**3GPP TSG-RAN WG2 Meeting #109eDraft2\_R2-2001786**

**24 February – 06 March2020 Revision of R2-2000930**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.306** | **CR** |  | **rev** | **1** | **Current version:** | **15.7.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Introduction of Rel-16 additional enhancements NB-IoT: running 36.306 CR | | | | | | | | | |
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| ***Source to WG:*** | BlackBerry | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NB-IOTenh3-Core, LTE\_eMTC5-Core | | | | |  | ***Date:*** | | | 2020-03-02 |
|  |  | | | |  | |  | | |  |
| ***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 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This CR captures the agreements for NB-IoT Rel-16. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The following agreements have been captured in this CR:  Scheduling Multiple DL/UL Transport Blocks: (common with MTC):  *UEs report capability to indicate support of multiple TB scheduling in connected mode (RAN2#104). [Added in 4.3.4.x1].*  *UE capability for multiple TB is indicated separately for uplink and downlink (RAN2#104). [Added in 4.3.4.x2]* Transmission in preconfigured resources (common with MTC): *PUR configuration can be provided without PUR Configuration Request from the UE, therefore optional radio access capabilities (separate for UP and CP) to indicate UE is capable of performing UL transmissions using PUR are introduced (RAN2#107bis). [Added in 4.3.8.z1 and 4.3.8.z2].*  Network management tool enhancement:  *ANR reporting is optional for NB-IoT UEs with capability signalling (RAN2#107). [Added in 4.3.12.p1].*  Improved multi-carrier operation:  *UE capability signalling for quality reporting in connected mode is defined (RAN2#107). [Added in 4.3.6.y1].*  *Support of DL channel quality in MSG3 for non-anchor carrier is optional without capability reporting and is a separate capability from support of DL channel quality in MSG3 for the anchor carrier (RAN2#107). [Added in 6.8.s3].*  *Support of idle mode RRM measurements on non-anchor paging carriers is optional at the UE without capability reporting (RAN2#107bis).**[Added in 6.17.t1].*  Mobile Terminated Early Data Transmission (common with MTC):  *If the UE supports MT-EDT (optional) for the CP solution, it shall also support MO-EDT for the CP solution.*  *If the UE supports MT-EDT (optional) for the UP solution, it shall also support MO-EDT for the UP solution.*  *Support of MT-EDT is optional at the UE without AS capability (RAN2#108). [Added in 6.8.s1 and 6.8.s2].*  Connection to 5GC (common with MTC):  *Introduce a new UE capability earlyData-UP-5GC-r16 in UE-EUTRA-Capability, UE-Capability-NB to indicate support of UP MO-EDT in 5GC (RAN2#107). [Added in 4.3.36.r1].*  *For EPS it is optional for a UE to support AS RAI, with capability reporting (RAN2#108).**[Added in 4.3.19.q1].*  - RRC Connection re-establishment for the control plane for NB-IoT UEs connected to 5GC is optional, without capability reporting.  *RAN2-109e:*  *- For DL Channel Quality reporting in RRC\_CONNECTED, separate capabilities are introduced for eMTC and NB-IoT.*  *- Intr*oduce a new UE capability earlyData-CP-5GC-r16 in UE-EUTRA-Capability, UE-Capability-NB to indicate support of CP MO-EDT in 5GC.  - MO-EDT (CP and UP EPS optimisations) applies to both FDD and TDD for eMTC, but only FDD for NB-IoT. [Consequence of the Rel-15 CR in R2-2001867].  - MT-EDT (CP and UP EPS optimisations) applies to both FDD and TDD for eMTC, but only FDD for NB-IoT.  - Support of both Control Plane and User Plane CIoT 5GS optimisations for both eMTC and NB-IoT devices connected to 5GC are not captured in TS 36.306, but are only referenced where appropriate.  - For NB-IoT, support of multiTB-UL-r16 and multiTB-DL-r16 is conditional on support of two HARQ processes.  - AS RAI can be used when connected to EPC or 5GC, including when in RRC connected mode and using CP/UP optimisations, EDT, or PUR.  - The existing capability multipleDRB-r13 is also applicable to 5GC.  - DL channel quality report can be supported for both NB-IoT and eMTC connected to 5GC.  - PUR is supported in EPC and 5GC.  Introduce separate UE capabilities pur-UP-5GC-r16 and pur-CP-5GC-r16.  Working assumption: Support of Release 16 WUS is independent to support of Release 15 WUS.  - RACH report is not applicable to 5GC.  - RLF report is not applicable to 5GC.  - Support of RACH report is optional with capability reporting.  - Support of RLF report is optional at the UE without capability reporting | | | | | | | | |
| ***iscussed*** | |  | | | | | | | | |
| ***Consequences if not approved:*** | | WI cannot be completed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.3, 4, 4.3.4.x1 (new), 4.3.4.x2 (new), 4.3.6.y1 (new), 4.3.8.z1 (new), 4.3.8.z2 (new), 4.3.12.p1 (new), 4.3.19.q1 (new), 4.3.36.r1, 6.8.4, 6.8.s1 (new), 6.8.s2 (new), 6.7.u1 (new), 6.17.t1 (new). | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **x** |  | Other core specifications | | | | TS/TR 36.331 CR xxxx | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR 36.304 CR xxxx | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | Because 4.3.4.x1, 4.3.4.x2, 4.3.6.y1, 4.3.8.z1, 4.3.8.z2, 4.3.19.q1, 6.8.s1, 6.8.s2, 6.8.s3, and 6.17.t1 need to apply to Rel-16 NB-IoT and Rel-16 eMTC, the WI Code of Rel-16 eMTC has been added on the coversheet (it is not possible to separate the changes if capturing the earlier agreements). | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

