**3GPP TSG-RAN WG2 Meeting #131** **R2-250xxxx**

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.306** | **CR** | **1912** | **rev** | **2** | **Current version:** | **18.5.0** |  |
|  | | | | | | | | |
| *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 | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | UE capability for Rel-19 IoT NTN | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Inc. | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | IoT\_NTN\_Ph3-Core | | | | |  | ***Date:*** | | | 2025-08-14 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Capturing UE capabilities for Rel-19 IoT NTN enhancements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Capturing UE capabilities for the Rel-19 features   1. UL capacity enhancements 2. Support of PWS 3. Support of store and forward operation 4. OCC (based on RAN1 feature in R1-2504676) | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No support for Release-19 enhancements for IoT NTN | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.3, 4, 4.3.38, 6.19, 7.10 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 36.331 CR 5137 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS 36.321 CR 1591 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS 36.304 CR 0882  TS 36.300 CR 1425 | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

# <<Start of the change>>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

1xRTT CDMA2000 1x Radio Transmission Technology

ACK Acknowledgement

ACDC Application specific Congestion control for Data Communication

ANDSF Access Network Discovery and Selection Function

ANR Automatic Neighbour Relation

BCCH Broadcast Control Channel

CAS Cell Acquisition Subframes

CFI Control Format Indicator

CG Cell Group

CRS Cell-specific Reference Signal

CSG Closed Subscriber Group

CSI Channel State Information

DC Dual Connectivity

DCI Downlink Control Information

DL-SCH Downlink Shared Channel

EHC Ethernet Header Compression

E-UTRA Evolved Universal Terrestrial Radio Access

E-UTRAN Evolved Universal Terrestrial Radio Access Network

FDD Frequency Division Duplex

GERAN GSM/EDGE Radio Access Network

HARQ Hybrid Automatic Repeat Request

HRPD High Rate Packet Data

HSDN High Speed Dedicated Network

IRC Interference Rejection Combining

MAC Medium Access Control

MMSE Minimum Mean Squared Error

MO-EDT Mobile Originated Early Data Transmission

MRO Mobility Robustness Optimisation

MT-EDT Mobile Terminated Early Data Transmission

MTSI Multimedia Telephony Service for IMS

MUST MultiUser Superposition Transmission

NAICS Network Assisted Interference Cancellation/Suppression

NB-IoT Narrow Band Internet of Things

OS OFDM Symbol

PCell Primary Cell

PDCCH Physical Downlink Control Channel

PDCP Packet Data Convergence Protocol

PDSCH Physical Downlink Shared Channel

PHR Power Headroom Reporting

ProSe Proximity-based Services

PUCCH Physical Uplink Control Channel

PUR Preconfigured Uplink Resource

PUSCH Physical Uplink Shared Channel

QoE Quality of Experience

RACH Random Access CHannel

RAI Release Assistance Indication

RAT Radio Access Technology

RLC Radio Link Control

RLF Radio Link Failure

ROHC RObust Header Compression

RRC Radio Resource Control

SC-PTM Single Cell Point to Multipoint

SCC Secondary Component Carrier

SCell Secondary Cell

SI System Information

SL Sidelink

SL-DCH Sidelink Discovery CHannel

SL-SCH Sidelink Shared CHannel

SON Self Organizing Networks

SPT Short Processing Time

SR Scheduling Request

SSAC Service Specific Access Control

SSTD SFN and Subframe Timing Difference

STTI Short TTI

TDD Time Division Duplex

TTI Transmission Time Interval

UCI Uplink Control Information

UDC Uplink Data Compression

UE User Equipment

UL-SCH Uplink Shared Channel

UMTS Universal Mobile Telecommunications System

UTRA UMTS Terrestrial Radio Access

V2X Vehicle-to-Everything

WLAN Wireless Local Area Network

# 4 UE radio access capability parameters

The following clauses define the UE radio access capability parameters and minimum capabilities for MBMS capable UE. Only parameters for which there is the possibility for UEs to signal different values are considered as UE radio access capability parameters. Therefore, mandatory features without capability parameters that are the same for all UEs are not listed here. Also capabilities which are optional or conditionally mandatory for UEs to implement but do not have UE radio access capability parameter are listed in this specification.

