**3GPP TSG-RAN WG2 Meeting #118-e *R2-220xxxx***

 **Online, 09 – 20 May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **36.331** | **CR** | **xxxx** | **rev** | **0** | **Current version:** | **17.0.0** |  |
|  |
| *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:***  | Corrections based on ASN.1 review of R17 NB-IoT/eMTC Enhancements  |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | RAN2 |
|  |  |
| ***Work item code:*** | NB\_IOTenh4\_LTE\_eMTC6-Core  |  | ***Date:*** | 2022-04-29 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Corrections to R17 enhancements for NB-IoT and eMTC to address issues found during ASN.1 review and to remove one Editor’s note. |
|  |  |
| ***Summary of change:*** | The CR implements the changes for the following:* RILs: Z308, Z309, H100, H101, Z312, Z313, B002, H102, Z316, Z317, H103, H104, H105, H106, H107, H108, H109, H110, H111, H318.
* Class 0 issues: 2, 3, 9 & 13.

In accordance with the LS from RAN1 in R2-2204423/R1-2202893, the UE capabiity for 16QAM is made per UE. |
|  |  |
| ***Consequences if not approved:*** | Errors will remain in Release 17 specifciation for NB-IoT/eMTC enhancements. |
|  |  |
| ***Clauses affected:*** | 3.2, 5.5.8, 6.3.2, 6.7.2, 6.7.3.1, 6.7.3.2, 6.7.3.6, 7.3.1, 10.6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 36.304 CR xxxx |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| Start of first change |

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], TS 36.300 [9] 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] or TS 36.300 [9].

1xRTT CDMA2000 1x Radio Transmission Technology

AB Access Barring

ACDC Application specific Congestion control for Data Communication

ACK Acknowledgement

AILC Assistance Information bit for Local Cache

AM Acknowledged Mode

ANDSF Access Network Discovery and Selection Function

ARQ Automatic Repeat Request

AS Access Stratum

ASN.1 Abstract Syntax Notation One

AUL Autonomous Uplink

BCCH Broadcast Control Channel

BCD Binary Coded Decimal

BCH Broadcast Channel

BL Bandwidth reduced Low complexity

BLER Block Error Rate

BR Bandwidth Reduced

BR-BCCH Bandwidth Reduced Broadcast Control Channel

CA Carrier Aggregation

CAS Cell Acquisition Subframes

CBP Coverage-Based Paging

CBR Channel Busy Ratio

CCCH Common Control Channel

CCO Cell Change Order

CE Coverage Enhancement

CFI Control Format Indicator

CG Cell Group

CHO Conditional Handover

CIoT Cellular IoT

CMAS Commercial Mobile Alert Service

CP Control Plane

CPA Conditional PSCell Addition

CPC Conditional PSCell Change

CP-EDT Control Plane EDT

C-RNTI Cell RNTI

CRS Cell-specific Reference Signal

CSFB CS fallback

CSG Closed Subscriber Group

CSI Channel State Information

DAPS Dual Active Protocol Stack

DC Dual Connectivity

DCCH Dedicated Control Channel

DCI Downlink Control Information

DCN Dedicated Core Networks

DFN Direct Frame Number

DL Downlink

DL-SCH Downlink Shared Channel

DRB (user) Data Radio Bearer

DRX Discontinuous Reception

DTCH Dedicated Traffic Channel

EAB Extended Access Barring

eDRX Extended DRX

EDT Early Data Transmission

EHPLMN Equivalent Home Public Land Mobile Network

eIMTA Enhanced Interference Management and Traffic Adaptation

ENB Evolved Node B

EN-DC E-UTRA NR Dual Connectivity with E-UTRAN connected to EPC

EPC Evolved Packet Core

EPDCCH Enhanced Physical Downlink Control Channel

EPS Evolved Packet System

ETWS Earthquake and Tsunami Warning System

E-UTRA Evolved Universal Terrestrial Radio Access

E-UTRA/5GC E-UTRA connected to 5GC

E-UTRA/EPC E-UTRA connected to EPC

E-UTRAN Evolved Universal Terrestrial Radio Access Network

FDD Frequency Division Duplex

FFS For Further Study

GERAN GSM/EDGE Radio Access Network

GNSS Global Navigation Satellite System

G-RNTI Group RNTI

GSM Global System for Mobile Communications

GWUS Group Wake Up Signal

HARQ Hybrid Automatic Repeat Request

HFN Hyper Frame Number

HPLMN Home Public Land Mobile Network

HRPD CDMA2000 High Rate Packet Data

HSDN High Speed Dedicated Network

H-SFN Hyper SFN

IAB Integrated Access and Backhaul

IAB-DU IAB-node DU

IAB-MT IAB Mobile Termination

IDC In-Device Coexistence

IE Information element

IMEI International Mobile Equipment Identity

IMSI International Mobile Subscriber Identity

IoT Internet of Things

ISM Industrial, Scientific and Medical

kB Kilobyte (1000 bytes)

L1 Layer 1

L2 Layer 2

L3 Layer 3

LAA Licensed-Assisted Access

LWA LTE-WLAN Aggregation

LWAAP LTE-WLAN Aggregation Adaptation Protocol

LWIP LTE-WLAN Radio Level Integration with IPsec Tunnel

MAC Medium Access Control

MBMS Multimedia Broadcast Multicast Service

MBSFN Multimedia Broadcast multicast service Single Frequency Network

MCG Master Cell Group

MCOT Maximum Channel Occupancy Time

MCPTT Mission Critical Push To Talk

MDT Minimization of Drive Tests

MIB Master Information Block

MO Mobile Originating

MPDCCH MTC Physical Downlink Control Channel

MRB MBMS Point to Multipoint Radio Bearer

MR-DC Multi-Radio Dual Connectivity

MRO Mobility Robustness Optimisation

MSI MCH Scheduling Information

MT Mobile Terminating

MTSI Multimedia Telephony Service for IMS

MUST MultiUser Superposition Transmission

N/A Not Applicable

NACC Network Assisted Cell Change

NAICS Network Assisted Interference Cancellation/Suppression

NAS Non Access Stratum

NB-IoT NarrowBand Internet of Things

NE-DC NR E-UTRA Dual Connectivity

(NG)EN-DC E-UTRA NR Dual Connectivity (i.e. covering both EN-DC and NGEN-DC)

