HarqDisableSingleTB-CE-ModeB-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration when operating in coverage enhancement mode B. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.22 *ntn-OverriddenHarqDisableSingleTB-CE-ModeB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission by overriding the RRC configuration when operating in coverage enhancement mode B. A UE supporting this feature shall also indicate the support of *ntn-RRC-HarqDisableSingleTB-CE-ModeB-r18*.

#### 4.3.38.23 *ntn-DCI-HarqDisableSingleTB-CE-ModeB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission when HARQ feedback disabling per HARQ process for downlink transmission is not configured by RRC and operating in coverage enhancement mode B. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.24 *ntn-RRC-HarqDisableMultiTB-CE-ModeA-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration when operating in coverage enhancement mode A and when scheduled with downlink transmission of multiple TBs. This feature is only applicable if the UE supports *ce-ModeA-r13.* A UE supporting this feature shall also indicate the support of *pdsch-MultiTB-CE-ModeA-r16* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.25 *ntn-RRC-HarqDisableMultiTB-CE-ModeB-r18*

This field indicates whether the UE supports HARQ feedback disabling per HARQ process for downlink transmission by RRC configuration when operating in coverage enhancement mode B and when scheduled with downlink transmission of multiple TBs. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *pdsch-MultiTB-CE-ModeB-r16* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.26 *ntn-OverriddenHarqDisableMultiTB-CE-ModeB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission by overriding the RRC configuration when operating in coverage enhancement mode B and when scheduled with downlink transmission of multiple TBs. A UE supporting this feature shall also indicate the support of *ntn-RRC-HarqDisableMultiTB-CE-ModeB-r18*.

#### 4.3.38.27 *ntn-DCI-HarqDisableMultiTB-CE-ModeB-r18*

This field indicates whether the UE supports DCI-based HARQ feedback disabling for downlink transmission when HARQ feedback disabling per HARQ process for downlink transmission is not configured by RRC and operating in coverage enhancement mode B and when scheduled with downlink transmission of multiple TBs. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *pdsch-MultiTB-CE-ModeB-r16* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.28 *ntn-SemiStaticHarqDisableSPS-r18*

This field indicates whether the UE supports HARQ feedback transmission for the first SPS PDSCH transmission after activation when operating in coverage enhancement mode A. A UE supporting this feature shall also indicate the support of *ce-ModeA-r13* and *ntn-Connectivity-EPC-r17*.

#### 4.3.38.29 *ntn-UplinkHarq-ModeB-SingleTB-r18*

This field indicates whether the UE supports HARQ Mode B. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*. For a UE indicating support of *ce-ModeA-r13*, this field also indicates whether the UE supports the corresponding LCP restrictions for uplink transmission.

#### 4.3.38.30 *ntn-HarqEnhScenarioSupport-r18*

This field indicates whether the UL and DL HARQ process enhancements that are indicated as supported are applicable in GSO or NGSO scenarios for UE indicating support of GSO and NGSO scenarios. If this field is not included, the UL and DL HARQ process enhancements that are indicated as supported are applicable in both GSO and NGSO scenarios. The UL and DL HARQ process enhancements that are indicated as supported are mandatory for GSO scenario. This field is only applicable if the UE supports at least one of *ntn-RRC-HarqDisableSingleTB-r18*, *ntn-OverriddenHarqDisableSingleTB-r18*, *ntn-DCI-HarqDisableSingleTB-r18*, *ntn-RRC-HarqDisableMultiTB-r18*, *ntn-OverriddenHarqDisableMultiTB-r18*, *ntn-DCI-HarqDisableMultiTB-r18*, *ntn-RRC-HarqDisableSingleTB-CE-ModeA-r18*, *ntn-RRC-HarqDisableSingleTB-CE-ModeB-r18*, *ntn-OverriddenHarqDisableSingleTB-CE-ModeB-r18*, *ntn-DCI-HarqDisableSingleTB-CE-ModeB-r18*, *ntn-RRC-HarqDisableMultiTB-CE-ModeA-r18*, *ntn-RRC-HarqDisableMultiTB-CE-ModeB-r18*, *ntn-OverriddenHarqDisableMultiTB-CE-ModeB-r18*, *ntn-DCI-HarqDisableMultiTB-CE-ModeB-r18,* *ntn-UplinkHarq-ModeB-SingleTB-r18* and *ntn-UplinkHarq-ModeB-MultiTB-r18*.