E-UTRAN needs to respect the signalled UE radio access capability parameters when configuring the UE and when scheduling the UE.

All parameters shown in italics are signalled and correspond to a field defined in TS 36.331 [5].

For optional features, the UE radio access capability parameter indicates whether the feature has been implemented and successfully tested. For mandatory features with the UE radio access capability parameter, the parameter indicates whether the feature has been successfully tested.

The mandatory features required to be supported by a UE are the same for all UE categories unless explicitly specified elsewhere in the specifications.

Unless otherwise stated, the requirements on the maximum number of transport block bits are applicable for a TTI length of 1 ms. For other TTI lengths, the requirements shall be scaled according to clause 7.1.7 or 11.1 in TS 36.213 [22] in order to get the corresponding requirement.

The following UE radio access capability parameters specified in clause 4 are applicable in NB-IoT:

- *ue-Category-NB* in NB-IoT (clause 4.1C)

- *supportedROHC-Profiles-r13* (clause 4.3.1.1A)

- *maxNumberROHC-ContextSessions-r13* (clause 4.3.1.2A)

- *rlc-UM-r15* (clause 4.3.2.5)

- *multiTone-r13* (clause 4.3.4.55)

- *multiCarrier-r13* (clause 4.3.4.56)

- *twoHARQ-Processes-r14* (clause 4.3.4.62)

- *multiCarrier-NPRACH-r14* (clause 4.3.4.75)

- *multiCarrierPaging-r14* (clause 4.3.4.76)

- *interferenceRandomisation-r14* (clause 4.3.4.80)

- *wakeUpSignal-r15* (clause 4.3.4.113)

- *wakeUpSignalMinGap-eDRX-r15* (clause 4.3.4.114)

- *mixedOperationMode-r15* (clause 4.3.4.115)

- *sr-WithHARQ-ACK-r15* (clause 4.3.4.117)

- *sr-WithoutHARQ-ACK-r15* (clause 4.3.4.118)

- *nprach-Format2-r15* (clause 4.3.4.119)

- *multiCarrierPagingTDD-r15* (clause 4.3.4.134)

- *additionalTransmissionSIB1-r15* (clause 4.3.4.137)

- *npusch-3dot75kHz-SCS-TDD-r15* (clause 4.3.4.177)

- *npusch-MultiTB-r16* (clause 4.3.4.182)

- *npdsch-MultiTB-r16* (clause 4.3.4.183)

- *npusch-MultiTB-Interleaving-r16* (clause 4.3.4.192)

- *npdsch-MultiTB-Interleaving-r16* (clause 4.3.4.193)

- *multiTB-HARQ-AckBundling-r16* (clause 4.3.4.194)

- *groupWakeUpSignal-r16* (clause 4.3.4.195)

- *groupWakeUpSignalAlternation-r16* (clause 4.3.4.196)

- *subframeResourceResvUL-r16* (clause 4.3.4.197)

- *subframeResourceResvDL-r16* (clause 4.3.4.198)

- *slotSymbolResourceResvUL-r16* (clause 4.3.4.199)

- *slotSymbolResourceResvDL-r16* (clause 4.3.4.200)

- *npdsch-16QAM-r17* (clause 4.3.4.222)

- *npusch-16QAM-r17* (clause 4.3.4.223)

- *supportedBandList-r13* (clause 4.3.5.1A)

- *multiNS-Pmax-r13* (clause 4.3.5.16A)

- *powerClassNB-20dBm-r13* (clause 4.3.5.1A.1)

- *powerClassNB-14dBm-r14* (clause 4.3.5.1A.2)

- *dl*-*ChannelQualityReporting-r16* (clause 4.3.6.37)