NGEN-DC E-UTRA NR Dual Connectivity with E-UTRAN connected to 5GC

NPBCH Narrowband Physical Broadcast channel

NPDCCH Narrowband Physical Downlink Control channel

NPDSCH Narrowband Physical Downlink Shared channel

NPRACH Narrowband Physical Random Access channel

NPSS Narrowband Primary Synchronization Signal

NPUSCH Narrowband Physical Uplink Shared channel

NR NR Radio Access

NRS Narrowband Reference Signal

NSSAI Network Slice Selection Assistance Information

NSSS Narrowband Secondary Synchronization Signal

NTN Non-Terrestrial Network

OS OFDM Symbol

P2X Pedestrian-to-Everything

PCCH Paging Control Channel

PCell Primary Cell

PDCCH Physical Downlink Control Channel

PDCP Packet Data Convergence Protocol

PDU Protocol Data Unit

PLMN Public Land Mobile Network

PMK Pairwise Master Key

PO Paging Occasion

posSIB Positioning SIB

ProSe Proximity based Services

PS Public Safety (in context of sidelink), Packet Switched (otherwise)

PSCell Primary Secondary Cell

PSK Pre-Shared Key

PTAG Primary Timing Advance Group

PUCCH Physical Uplink Control Channel

PUR Preconfigured Uplink Resource

QCI QoS Class Identifier

QoE Quality of Experience

QoS Quality of Service

RACH Random Access CHannel

RAI Release Assistance Indication

RAT Radio Access Technology

RB Radio Bearer

RCLWI RAN Controlled LTE-WLAN Integration

RLC Radio Link Control

RLOS Restricted Local Operator Services

RMTC RSSI Measurement Timing Configuration

RN Relay Node

RNA RAN-based Notification Area

RNAU RAN-based Notification Area Update

RNTI Radio Network Temporary Identifier

ROHC RObust Header Compression

RPLMN Registered Public Land Mobile Network

RRC Radio Resource Control

RSCP Received Signal Code Power

RSRP Reference Signal Received Power

RSRQ Reference Signal Received Quality

RSS Resynchronisation signal

RSSI Received Signal Strength Indicator

SAE System Architecture Evolution

SAP Service Access Point

SBAS Satellite Based Augmentation System

SC Sidelink Control

SCell Secondary Cell

SCG Secondary Cell Group

SC-MRB Single Cell MRB

SC-RNTI Single Cell RNTI

SD-RSRP Sidelink Discovery Reference Signal Received Power

SFN System Frame Number

SI System Information

SIB System Information Block

SI-RNTI System Information RNTI

SL Sidelink

SLSS Sidelink Synchronisation Signal

SMC Security Mode Control

SMTC SS/PBCH Block Measurement Timing Configuration

SPDCCH Short PDCCH

SPS Semi-Persistent Scheduling

SPT Short Processing Time

SPUCCH Short PUCCH

SR Scheduling Request

SRB Signalling Radio Bearer

S-RSRP Sidelink Reference Signal Received Power

SSAC Service Specific Access Control

SSTD SFN and Subframe Timing Difference

STAG Secondary Timing Advance Group

S-TMSI SAE Temporary Mobile Station Identifier

STTI Short TTI

TA Tracking Area

TAG Timing Advance Group

TDD Time Division Duplex

TDM Time Division Multiplexing

TM Transparent Mode

TPC-RNTI Transmit Power Control RNTI

T-RPT Time Resource Pattern of Transmission

TTI Transmission Time Interval

TTT Time To Trigger

UDC Uplink Data Compression

UE User Equipment

UICC Universal Integrated Circuit Card

UL Uplink

UL-SCH Uplink Shared Channel

UM Unacknowledged Mode

UP User Plane

UP-EDT User Plane EDT

UTC Coordinated Universal Time

UTRAN Universal Terrestrial Radio Access Network

V2X Vehicle-to-Everything

VoLTE Voice over Long Term Evolution

WLAN Wireless Local Area Network

WT WLAN Termination

WUS Wake-up Signal

In the ASN.1, lower case may be used for some (parts) of the above abbreviations e.g. c-RNTI.

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| --- |
| Start of next change |

### 5.5.8 Measurements in NB-IoT

Upon transition to RRC\_CONNECTED mode, the UE shall:

1> if *neighCellMeasCriteria* is present in *SystemInformationBlockType3-NB:*

2> set NRSRPRef to the latest result of the serving cell measurement as used for cell selection/reselection evaluation;

2> if therelaxed monitoring criterion defined in TS 36.304 [4] was not fulfilled:

3> start T326 with the value *t-MeasureDeltaP*;

While in RRC\_CONNECTED mode, after performing a measurement, the UE shall:

1> in the following use the NRSRP measurement for the measured carrier and *nrs-PowerOffsetNonAnchor* corresponding to the measured carrier;

1> if *neighCellMeasCriteria* is present in *SystemInformationBlockType3-NB*:

2> if (NRSRPRef – (NRSRP– *nrs-PowerOffsetNonAnchor*)) > *s-MeasureDeltaP*:

3> set NRSRPRef = (NRSRP – *nrs-PowerOffsetNonAnchor*);

3> start or restart T326 with the value *t-MeasureDeltaP*;

1> if *neighCellMeasCriteria* is not present in *SystemInformationBlockType3-NB*; or

1> if T326 is running:

2> if (NRSRP – *nrs-PowerOffsetNonAnchor*) < *s-MeasureIntra*, perform intra-frequency measurements as defined in TS 36.133 [16];

2> if (NRSRP – *nrs-PowerOffsetNonAnchor*) < *s-MeasureInter*, perform inter-frequency measurements as defined in TS 36.133 [16].