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| First change |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.323: "Evolved Universal Terrestrial Radio Access (E-UTRA) Packet Data Convergence Protocol (PDCP) specification".

[3] 3GPP TS 36.322: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Link Control (RLC) specification".

[4] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) specification".

[5] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA) Radio Resource Control (RRC) specification".

[6] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA) radio transmission and reception".

[7] IETF RFC 5795: "The RObust Header Compression (ROHC) Framework".

[8] IETF RFC 6846: "RObust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".

[9] IETF RFC 3095: "RObust Header Compression (RoHC): Framework and four profiles: RTP, UDP, ESP and uncompressed".

[10] IETF RFC 3843: "RObust Header Compression (RoHC): A Compression Profile for IP".

[11] IETF RFC 4815: "RObust Header Compression (ROHC): Corrections and Clarifications to RFC 3095".

[12] IETF RFC 5225: "RObust Header Compression (ROHC) Version 2: Profiles for RTP, UDP, IP, ESP and UDP Lite".

[13] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA) LTE Positioning Protocol (LPP)".

[14] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); UE Procedures in Idle Mode".

[15] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2".

[16] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".

[17] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical Channels and Modulation".

[18] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[19] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC)".

[20] 3GPP TS 25.307: "Requirement on User Equipments (UEs) supporting a release-independent frequency band".

[21] 3GPP TS 24.312: "Access Network Discovery and Selection Function (ANDSF) Management Object (MO)".

[22] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures".

[23] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer - Measurements".

[24] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[25] 3GPP TS 36.314: "Evolved Universal Terrestrial Radio Access (E-UTRA); Layer 2- Measurements".

[26] 3GPP TS 36.212: "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".

[27] 3GPP TS 36.307: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band".

[28] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[29] 3GPP TS 23.285: "Technical Specification Group Services and System Aspects; Architecture enhancements for V2X services".

[30] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRAN); Overall description; Stage 2".

[31] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[32] 3GPP TS 38.306 "NR; UE Radio Access Capabilities".

[33] 3GPP TS 38.101-1: "NR User Equipment (UE) radio transmission and reception Part 1: Range 1 Standalone".