- *connModeMeasIntraFreq-r17* (clause 4.3.6.49)

- *connModeMeasInterFreq-r17* (clause 4.3.6.50)

- *accessStratumRelease-r13* (clause 4.3.8.1A)

- *multipleDRB-r13* (clause 4.3.8.5)

- *earlyData-UP-r15* (clause 4.3.8.7)

- *earlySecurityReactivation-r16* (clause 4.3.8.11)

- *coverageBasedPaging-r17* (clause 4.3.8.16)

- *anr-Report-r16* (clause 4.3.12.2)

- *rach-Report-r16* (clause 4.3.12.3)

- *locationInfo-r16* (clause 4.3.12.5)

- *logicalChannelSR-ProhibitTimer* (clause 4.3.19.2)

- *dataInactMon-r14* (clause 4.3.19.9)

- *rai-Support-r14* (clause 4.3.19.10)

- *earlyContentionResolution-r14* (clause 4.3.19.14)

- *sr-SPS-BSR-r15* (clause 4.3.19.15)

- *rai-SupportEnh-r16* (clause 4.3.19.22)

- *earlyData-UP-5GC-r16* (clause 4.3.36.9)

- *pur-CP-EPC-r16* (clause 4.3.37.1)

- *pur-UP-EPC-r16* (clause 4.3.37.2)

- *pur-CP-5GC-r16* (clause 4.3.37.3)

- *pur-UP-5GC-r16* (clause 4.3.37.4)

- *pur-CP-L1Ack-r16* (clause 4.3.37.5)

- *pur-NRSRP-Validation-r16* (clause 4.3.37.6)

- *ntn-Connectivity-EPC-r17* (clause 4.3.38.1)

- *ntn-TA-Report-r17* (clause 4.3.38.2)

- *ntn-PUR-TimerDelay-r17* (clause 4.3.38.3)

*-* *ntn-OffsetTimingEnh-r17* (clause 4.3.38.4)

*-* *ntn-ScenarioSupport-r17* (clause 4.3.38.5)

*-* *ntn-SegmentedPrecompensationGaps-r17* (clause 4.3.38.6)

*-* *ntn-LocationBasedMeasTrigger-EFC-r18* (clause 4.3.38.11)

*-* *ntn-LocationBasedMeasTrigger-EMC-r18* (clause 4.3.38.12)

*-* *ntn-TimeBasedMeasTrigger-r18* (clause 4.3.38.13)

*-* *ntn-RRC-HarqDisableSingleTB-r18* (clause 4.3.38.14)

*-* *ntn-OverriddenHarqDisableSingleTB-r18* (clause 4.3.38.15)

*-* *ntn-DCI-HarqDisableSingleTB-r18* (clause 4.3.38.16)

*-* *ntn-RRC-HarqDisableMultiTB-r18* (clause 4.3.38.17)

*-* *ntn-OverriddenHarqDisableMultiTB-r18* (clause 4.3.38.18)

*-* *ntn-DCI-HarqDisableMultiTB-r18* (clause 4.3.38.19)

*-* *ntn-UplinkHarq-ModeB-SingleTB-r18* (clause 4.3.38.29)

*-* *ntn-HarqEnhScenarioSupport-r18* (clause 4.3.38.30)

*-* *ntn-Triggered-GNSS-Fix-r18* (clause 4.3.38.31)

*-* *ntn-Autonomous-GNSS-Fix-r18* (clause 4.3.38.32)

*-* *ntn-UplinkTxExtension-r18* (clause 4.3.38.33)

*-* *ntn-GNSS-EnhScenarioSupport-r18* (clause 4.3.38.34)

*-* *ntn-UplinkHarq-ModeB-MultiTB-r18* (clause 4.3.38.35)

*-* *ntn-cbMsg3EDT-UP-r19* (clause 4.3.38.xx)

*-* *ntn-PWS-r19* (clause 4.3.38.xx)

*-* *ntn-OCC-SingleTone-khz3dot75-r19* (clause 4.3.38.xx)

*-* *ntn-OCC-SingleTone-khz15-r19* (clause 4.3.38.xx)

*-* *ntn-OCC-EnhScenarioSupport-r19* (clause 4.3.38.xx)

The UE radio access capabilities specified in clause 4 are not applicable in NB-IoT, unless they are listed above.