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| Start of next change |

### 6.3.2 Radio resource control information elements

<Unchanged text omitted >

#### – *PDSCH-Config*

The IE *PDSCH-ConfigCommon* and the IE *PDSCH-ConfigDedicated* are used to specify the common and the UE specific PDSCH configuration respectively.

*PDSCH-Config* information element

-- ASN1START

PDSCH-ConfigCommon ::= SEQUENCE {

 referenceSignalPower INTEGER (-60..50),

 p-b INTEGER (0..3)

}

PDSCH-ConfigCommon-v1310 ::= SEQUENCE {

 pdsch-maxNumRepetitionCEmodeA-r13 ENUMERATED {

 r16, r32 } OPTIONAL, -- Need OR

 pdsch-maxNumRepetitionCEmodeB-r13 ENUMERATED {

 r192, r256, r384, r512, r768, r1024,

 r1536, r2048} OPTIONAL -- Need OR

}

PDSCH-ConfigDedicated::= SEQUENCE {

 p-a ENUMERATED {

 dB-6, dB-4dot77, dB-3, dB-1dot77,

 dB0, dB1, dB2, dB3}

}

PDSCH-ConfigDedicated-v1130 ::= SEQUENCE {

 dmrs-ConfigPDSCH-r11 DMRS-Config-r11 OPTIONAL, -- Need ON

 qcl-Operation ENUMERATED {typeA, typeB} OPTIONAL, -- Need OR

 re-MappingQCLConfigToReleaseList-r11 RE-MappingQCLConfigToReleaseList-r11 OPTIONAL, -- Need ON

 re-MappingQCLConfigToAddModList-r11 RE-MappingQCLConfigToAddModList-r11 OPTIONAL -- Need ON

}

PDSCH-ConfigDedicated-v1280 ::= SEQUENCE {

 tbsIndexAlt-r12 ENUMERATED {a26, a33} OPTIONAL -- Need OR

}

PDSCH-ConfigDedicated-v1310 ::= SEQUENCE {

 dmrs-ConfigPDSCH-v1310 DMRS-Config-v1310 OPTIONAL -- Need ON

}

PDSCH-ConfigDedicated-v1430 ::= SEQUENCE {

 ce-PDSCH-MaxBandwidth-r14 ENUMERATED {bw5, bw20} OPTIONAL, -- Need OP

 ce-PDSCH-TenProcesses-r14 ENUMERATED {on} OPTIONAL, -- Need OR

 ce-HARQ-AckBundling-r14 ENUMERATED {on} OPTIONAL, -- Need OR

 ce-SchedulingEnhancement-r14 ENUMERATED {range1, range2} OPTIONAL, -- Need OR

 tbsIndexAlt2-r14 ENUMERATED {b33} OPTIONAL -- Need OR

}

PDSCH-ConfigDedicated-v1530 ::= SEQUENCE {

 qcl-Operation-v1530 ENUMERATED {typeC} OPTIONAL, -- Need OR

 tbs-IndexAlt3-r15 ENUMERATED {a37} OPTIONAL, -- Need OR

 ce-CQI-AlternativeTableConfig-r15 ENUMERATED {on} OPTIONAL, -- Need OR

 ce-PDSCH-64QAM-Config-r15 ENUMERATED {on} OPTIONAL, -- Need OR

 ce-PDSCH-FlexibleStartPRB-AllocConfig-r15 ENUMERATED {on} OPTIONAL, -- Need OR

 altMCS-TableScalingConfig-r15 ENUMERATED {oDot5, oDot625, oDot75, oDot875} OPTIONAL -- Need OR

}

PDSCH-ConfigDedicated-v1610 ::= SEQUENCE {

 ce-PDSCH-MultiTB-Config-r16 SetupRelease {CE-PDSCH-MultiTB-Config-r16}

}

PDSCH-ConfigDedicated-v1700 ::= SEQUENCE {

 ce-PDSCH-14HARQ-Config-r17 SetupRelease {CE-PDSCH-14HARQ-Config-r17} OPTIONAL, -- Need ON

 ce-PDSCH-maxTBS-r17 ENUMERATED {enabled} OPTIONAL -- Need OR

}

PDSCH-ConfigDedicatedSCell-v1430 ::= SEQUENCE {

 tbsIndexAlt2-r14 ENUMERATED {b33} OPTIONAL -- Need OR

}

CE-PDSCH-MultiTB-Config-r16 ::= SEQUENCE {

 interleaving-r16 ENUMERATED {on} OPTIONAL, -- Need OR

 harq-AckBundling-r16 ENUMERATED {on} OPTIONAL -- Need OR

}

CE-PDSCH-14HARQ-Config-r17 ::= SEQUENCE {

 ce-HARQ-AckDelay-r17 ENUMERATED {alt-1, alt-2e}

}

RE-MappingQCLConfigToAddModList-r11 ::= SEQUENCE (SIZE (1..maxRE-MapQCL-r11)) OF PDSCH-RE-MappingQCL-Config-r11

RE-MappingQCLConfigToReleaseList-r11 ::= SEQUENCE (SIZE (1..maxRE-MapQCL-r11)) OF PDSCH-RE-MappingQCL-ConfigId-r11