#### 4.3.38.31 *ntn-Triggered-GNSS-Fix-r18*

This field indicates whether the UE supports network triggered GNSS position fix in RRC\_CONNECTED as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*. If the UE indicates this capability, the UE shall support the following enhancements:

- UE reports GNSS position fix time duration for measurement in *RRCConnectionSetupComplete (-NB)*, *RRCConnectionResumeComplete (-NB)*, and *RRCConnectionReestablishmentComplete (-NB)* and *RRCConnectionReconfigurationComplete* messages;

- UE receives GNSS measurement trigger from eNB;

- UE re-acquires GNSS position fix within a configured gap;

- UE reports the remaining GNSS validity duration with MAC CE in RRC\_CONNECTED.

#### 4.3.38.32 *ntn-Autonomous-GNSS-Fix-r18*

This field indicates whether the UE supports autonomous GNSS position fix in RRC\_CONNECTED as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*. If the UE indicates this capability, the UE shall support the following enhancements:

- UE reports GNSS position fix time duration for measurement in *RRCConnectionSetupComplete (-NB)*, *RRCConnectionResumeComplete (-NB)*, and *RRCConnectionReestablishmentComplete (-NB)* and *RRCConnectionReconfigurationComplete* messages;

- UE re-acquires GNSS autonomously (when configured by the network) if it does not receive eNB GNSS measurement trigger;

- UE reports the remaining GNSS validity duration with MAC CE in RRC\_CONNECTED.

#### 4.3.38.33 *ntn-UplinkTxExtension-r18*

This field indicates whether the UE supports to perform UL transmission in a duration after original GNSS validity duration expires without GNSS re-acquisition as specified in TS 36.331 [5]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.34 *ntn-GNSS-EnhScenarioSupport-r18*

This field indicates whether the GNSS measurement and UL transmission extension enhancements in RRC\_CONNECTED that are indicated as supported are applicable in GSO or NGSO scenario for UE indicating support of GSO and NGSO scenarios. If this field is not included, the GNSS measurement and UL transmission extension enhancements in RRC\_CONNECTED that are indicated as supported are applicable in both GSO and NGSO scenario. The GNSS measurement and UL transmission extension enhancements that are indicated as supported are mandatory for GSO scenario. This field is only applicable if the UE supports at least one of *ntn-Triggered-GNSS-Fix-r18,* *ntn-Autonomous-GNSS-Fix-r18* and *ntn-UplinkTxExtension-r18*.

#### 4.3.38.35 *ntn-UplinkHarq-ModeB-MultiTB-r18*

This field indicates whether the UE supports HARQ Mode B when scheduled with uplink transmission of multiple TBs. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17* and one of *npdsch-MultiTB-r16*, *pdsch-MultiTB-CE-ModeA-r16* and *pdsch-MultiTB-CE-ModeB-r16*. For a UE indicating support of *ce-ModeA-r13*, this field also indicates whether the UE supports the corresponding LCP restrictions for uplink transmission.

#### 4.3.38.36 *eventD1-MeasReportTrigger-r18*

This field indicates whether the UE supports location-based measurement report trigger in RRC\_CONNECTED in (quasi-)earth fixed cell (i.e., event D1) as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.37 *eventD2-MeasReportTrigger-r18*

This field indicates whether the UE supports location-based measurement report trigger in RRC\_CONNECTED in earth moving cell (i.e., event D2) as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ce-ModeB-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

Unchanged part skipped

### 6.19.6 Cell reselection measurements triggering based on location for (quasi-)fixed cell

It is optional for UE camped on NTN (quasi-)earth fixed cell to support triggering of early cell reselection measurements based on the reference location broadcasted by the cell as specified in TS 36.304 [14]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

END OF CHANGE