The following optional features without UE radio access capability parameters specified in clause 6 are applicable in NB-IoT:

- RRC Connection Re-establishment for the Control Plane CIoT EPS Optimization (clause 6.7.5)

- System Information Block Type 16 (clause 6.8.1)

- Enhanced random access power control (clause 6.8.3)

- MT-EDT for Control Plane CIoT EPS Optimisation (clause 6.8.10)

- MT-EDT for User Plane CIoT EPS Optimisation (clause 6.8.11)

- EDT for Control Plane CIoT EPS Optimization (clause 6.8.4)

- Enhanced PHR (clause 6.8.6)

- Carrier specific NRSRP thresholds for NPRACH resource selection (clause 6.8.15)

- Radio Link Failure Report for NB-IoT (clause 6.10.2)

- SC-PTM in Idle mode (clause 6.16.1)

- Multiple TB scheduling for SC-PTM in Idle mode for NB-IoT (clause 6.16.2)

- Relaxed monitoring (clause 6.17.1)

- DL channel quality reporting in Msg3 for the anchor carrier (clause 6.17.2)

- Serving cell idle mode measurements reporting (clause 6.17.3)

- NSSS-Based RRM measurements (clause 6.17.4)

- NPBCH-Based RRM measurements (clause 6.17.5)

- RRM measurements on non-anchor paging carriers (clause 6.17.6)

- NRS presence on non-anchor paging carriers (clause 6.17.7)

- DL channel quality reporting in Msg3 for non-anchor carrier (clause 6.17.8)

- Assistance information for inter-RAT cell selection to/from NB-IoT (clause 6.17.9)

- RRC Connection Re-establishment for the Control Plane CIoT 5GS Optimisation (clause 6.18.3)

- NB-IoT/5GC (clause 6.18.4)

- MO-EDT for Control Plane CIoT 5GS Optimisation (clause 6.18.5)

- AS RAI (clause 6.18.6)

- Cell reselection measurements triggering based on service time (clause 6.19.1)

- Discontinuous coverage (clause 6.19.2).

- Early RLF triggering based on service time (clause 6.19.3).

- Neighbour cell measurements based on service start time of the neighbour cell (clause 6.19.4).

- UE autonomous release based on service time (clause 6.19.5).

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

- Cell reselection measurements triggering based on location for earth moving cell (clause 6.19.7).

- GNSS measurements during inactive time (clause 6.19.8).

- SystemInformationBlockType33(-NB) reception in a TN cell (clause 6.19.9).

- Inband operation with NR NTN (6.19.10).

- CB-Msg3-EDT for Control Plane CIoT EPS Optimization (clause 6.19.xx).

- Geofencing of PWS message (6.19.xx).

The optional features without UE radio access capability parameters specified in clause 6 are not applicable in NB-IoT, unless they are listed above.

<<Next change>>

### 4.3.38 IoT NTN parameters

#### 4.3.38.1 *ntn-Connectivity-EPC-r17*

This field indicates whether the UE supports NTN access. This field is only applicable if the UE supports *ce-ModeA-r13* or any *ue-Category-NB*. If the UE indicates this capability the UE shall support the following enhancements:

- General:

- handling of *cellBarred-NTN-r17* and *trackingAreaList-r17* in *SystemInformationBlockType1(-NB)* as specified in TS 36.331 [5];

- reception of *SystemInformationBlockType31(-NB)* as specified in TS 36.331 [5];

- derivation of its position based on its GNSS measurements;

- reporting of the remaining GNSS validity duration as specified in TS 36.331 [5];

- PDCP:

- if the UE supports *ce-ModeA-r13, discardTimerExt-r17* as specified in TS 36.331 [5];