PDSCH-RE-MappingQCL-Config-r11 ::= SEQUENCE {

 pdsch-RE-MappingQCL-ConfigId-r11 PDSCH-RE-MappingQCL-ConfigId-r11,

 optionalSetOfFields-r11 SEQUENCE {

 crs-PortsCount-r11 ENUMERATED {n1, n2, n4, spare1},

 crs-FreqShift-r11 INTEGER (0..5),

 mbsfn-SubframeConfigList-r11 CHOICE {

 release NULL,

 setup SEQUENCE {

 subframeConfigList MBSFN-SubframeConfigList

 }

 } OPTIONAL, -- Need ON

 pdsch-Start-r11 ENUMERATED {reserved, n1, n2, n3, n4, assigned}

 } OPTIONAL, -- Need OP

 csi-RS-ConfigZPId-r11 CSI-RS-ConfigZPId-r11,

 qcl-CSI-RS-ConfigNZPId-r11 CSI-RS-ConfigNZPId-r11 OPTIONAL, -- Need OR

 ...,

 [[ mbsfn-SubframeConfigList-v1430 CHOICE {

 release NULL,

 setup SEQUENCE {

 subframeConfigList-v1430 MBSFN-SubframeConfigList-v1430

 }

 } OPTIONAL -- Need OP

 ]],

 [[ codewordOneConfig-v1530 CHOICE {

 release NULL,

 setup SEQUENCE {

 crs-PortsCount-v1530 ENUMERATED {n1, n2, n4, spare1},

 crs-FreqShift-v1530 INTEGER (0..5),

 mbsfn-SubframeConfigList-v1530 MBSFN-SubframeConfigList OPTIONAL,

 mbsfn-SubframeConfigListExt-v1530 MBSFN-SubframeConfigList-v1430 OPTIONAL,

 pdsch-Start-v1530 ENUMERATED {reserved, n1, n2, n3, n4, assigned},

 csi-RS-ConfigZPId-v1530 CSI-RS-ConfigZPId-r11,

 qcl-CSI-RS-ConfigNZPId-v1530 CSI-RS-ConfigNZPId-r11 OPTIONAL

 }

 } OPTIONAL -- Cond TypeC

 ]]