[34] 3GPP TS 38.101-2: "NR User Equipment (UE) radio transmission and reception Part 2: Range 2 Standalone".

[35] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[36] 3GPP TS 38.215: "NR; Physical layer measurements".

[37] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".

[38] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity".

[xx] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

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| Next changes |

## 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

CG Cell Group

CRS Cell-specific Rerefence Signal

CSG Closed Subscriber Group

CSI Channel State Information

DC Dual Connectivity

DCI Downlink Control Information

DL-SCH Downlink Shared Channel

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

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

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

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| Next changes |

# 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 in TS 36.213 [22] in order to get the corresponding requirement.

The following UE radio access capability parameters specified in Chapter 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)

- *multiTB-UL-r16* (clause 4.3.4.x1)

- *multiTB-DL-r16* (clause 4.3.4.x2)

- *wakeUpSignal-r16* (clause 4.3.4.x3)

- *multiTB-HARQ-ACK-Bundling-r16* (clause 4.3.4.x4)

- *nr-ResourceResvUL-r16* (clause 4.3.4.x5)

- *nr-ResourceResvDL-r16* (clause 4.3.4.x6)

- *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.y1)

- *accessStratumRelease-r13* (clause 4.3.8.1A)

- *multipleDRB-r13* (clause 4.3.8.5)

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

- *pur-CP-r16* (clause 4.3.8.z1)

- *pur-UP-r16* (clause 4.3.8.z2)

- *anr-Report-r16* (clause 4.3.12.p1)

- rach*-Report-r16* (clause 4.3.12.p2)

- *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-r16* (clause 4.3.19.q1)

- *earlyData-UP-5GC-r16* (clause 4.3.36.r1)

- *earlyData-CP-5GC-r16* (clause 4.3.36.r2)

- *pur-CP-5GC-r16* (clause 4.3.36.r3)

- *pur-UP-5GC-r16* (clause 4.3.36.r4)

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

The following optional features without UE radio access capability parameters specified in Chapter 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)

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

- Enhanced PHR (clause 6.8.6)- MT-EDT for Control Plane CIoT EPS Optimisation (clause 6.8.s1)- MT-EDT for User Plane CIoT EPS Optimisation (clause 6.8.s2)

- Radio Link Failure Report in NB-IoT (clause 6.10.x)

- SC-PTM in Idle mode (clause 6.16.1)

- SC-PTM in Idle mode with multiple TB scheduling (clause 6.16.y)

- Relaxed monitoring (clause 6.17.1)

- DL channel quality reporting (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.t1)

- DL channel quality reporting in MSG3 for non-anchor carrier (clause 6.17.t2)

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

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| Next changes |

#### 4.3.4.114 *wakeUpSignalMinGap-eDRX-r15*

This field indicates the minimum gap required between end of WUS and start of PO by a UE indicating support of extended idle mode DRX for FDD, as specified in TS 24.301 [28]. A UE indicating support of *wakeUpSignalMinGap-eDRX-r15* shall also indicate support of w*akeUpSignal-r15* orsupport of w*akeUpSignal-r16*. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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| Next changes |

#### 4.3.4.x1 *multiTB-UL-r16*

This field indicates whether the UE supports multiple TB scheduling in the uplink as specified in TS 36.213 [22]. A UE indicating support of *multiTB-UL-r16* shall also indicate support of *twoHARQ-Processes-r14*.. This feature is only applicable if the UE supports category NB2.

#### 4.3.4.x2 *multiTB-DL-r16*

This field indicates whether the UE supports multiple TB scheduling in the downlink as specified in TS 36.213 [22]. A UE indicating support of *multiTB-DL-r16* shall also indicate support of *twoHARQ-Processes-r14*. This feature is only applicable if the UE supports category NB2.