- RLC:

- *t-ReorderingExt-r17* as specified in TS 36.331 [5];

- MAC:

- estimation of UE-gNB RTT as specified in TS 36.321 [4];

- delaying the start of the RA response window as specified in TS 36.321 [4];

*-* delaying the start of the *mac-ContentionResolutionTimer* as specified in TS 36.321 [4];

- if the UE supports *ce-ModeA-r13* orif the UE supports any *ue-Category-NB* and supports *sr-WithoutHARQ-ACK-r15,* handling of *sr-ProhibitTimerOffset-r17* as specified in TS 36.331 [5];

- extending the length of the (UL) HARQ RTT timer as specified in TS 36.321 [4];

- Physical layer:

- calculation of the UE specific TA in RRC\_IDLE and RRC\_CONNECTED state based on its GNSS-acquired position and the serving satellite ephemeris as specified in TS 36.211 [17];

- calculation of the common TA in RRC\_IDLE and RRC\_CONNECTED as specified in TS 36.213 [22];

- for TA update in RRC\_CONNECTED state, support of combination of both open (i.e. UE specific TA estimation, and common TA calculation) and closed (i.e., received TA commands) control loops;

- frequency pre-compensation to counter shift the Doppler experienced on the service link;

- timing relationship enhancements using higher layer parameters *k-Offset-r17* and *k-Mac-r17* as specified in TS 36.213 [22];

- segmented UL transmission using higher layer parameters *prach-TxDuration-r17*, *nprach-TxDurationFmt01-r17, nprach-TxDurationFmt2-r17, pucch-TxDuration-r17* and *(n)pusch-TxDuration-r17* as specified in TS 36.331 [5] except for UEs indicating support of *ue-Category-NB* and *ntn-ScenarioSupport-r17* with value GSO.

A UE indicating support of *ce-ModeA-r13* and *ntn-Connectivity-EPC-r17* shall also indicate support of *standaloneGNSS-Location*. A UE indicating support for any *ue-Category-NB* and *ntn-Connectivity-EPC-r17* is assumed to have GNSS location capability*.*

#### 4.3.38.2 *ntn-TA-Report-r17*

This field indicates whether the UE supports Timing advance reporting in NTN cell as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

#### 4.3.38.3 *ntn-PUR-TimerDelay-r17*

This field indicates whether the UE supports delaying the start of the *pur-ResponseWindowTimer* for NTN operation as specified in TS36.321 [4]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*. A UE indicating support of *ntn-PUR-TimerDelay-r17* shall also indicate support of *pur-CP-EPC-CE-ModeA-r16* or *pur-UP-EPC-CE-ModeA-r16* or *pur-CP-EPC-r16* or *pur-UP-EPC-r16.*

#### 4.3.38.4 *ntn-OffsetTimingEnh-r17*

This field indicates whether the UE supports timing relationship enhancements using Differential Koffset as specified in TS 36.321 [4] and TS 36.213 [22]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

#### 4.3.38.5 *ntn-ScenarioSupport-r17*

This field indicates whether the UE supports NTN features in GSO or NGSO scenario. The UE indicating support of *ntn-ScenarioSupport-r17* shall also indicate support of *ntn-Connectivity-EPC-r17*. If a UE does not include this field but includes *ntn-Connectivity-EPC-r17*, the UE supports the NTN features for both GSO and NGSO scenarios.

#### 4.3.38.6 *ntn-SegmentedPrecompensationGaps-r17*

This field indicates the supported gap length between segments for PUSCH and PUCCH required by a UE supporting *ce-ModeA-r13* or for NPUSCH required by a UE supporting *ue-category-NB*, for TA pre-compensation. This feature is only applicable if the UE supports either *ue-category-NB* or *ce-ModeA-r13* and also supports *ntn-Connectivity-EPC-r17*. If a UE does not include this field but includes *ntn-Connectivity-EPC-r17*, in case of overlapped transmission between successive uplink segments, UE shall follow the procedure specified in TS 36.213 [22]. This field is not applicable for UEs indicating support of *ue-Category-NB* and *ntn-ScenarioSupport-r17* with value GSO.