}

-- ASN1STOP

| *PDSCH-Config* field descriptions |
| --- |
| ***altMCS-TableScalingConfig***Presence of the field indicates activation of 6-bit MCS table (i.e., *altMCS-Table*) for UE indicating support for *altMCS-Table*, see TS 36.212 [22] and TS 36.213 [23]. The indicated value configures the parameter *altMCS-Table-Scaling* where value oDot5 corresponds to scaling factor 0.5, value oDot625 corresponds to scaling factor 0.625 and so on, see TS 36.213 [23]. |
| ***ce-CQI-AlternativeTableConfig***Configures the UE supporting alternative CQI table to use the alternative CQI table in CE mode A. See TS 36.213 [23]. |
| ***ce-HARQ-AckBundling***Activation of PDSCH HARQ-ACK bundling in half duplex FDD in CE mode A, see TS 36.212 [22] and TS 36.213 [23]. |
| ***ce-HARQ-AckDelay***Configures the HARQ ACK delay between different subframe types and absolute subframes when UE is configured with 14 HARQ, see TS 36.212 [22] and TS 36.213 [23]. Value *alt-1* corresponds to Alt-1 and value *alt-2e* corresponds to Alt-2e. |
| ***ce-PDSCH-14HARQ-Config***Indicates whether 14-HARQ is enabled for HD-FDD Cat M1 UE, see TS 36.211 [21], TS 36.212 [22] and TS 36.213 [23]. E-UTRAN may set this field to setup only when DL multi-TB scheduling is not enabled and PUCCH repetition with HARQ-ACK bundling is not configured. |
| ***ce-PDSCH-64QAM-Config***Activation of 64 QAM for non-repeated unicast PDSCH in CE mode A. |
| ***ce-PDSCH-FlexibleStartPRB-AllocConfig***Activation of flexible starting PRB for PDSCH resource allocation in CE mode A or B. E-UTRAN does not configure this field when E-UTRA system bandwidth is 1.4 MHz. |
| ***ce-PDSCH-MaxBandwidth***Maximum PDSCH channel bandwidth in CE mode A and B, see TS 36.212 [22] and TS 36.213 [23]. Value bw5 corresponds to 5 MHz, and value bw20 corresponds to 20 MHz. If this field is absent, the UE shall release any existing value and set the maximum PDSCH channel bandwidth in CE mode A and B to 1.4 MHz. Parameter: transmission bandwidth configuration, see TS 36.101 [42], table 5.6-1. The max bandwidth can by configured to 5MHz for BL UEs and 5MHz or 20MHz for UEs in CE. |
| ***ce-PDSCH-maxTBS***Indicates whether DL TBS of 1736 bits is enabled for HD-FDD Cat M1 UE in CE mode A, see TS 36.213 [23], clause 7.1.7.2. |
| ***ce-PDSCH-MultiTB-Config***Indicates whether DL multi-TB scheduling is enabled, i.e., a single DCI can schedule up to 8 PDSCH transport blocks in CE mode A and up to 4 PDSCH transport blocks in CE mode B. See TS 36.213 [23], clause 7.1.11. |
| ***ce-PDSCH-TenProcesses***Configuration of 10 (instead of 8) DL HARQ processes in FDD in CE mode A, see TS 36.212 [22] and TS 36.213 [23]. |
| ***ce-SchedulingEnhancement***Activation of dynamic HARQ-ACK delay for HD-FDD for PDSCH in CE mode A controlled by the DCI, see TS 36.212 [22] and TS 36.213 [23]. Value range1 corresponds to the first range of HARQ-ACK delays, and value range2 corresponds to second range of HARQ-ACK delays. |
| ***codewordOneConfig***The field corresponds to codeword 1, see TS 36.213 [23], clause 7.1.10. If absent, the UE applies the values from the serving cell configured on the same frequency. |
| ***harq-AckBundling***Indicates whether HARQ-ACK bundling for DL multi-TB scheduling is enabled, see TS 36.213 [23], clause 7.3. |
| ***interleaving***Indicates whether interleaving for DL multi-TB scheduling is enabled, see TS 36.213 [23], clause 7.1.11. |
| ***mbsfn-SubframeConfigList***Indicates the MBSFN configuration for the CSI-RS resources. If *optionalSetOfFields* is absent, the fields *mbsfn-SubframeConfigList-r11* and *mbsfn-SubframeConfigList-v1430* are released. |
| ***optionalSetOfFields***If absent, the UE releases the configuration provided previously, if any, and applies the values from the serving cell configured on the same frequency. If the UE is configured with *qcl-Operation-v1530*, this field corresponds to codeword 0, see TS 36.213 [23], clause 7.1.10. |
| ***p-a***Parameter: , see TS 36.213 [23], clause 5.2. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc. |
| ***p-b***Parameter: , see TS 36.213 [23], clause Table 5.2-1. |
| ***pdsch-maxNumRepetitionCEmodeA***Maximum value to indicate the set of PDSCH repetition numbers for CE mode A, see TS 36.211 [21] and TS 36.213 [23]. |
| ***pdsch-maxNumRepetitionCEmodeB***Maximum value to indicate the set of PDSCH repetition numbers for CE mode B, see TS 36.211 [21] and TS 36.213 [23]. |
| ***pdsch-Start***The starting OFDM symbol of PDSCH for the concerned serving cell, see TS 36.213 [23], clause 7.1.6.4. Values 1, 2, 3 are applicable when *dl-Bandwidth* for the concerned serving cell is greater than 10 resource blocks, values 2, 3, 4 are applicable when *dl-Bandwidth* for the concerned serving cell is less than or equal to 10 resource blocks, see TS 36.211 [21], Table 6.7-1. Value *n1* corresponds to 1, value *n2* corresponds to 2 and so on. If the field *pdsch-Start-v1530* is also configured, E-UTRAN ensures that this value is the same as *pdsch-Start* (i.e., without suffix)*.* |
| ***qcl-CSI-RS-ConfigNZPId***Indicates the CSI-RS resource that is quasi co-located with the PDSCH antenna ports, see TS 36.213 [23], clause 7.1.9. E-UTRAN configures this field if and only if the UE is configured with *qcl-Operation* set to *typeB* or *qcl-Operation-v1530* set to *typeC*. If the UE is configured with *qcl-Operation-v1530* set to *typeC*, the field *qcl-CSI-RS-ConfigNZPId-r11* corresponds to codeword 0, and the field *qcl-CSI-RS-ConfigNZPId-v1530* corresponds to codeword 1, see TS 36.213 [23], clause 7.1.10.. |
| ***qcl-Operation***Indicates the quasi co-location behaviour to be used by the UE, type A, type B, or type C, as described in TS 36.213 [23], clause 7.1.10. In case *qcl-Operation-v1530* is present, the UE shall ignore the field qcl-Operation (without suffix). E-UTRAN configures *qcl-Operation-v1530* only when transmission mode 10 is configured for the serving cell on this carrier frequency and QCL type C is configured. |
| ***referenceSignalPower***Parameter: *Reference-signal power*, which provides the downlink reference-signal EPRE,see TS 36.213 [23], clause 5.2. The actual value in dBm. |
| ***re-MappingQCLConfigToAddModList, re-MappingQCLConfigToReleaseList***For a serving frequency E-UTRAN configures at least one *PDSCH-RE-MappingQCL-Config* when transmission mode 10 is configured for the serving cell on this carrier frequency. Otherwise it does not configure this field. |
| ***tbsIndexAlt***Indicates the applicability of the alternative TBS index for the ITBS 26 and 33 (see TS 36.213 [23], Table 7.1.7.2.1-1), to all subframes scheduled by DCI format 2C or 2D. Value a26 refers to the alternative TBS index ITBS 26A, and value a33 refers to the alternative TBS index ITBS 33A. If this field is not configured, the UE shall use ITBS 26 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead. If neither this field nor tbsIndexAlt2 configures an alternative TBS index for ITBS 33, the UE shall use ITBS 33 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead. |
| ***tbsIndexAlt2***Indicates the applicability of the alternative TBS index for the *I*TBS 33 (see TS 36.213 [23], Table 7.1.7.2.1-1) to all subframes. Value *b33* refers to the alternative TBS index *I*TBS 33B. If neither this field nor *tbsIndexAlt* configures an alternative TBS index for *I*TBS 33, the UE shall use *I*TBS 33 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead. |
| ***tbs-IndexAlt3***Indicates the applicability of the alternative TBS index for the *I*TBS 37 (see TS 36.213 [23], Table 7.1.7.2.1-1) to all subframes. Value a37 refers to the alternative TBS index *I*TBS 37A. |

| Conditional presence | Explanation |
| --- | --- |
| *TypeC* | The field is optional, need ON when *qcl-Operation* is configured with *typeC*. Otherwise the field is not present and the UE shall delete any existing value for this field.  |

|  |
| --- |
| Start of next change |

### 6.7.2 NB-IoT Message definitions

<Unchanged text omitted >

#### – *RRCConnectionRelease-NB*

The *RRCConnectionRelease-NB* message is used to command the release of an RRC connection, or to complete an UP-EDT procedure.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: E‑UTRAN to UE