4.3.4.x3 *wakeUpSignal-r16*

This field indicates whether the UE supports GWUS as specified in TS 36.211 [17], TS 36.213 [22] and TS 36.304 [14]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

4.3.4.x4 *multiTB-HARQ-ACK-Bundling-r16*

#### This field indicates whether the UE supports HARQ ACK bundling for multiple TB interleaved transmission in the downlink as specified in TS 36.213 [22]. A UE indicating support of *multiTB-HARQ-ACK-Bundling-r16* shall also indicate support of *multiTB-DL-r16*. This feature is only applicable if the UE supports category NB2.4.3.4.x5 *nr-ResourceResvUL-r16*

This field indicates whether the UE supports UL resource reservation for NB-IoT coexistence with NR as specified in TS 36.211 [17], TS 36.212 [26] and TS 36.213 [22]. This feature is only applicable if the UE supports any *ue-Category-NB.*

#### 4.3.4.x6 *nr-ResourceResvDL-r16*

This field indicates whether the UE supports DL resource reservation for NB-IoT coexistence with NR as specified in TS 36.211 [17], TS 36.212 [26] and TS 36.213 [22]. This feature is only applicable if the UE supports any *ue-Category-NB.*

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| Next changes |

#### 4.3.6.y1 *dlChannelQualityReporting-r16*

This field defines whether the UE supports DL channel quality reporting of the configured carrier for FDD in RRC\_CONNECTED as specified in TS 36.321 [4]. This feature is only applicable if the UE supports any *ue-Category-NB*.

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#### 4.3.8.5 *multipleDRB-r13*

This field defines whether the UE supports multiple DRBs when connected to EPC or 5GC. This field is only applicable if the UE supports S1-U data transfer or User plane CIoT EPS Optimisation, as defined in TS 24.301 [28] and any *ue-Category-NB*. If a UE of this release supports multiple DRBs, the UE shall support two simultaneous DRBs.

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| Next changes |

#### 4.3.8.7 *earlyData-UP-r15*

This field defines whether the UE supports MO-EDT for User Plane CIoT EPS optimizations for FDD, as defined in TS 24.301 [28]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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#### 4.3.8.z1 *pur-CP-r16*

This field indicates whether the UE supports Transmission using PUR for Control Plane CIoT EPS optimisations, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.8.z2 *pur-UP-r16*

This field indicates whether the UE supports Transmission using PUR for User Plane CIoT EPS optimisations, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

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#### 4.3.12.p1 *anr-Report-r16*

This field defines whether the UE supports ANR measurement configuration and reporting in RRC\_CONNECTED when connected to EPC as specified in TS 36.304 [14] and TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

4.3.12.p2 *rach-Report-r16*

This field defines whether the UE supports delivery of *rachReport* upon request from the network when connected to EPC as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*. It is mandatory for UEs of this release of the specification.

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| Next changes |

#### 4.3.19.10 *rai-Support-r14*

This field defines whether the UE supports Release Assistance Indication (RAI) via Buffer Status Reporting when connected to EPC as specified in TS 36.321 [4]. This field is only applicable if the UE supports UE category M1 or UE category M2 or any *ue-Category-NB*.

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| Next changes |

#### 4.3.19.q1 *rai-r16*

This field defines whether the UE supports Release Assistance Indication (RAI) via MAC CE when connected to EPC, as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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| Next changes |

#### 4.3.36.r1 *earlyData-UP-5GC-r16*

This field indicates whether the UE supports MO-EDT for User Plane CIoT 5GS optimisations, as defined in TS 24.501 [xx]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.36.r2 *earlyData-CP-5GC-r16*

This field indicates whether the UE supports MO-EDT for Control Plane CIoT 5GS optimisations, as defined in TS 24.501 [xx]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.36.r3 *pur-CP-5GC-r16*

This field indicates whether the UE supports Transmission using PUR for Control Plane CIoT 5GS optimisations, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

#### 4.3.36.r4 *pur-UP-5GC-r16*

This field indicates whether the UE supports Transmission using PUR for User Plane CIoT 5GS optimisations, as defined in TS 36.300 [30]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