#### 4.3.38.7 *ntn-EventA4BasedCHO-r18*

This field indicates whether the UE supports Event A4-based conditional handover, i.e., *CondEvent A4* 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.*

#### 4.3.38.8 *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 D2* 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*. If *ntn-ScenarioSupport-r17* is included, this field is set in consistency with *ntn-ScenarioSupport-r17* (i.e., this field is set to GSO if the *ntn-ScenarioSupport-r17* indicates GSO).

#### 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*. A UE supporting *ce-ModeA-r13* and this feature in NGSO scenario shall also indicate the support of *ntn-Triggered-GNSS-Fix-r18*. 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*. If *ntn-ScenarioSupport-r17* is included, this field is set in consistency with *ntn-ScenarioSupport-r17* (i.e., this field is set to GSO if the *ntn-ScenarioSupport-r17* indicates GSO).

#### 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-ModeA-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-ModeA-r13.* A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*.

#### 4.3.38.38 s*atelliteInfoConfigDedicated-r18*

This field indicates whether the UE can be configured via dedicated signalling with NTN assistance information (i.e., *satelliteId-r18* or ephemeris information in *measObjectEUTRA*) to measure an NTN cell in RRC\_CONNECTED as specified in TS 36.331 [5]. 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.xx *ntn-cbMsg3EDT-UP-r19*

This field indicates whether the UE supports MO contention-based Msg3 EDT for User Plane CIoT EPS optimizations, as defined in TS 36.321 [4]. A UE supporting this feature shall also indicate the support of *ntn-Connectivity-EPC-r17*. This field is not applicable for UEs operating in coverage enhancement mode B.

#### 4.3.38.xx *ntn-PWS-r19*

This field indicates whether the UE supports the reception of PWS message including ETWS, CMAS, KPAS, EU-Alert in RRC\_IDLE as defined in TS 36.331 [5]. This feature is only applicable if the UE supports *ue-category-NB.*

#### 4.3.38.xx *ntn-OCC-SingleTone-khz3dot75-r19*

This field indicates whether the UE supports OCC for single-tone NPUSCH format 1 with 3.75 kHz SCS in RRC\_CONNECTED. 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*. If the UE indicates this capability, the UE shall support the followings in RRC\_CONNECTED:

- symbol-level length-2 OCC for single-tone NPUSCH format 1 with 3.75 kHz SCS;

- TDM DMRS over 4 slots where DMRS are transmitted in the first 2 slots and DMRS REs are blanked in the next 2 slots, or vice-versa;

- dynamic activation or deactivation of OCC for single-tone NPUSCH format 1 with 3.75 kHz SCS via DCI.

#### 4.3.38.xx *ntn-OCC-SingleTone-khz15-r19*

This field indicates whether the UE supports OCC for single-tone NPUSCH format 1 with 15 kHz SCS in RRC\_CONNECTED. 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*. If the UE indicates this capability, the UE shall support the following in RRC\_CONNECTED:

- slot-level length-2 OCC for single-tone NPUSCH format 1 with 15 kHz SCS;

- Support of CDM DMRS for NPUSCH format 1 with 15 kHz SCS;

- dynamic activation or deactivation of OCC for single-tone NPUSCH format 1 with 15 kHz SCS via DCI.

#### 4.3.38.xx *ntn-OCC-EnhScenarioSupport-r19*

This field indicates whether the OCC enhancements in RRC\_CONNECTED that are indicated as supported are applicable in GSO scenario or NGSO scenario for UE indicating support of both GSO and NGSO scenarios (i.e., for UE not including *ntn-ScenarioSupport-r17*). If this field is not included, the OCC enhancements in RRC\_CONNECTED that are indicated as supported are applicable in both GSO and NGSO scenarios. This field is only applicable if the UE supports at least one of *ntn-OCC-SingleTone-khz3dot75-r19* and *ntn-OCC-SingleTone-khz15-r19*. If *ntn-ScenarioSupport-r17* is included, this field is set in consistency with *ntn-ScenarioSupport-r17* (i.e., this field is set to GSO if the *ntn-ScenarioSupport-r17* indicates GSO).