*RRCConnectionRelease-NB* message

-- ASN1START

RRCConnectionRelease-NB ::= SEQUENCE {

 rrc-TransactionIdentifier RRC-TransactionIdentifier,

 criticalExtensions CHOICE {

 c1 CHOICE {

 rrcConnectionRelease-r13 RRCConnectionRelease-NB-r13-IEs,

 spare1 NULL

 },

 criticalExtensionsFuture SEQUENCE {}

 }

}

RRCConnectionRelease-NB-r13-IEs ::= SEQUENCE {

 releaseCause-r13 ReleaseCause-NB-r13,

 resumeIdentity-r13 ResumeIdentity-r13 OPTIONAL, -- Need OR

 extendedWaitTime-r13 INTEGER (1..1800) OPTIONAL, -- Need ON

 redirectedCarrierInfo-r13 RedirectedCarrierInfo-NB-r13 OPTIONAL, -- Need ON

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension RRCConnectionRelease-NB-v1430-IEs OPTIONAL

}

RRCConnectionRelease-NB-v1430-IEs ::= SEQUENCE {

 redirectedCarrierInfo-v1430 RedirectedCarrierInfo-NB-v1430 OPTIONAL, -- Cond Redirection

 extendedWaitTime-CPdata-r14 INTEGER (1..1800) OPTIONAL, -- Cond NoExtendedWaitTime

 nonCriticalExtension RRCConnectionRelease-NB-v1530-IEs OPTIONAL

}

RRCConnectionRelease-NB-v1530-IEs ::= SEQUENCE {

 drb-ContinueROHC-r15 ENUMERATED {true} OPTIONAL, -- Cond UP-EDT

 nextHopChainingCount-r15 NextHopChainingCount OPTIONAL, -- Cond EarlySec

 nonCriticalExtension RRCConnectionRelease-NB-v1550-IEs OPTIONAL

}

RRCConnectionRelease-NB-v1550-IEs ::= SEQUENCE {

 redirectedCarrierInfo-v1550 RedirectedCarrierInfo-NB-v1550 OPTIONAL, -- Cond Redirection-TDD

 nonCriticalExtension RRCConnectionRelease-NB-v15b0-IEs OPTIONAL

}

RRCConnectionRelease-NB-v15b0-IEs ::= SEQUENCE {

 noLastCellUpdate-r15 ENUMERATED {true} OPTIONAL, -- Need OP

 nonCriticalExtension RRCConnectionRelease-NB-v1610-IEs OPTIONAL

}

RRCConnectionRelease-NB-v1610-IEs ::= SEQUENCE {

 resumeIdentity-r16 I-RNTI-r15 OPTIONAL, -- Need OR

 anr-MeasConfig-r16 ANR-MeasConfig-NB-r16 OPTIONAL, -- Need OP

 pur-Config-r16 SetupRelease {PUR-Config-NB-r16}

 OPTIONAL, -- Need ON

 nonCriticalExtension RRCConnectionRelease-NB-v1700-IEs OPTIONAL

}

RRCConnectionRelease-NB-v1700-IEs ::= SEQUENCE {

 cbp-Index-r17 INTEGER (1..2) OPTIONAL, -- Need OR

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

ReleaseCause-NB-r13 ::= ENUMERATED {loadBalancingTAUrequired, other,

 rrc-Suspend, spare1}

RedirectedCarrierInfo-NB-r13::= CarrierFreq-NB-r13

RedirectedCarrierInfo-NB-v1430 ::= SEQUENCE {

 redirectedCarrierOffsetDedicated-r14 ENUMERATED{

 dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,

 dB12, dB14, dB16, dB18, dB20, dB22, dB24, dB26},

 t322-r14 ENUMERATED{

 min5, min10, min20, min30, min60, min120, min180,

 spare1}

}

RedirectedCarrierInfo-NB-v1550::= CarrierFreq-NB-v1550

-- ASN1STOP

| *RRCConnectionRelease-NB* field descriptions |
| --- |
| ***cbp-Index***Index to the coverage-based paging configuration. Value 1 corresponds to the first entry in *cbp-ConfigList* and value2 corresponds to the second entry in *cbp-ConfigList* in *SystemInformationBlockType22-NB*. |
| ***drb-ContinueROHC***This field indicates whether to continue or reset the header compression protocol context for the DRBs configured with the header compression protocol. Presence of the field indicates that the header compression protocol context continues when UE initiates UP-EDT in the same cell, while absence indicates that the header compression protocol context is reset.  |
| ***extendedWaitTime***Value in seconds. |
| ***extendedWaitTime-CPdata***Wait time for data transfer using the Control Plane CIoT EPS optimisation. Value in seconds. See TS 24.301 [35]. |
| ***noLastCellUpdate***Presence of the field indicates that the last used cell for (G)WUS shall not be updated. |
| ***redirectedCarrierInfo***The r*edirectedCarrierInfo* indicates a carrier frequency (downlink for FDD) and is used to redirect the UE to a NB-IoT carrier frequency, by means of the cell selection upon leaving RRC\_CONNECTED as specified in TS 36.304 [4]. |
| ***redirectedCarrierOffsetDedicated***Parameter "Qoffsetdedicatedfrequency" in TS 36.304 [4]. For NB-IoT carrier frequencies, a UE that supports multi-band cells considers the *redirectedCarrierOffsetDedicated* to be common for all overlapping bands (i.e. regardless of the EARFCN that is used). |
| ***releaseCause***The *releaseCause* is used to indicate the reason for releasing the RRC Connection.E-UTRAN should not set the *releaseCause* to *loadBalancingTAURequired* if the *extendedWaitTime* is present and/or if the UE is connected to 5GC. |
| ***resumeIdentity***UE identity to facilitate UE context retrieval at eNB. E-UTRAN configures *resumeIdentity-r13* only when the UE is connected to EPC and configures *resumeIdentity-r16* only when the UE is connected to 5GC. |
| ***t322***Timer T322 as described in clause 7.3. Value minN corresponds to N minutes. |