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| Next changes |

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| Next changes |

### 6.8.4 MO-EDT for Control Plane CIoT EPS Optimization

It is optional for UE to support MO-EDT for Control Plane CIoT EPS optimizations for FDD, as defined in TS 24.301 [28]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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| Next changes |

### 6.8.s1 MT-EDT for Control Plane CIoT EPS Optimisation

It is optional for UE to support MT-EDT for Control Plane CIoT EPS Optimisations, as defined in TS 24.301 [28]. If the UE supports Mobile Terminated EDT for Control Plane CIoT EPS optimizations, then it shall also support EDT for Control Plane CIoT EPS Optimization as described in clause 6.8.4. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

### 6.8.s2 MT-EDT for User Plane CIoT EPS Optimisation

It is optional for UE to support MT-EDT for User Plane CIoT EPS Optimisations, as defined in TS 24.301 [28]. If the UE supports Mobile Terminated EDT for User Plane CIoT EPS optimizations, then it shall also support Mobile Originated EDT for User Plane CIoT EPS optimization as described in clause 4.3.8.7. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

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| Next changes |
| Next changes |

6.10.x Radio Link Failure Report in NB-IoT

It is optional for UE to support the storage of *RLF-Report* and the reporting in *UEInformationResponse* message when connected to EPC as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

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| Next changes |

### 6.16.1 SC-PTM in Idle mode

It is optional for UE to support the SC-PTM reception in RRC\_IDLE when connected to EPC as specified in TS 36.331 [5]. This feature is only applicable if the UE supports UE category M1 or UE category M2 or if the UE supports coverage enhancements (*ce-ModeB-r13* and/or *ce-ModeA-r13*) or for FDD, if the UE supports any *ue-Category-NB*.

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| Next changes |

6.16.y SC-PTM in Idle mode with multiple TB scheduling

It is optional for UE to support the SC-PTM reception in RRC\_IDLE with multiple TB scheduling when connected to EPC as specified in TS 36.331 [5] and TS 36.213 [22]. This feature is only applicable if the UE supports UE category M1 or UE category M2 or if the UE supports coverage enhancements (ce-ModeB-r13 and/or ce-ModeA-r13), or for FDD if the UE supports any *ue-Category-NB*.

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| Next changes |

### 6.17.2 DL channel quality reporting in MSG3 for the anchor carrier

It is optional for UE to support DL channel quality reporting in MSG3 for the anchor carrier for FDD, as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

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| Next changes |

### 6.17.t1 RRM measurements on non-anchor paging carriers

It is optional for UE to support idle mode RRM measurements on non-anchor paging carriers for FDD, as defined in TS 36.133 [6]. This feature is only applicable if the UE supports any *ue-Category-NB*.

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| Next changes |

### 6.17.t2 DL channel quality reporting in MSG3 for non-anchor carrier

It is optional for UE to support DL channel quality reporting in MSG3 for a non-anchor carrier for FDD, as defined in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB.*

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| Next changes |

6.xy E-UTRA/5GC Parameters

6.xy.a1 NB-IoT/5GC

It is optional for UE to support NB-IoT//5GC. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.xy.a2 MO-EDT for Control Plane CIoT 5GS Optimisation

It is optional for UE to support for MO-EDT for Control Plane CIoT 5GS optimisations, as defined in TS 24.501 [xx]. This feature is only applicable if the UE supports *ce-ModeA-r13,* or for FDD if the UE supports any *ue-Category-NB*.

6.xy.a3 RRC Connection Re-establishment for the Control Plane CIoT 5GS Optimisation

It is optional for UE to support *RRCConnectionReestablishment* for the Control Plane CIoT 5GS Optimisation as specified in TS 36.331 [5]. This feature is only applicable if the UE supports any *ue-Category-NB*.

6.xy.a4 Release Assistance Indication (RAI)

It is optional for UE to support Release Assistance Indication (RAI) via MAC CE when connected to 5GC, as specified in TS 36.321 [4]. This feature is only applicable if the UE supports *ce-ModeA-r13* or if the UE supports any *ue-Category-NB*.

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| End of changes |