<<Next change>>

## 6.19 IoT NTN Features

### 6.19.1 Cell reselection measurements triggering based on service time

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

### 6.19.2 Discontinuous coverage

It is optional for a UE camped on NTN cell to support discontinuous coverage as specified in TS 36.304 [14]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 6.19.3 Early RLF triggering based on service time

It is optional for UE in RRC\_CONNECTED in an NTN cell to support triggering of RLF upon reaching the service time broadcasted for the serving cell as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 6.19.4 Neighbour cell measurements based on service start time of the neighbour cell

It is optional for UE camped on NTN cell to support NTN neighbour cell measurements based on the service start time of the neighbour cell broadcasted by the serving cell as specified in TS 36.304 [14]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 6.19.5 UE autonomous release based on service time

It is optional for UE in RRC\_CONNECTED in an NTN cell to go to RRC\_IDLE after RLF is triggered if the UE determines by implementation there is not enough time to finish the procedure of reestablishment due to the discontinuous coverage as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 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*.

### 6.19.7 Cell reselection measurements triggering based on location for earth moving cell

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

### 6.19.8 GNSS measurements during inactive time

It is optional for UE in RRC\_CONNECTED in an NTN cell to perform GNSS measurements during inactive time of a C-DRX cycle. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 6.19.9 *SystemInformationBlockType33(-NB)* reception in a TN cell

It is optional for a UE in RRC\_IDLE to support the reception of *SystemInformationBlockType33(-NB)* in a TN cell as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

### 6.19.10 Inband operation with NR NTN

It is optional for a UE to support inband operation with NR NTN as specified in TS 36.102 [43]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17* and any *ue-Category-NB*.

### 6.19.xx CB-Msg3-EDT for Control Plane CIoT EPS Optimization

It is optional for UE to support contention-based Msg3 EDT for Control Plane CIoT EPS optimizations as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*. This field is not applicable for UEs operating in coverage enhancement mode B.

### 6.19.xx Geofencing of PWS message

It is optional for a PWS-capable UE to support Geofencing information as specified in TS 36.331 [5]. This feature is only applicable if the UE supports *ntn-Connectivity-EPC-r17*.

<<Next change>>

## 7.10 Other features

### 7.10.1 Logged MDT measurement suspension due to IDC interference

It is mandatory to support Logged MDT measurement suspension due to IDC interference for UEs which are supporting logged measurements in RRC\_IDLE upon request from the network and in-device coexistence indication as well as autonomous denial functionality as specified in TS 36.331 [5].

### 7.10.2 Support of extended reporting of WLAN measurements

It is mandatory to support reporting of extended number of measurements of WLAN IDs for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

### 7.10.3 wlan-ReportAnyWLAN-r14

Indicates whether UE supports reporting of measurements of unknown WLAN as specified in TS 36.331 [5]. It is mandatory to support reporting of measurements of unknown WLAN ID for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

### 7.10.4 *wlan-PeriodicMeas-r14*

This parameter indicates whether the UE supports periodic reporting of WLAN measurements. It is mandatory to support periodic reporting of WLAN measurements for UEs which are supporting WLAN measurements as specified in TS 36.331 [5].

### 7.10.5TA Reporting during Initial Access for NTN

It is mandatory to support TA report during initial access for UEs which support *ntn-TA-Report-r17* as specified in TS 36.321 [4].

### 7.10.5Acceptable cell for NB-IoT NTN

It is mandatory to support an acceptable cell in RRC\_IDLE for UEs which support *ntn-PWS-r19* as specified in TS 36.304 [14].

<<End of the change>>