| Conditional presence | Explanation |
| --- | --- |
| *NoExtendedWaitTime* | The field is optionally present, Need ON, if the *extendedWaitTime* is not included; otherwise the field is not present. |
| *Redirection* | The field is optionally present, Need ON, if *redirectedCarrierInfo* is included; otherwise the field is not present. |
| *Redirection-TDD* | The field is optionally present, Need ON, if *redirectedCarrierInfo* is included in TDD mode. Otherwise, the field is not present. |
| *UP-EDT* | The field is optionally present, Need ON, if the UE supports UP-EDT or UP transmission using PUR and *releaseCause* is set to *rrc-Suspend*; otherwise the field is not present. |
| *EarlySec* | For EPC, the field is optionally present, Need ON, if the UE supports early security reactivation or UP-EDT or UP transmission using PUR and *releaseCause* is set to *rrc-Suspend*; otherwise the field is not present.For 5GC, the field is mandatory present if *releaseCause* is set to *rrc-Suspend*; otherwise the field is not present. |

|  |
| --- |
| Start of next change |

### 6.7.2 NB-IoT Message definitions

<Unchanged text omitted >

#### – *RRCEarlyDataComplete-NB*

The *RRCEarlyDataComplete-NB* message is used to confirm the successful completion of the CP-EDT procedure.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E‑UTRAN to UE

*RRCEarlyDataComplete-NB* message

-- ASN1START

RRCEarlyDataComplete-NB-r15 ::= SEQUENCE {

 criticalExtensions CHOICE {

 rrcEarlyDataComplete-r15 RRCEarlyDataComplete-NB-r15-IEs,

 criticalExtensionsFuture SEQUENCE {}

 }

}

RRCEarlyDataComplete-NB-r15-IEs ::= SEQUENCE {

 dedicatedInfoNAS-r15 DedicatedInfoNAS OPTIONAL, -- Need ON

 extendedWaitTime-r15 INTEGER (1..1800) OPTIONAL, -- Need ON

 redirectedCarrierInfo-r15 RedirectedCarrierInfo-NB-r13 OPTIONAL, -- Need ON

 redirectedCarrierInfoExt-r15 RedirectedCarrierInfo-NB-v1430 OPTIONAL, -- Cond Redirection

 nonCriticalExtension RRCEarlyDataComplete-NB-v1590-IEs OPTIONAL

}

RRCEarlyDataComplete-NB-v1590-IEs ::= SEQUENCE {

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension RRCEarlyDataComplete-NB-v1700-IEs OPTIONAL

}

RRCEarlyDataComplete-NB-v1700-IEs ::= SEQUENCE {

 cbp-Index-r17 INTEGER (1..2) OPTIONAL, -- Need OR

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- ASN1STOP

| *RRCEarlyDataComplete-NB* field descriptions |
| --- |
| ***cbp-Index***Index to the coverage-based configuration. Value 1 corresponds to the first entry in *cbp-ConfigList* and *value* 2 corresponds to the second entry in *cbp-ConfigList* in *SystemInformationBlockType22-NB*. |
| ***extendedWaitTime***Value in seconds. |

| Conditional presence | Explanation |
| --- | --- |
| *Redirection* | The field is optionally present, Need ON, if *redirectedCarrierInfo* is included; otherwise the field is not present. |

|  |
| --- |
| Start of next change |

#### 6.7.3.1 NB-IoT System information blocks

<Unchanged text omitted >

#### – *SystemInformationBlockType3-NB*

The IE *SystemInformationBlockType3-NB* contains cell re-selection information common for intra-frequency, and inter-frequency cell re-selection as well as intra-frequency cell re-selection information other than neighbouring cell related.

*SystemInformationBlockType3-NB* information element

-- ASN1START

SystemInformationBlockType3-NB-r13 ::= SEQUENCE {

 cellReselectionInfoCommon-r13 SEQUENCE {

 q-Hyst-r13 ENUMERATED {

 dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,

 dB12, dB14, dB16, dB18, dB20, dB22, dB24

 }

 },

 cellReselectionServingFreqInfo-r13 SEQUENCE {

 s-NonIntraSearch-r13 ReselectionThreshold

 },

 intraFreqCellReselectionInfo-r13 SEQUENCE {

 q-RxLevMin-r13 Q-RxLevMin,

 q-QualMin-r13 Q-QualMin-r9 OPTIONAL, -- Need OP

 p-Max-r13 P-Max OPTIONAL, -- Need OP

 s-IntraSearchP-r13 ReselectionThreshold,

 t-Reselection-r13 T-Reselection-NB-r13

 },

 freqBandInfo-r13 NS-PmaxList-NB-r13 OPTIONAL, -- Need OR

 multiBandInfoList-r13 SEQUENCE (SIZE (1..maxMultiBands)) OF

 NS-PmaxList-NB-r13 OPTIONAL, -- Need OR

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[ intraFreqCellReselectionInfo-v1350 IntraFreqCellReselectionInfo-NB-v1350 OPTIONAL -- Cond Qrxlevmin

 ]],

 [[ intraFreqCellReselectionInfo-v1360 IntraFreqCellReselectionInfo-NB-v1360 OPTIONAL -- Need OR

 ]],

 [[ intraFreqCellReselectionInfo-v1430 IntraFreqCellReselectionInfo-NB-v1430 OPTIONAL -- Need OR

 ]],

 [[ cellReselectionInfoCommon-v1450 CellReselectionInfoCommon-NB-v1450 OPTIONAL -- Need OR

 ]],

 [[ nsss-RRM-Config-r15 NSSS-RRM-Config-NB-r15 OPTIONAL, -- Need OR

 npbch-RRM-Config-r15 ENUMERATED {enabled} OPTIONAL -- Need OR

 ]],

 [[ connMeasConfig-r17 ConnMeasConfig-NB-r17 OPTIONAL, -- Need OR

 t-Service-r17 TimeUTC-r17 OPTIONAL -- Need OR

 ]]

}

IntraFreqCellReselectionInfo-NB-v1350 ::= SEQUENCE {

 delta-RxLevMin-v1350 INTEGER (-8..-1)

}

IntraFreqCellReselectionInfo-NB-v1360 ::= SEQUENCE {

 s-IntraSearchP-v1360 ReselectionThreshold-NB-v1360

}

IntraFreqCellReselectionInfo-NB-v1430 ::= SEQUENCE {

 powerClass14dBm-Offset-r14 ENUMERATED {dB-6, dB-3, dB3, dB6, dB9, dB12} OPTIONAL, -- Need OP

 ce-AuthorisationOffset-r14 ENUMERATED {dB5, dB10, dB15, dB20, dB25, dB30, dB35} OPTIONAL -- Need OP

}

CellReselectionInfoCommon-NB-v1450 ::= SEQUENCE {

 s-SearchDeltaP-r14 ENUMERATED {dB6, dB9, dB12, dB15}

}

ConnMeasConfig-NB-r17 ::= SEQUENCE {

 s-MeasureIntra-r17 NRSRP-Range-NB-r14,

 s-MeasureInter-r17 NRSRP-Range-NB-r14 OPTIONAL, -- Need OP

 neighCellMeasCriteria-r17 SEQUENCE {

 s-MeasureDeltaP-r17 ENUMERATED {dB6, dB9, dB12, dB15},

 t-MeasureDeltaP-r17 ENUMERATED {s15, s30, s45, s60}

 } OPTIONAL -- Need OR

}

-- ASN1STOP

| *SystemInformationBlockType3-NB* field descriptions |
| --- |
| ***ce-AuthorisationOffset***Parameter "Qoffsetauthorization" in TS 36.304 [4]. Value in dB. Value dB5 corresponds to 5 dB, dB10 corresponds to 10 dB and so on.If the field is absent, the UE applies the value of ce-*authorisationOffset* in *SystemInformationBlockType1-NB*.  |
| ***multiBandInfoList***A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42], clause 6.2.4F, applicable for the intra-frequency neighbouring NB-IoT cells if the UE selects the frequency band from *freqBandIndicator* in *SystemInformationBlockType1-NB*. |
| ***npbch-RRM-Config***For FDD: Configuration for NPBCH-based RRM measurements. See TS 36.214 [24].If enabled, NPBCH can be used in addition to NRS for RRM measurements for serving cell.  |
| ***nsss-RRM-Config***For FDD: Configuration for NSSS-based RRM measurements for the serving cell. |
| ***powerClass14dBm-Offset***Parameter "Poffset" in TS 36.304 [4], only applicable for UE supporting *powerClassNB-14dBm*. Value in dB. Value dB-6 corresponds to -6 dB, dB-3 corresponds to -3 dB and so on. If the field is absent, the UE applies the (default) value of 0 dB for "Poffset" in TS 36.304 [4]. |
| ***p-Max***Value applicable for the intra-frequency neighbouring E-UTRA cells. If absent the UE applies the maximum power according to the UE capability. |
| ***q-Hyst***Parameter *Qhyst* in TS 36.304 [4], Value in dB. Value dB1 corresponds to 1 dB, dB2 corresponds to 2 dB and so on. |
| ***q-QualMin***Parameter "Qqualmin" in TS 36.304 [4], applicable for intra-frequency neighbour cells. If the field is not present, the UE applies the (default) value of negative infinity for Qqualmin. |
| ***q-RxLevMin, delta-RxLevMin***Parameter "Qrxlevmin" in TS 36.304 [4], applicable for intra-frequency neighbour cells. If *delta-RxLevMin* is not included, actual value Qrxlevmin = *q-RxLevMin* \* 2 [dBm]. If *delta-RxLevMin* is included, actual value Qrxlevmin = (*q-RxLevMin* + *delta-RxLevMin*) \* 2 [dBm]. |
| ***s-IntraSearchP***Parameter "SIntraSearchP" in TS 36.304 [4].In case *s-IntraSearchP-v1360* is included, the UE shall ignore *s-IntraSearchP* (i.e. without suffix). |
| ***s-MeasureDeltaP***Threshold of change in serving cell NRSRP to trigger neighbour cell measurement in RRC\_CONNECTED state. |
| ***s-MeasureInter***NRSRP threshold to trigger inter-frequency neighbour cell measurement in RRC\_CONNECTED state. If the field is not present when *connMeasConfig* is present, the UE applies the value of *s-MeasureIntra*. |
| ***s-MeasureIntra***NRSRP threshold to trigger intra-frequency neighbour cell measurement in RRC\_CONNECTED state. |
| ***s-NonIntraSearch***Parameter "SnonIntraSearchP" in TS 36.304 [4]. |
| ***s-SearchDeltaP***Parameter "SSearchDeltaP" in TS 36.304 [4]. This parameter is only applicable for UEs supporting relaxed monitoring as specified in TS 36.306 [5]. Value dB6 corresponds to 6 dB, dB9 corresponds to 9 dB and so on. |
| ***t-MeasureDeltaP***Duration after which the UE is not required to perfom neighbour cell measurement in RRC\_CONNECTED when *s-MeasureDeltaP* criterion is fulfilled. |
| ***t-Reselection***Parameter "TreselectionNB-IoT\_Intra" in TS 36.304 [4]. |
| ***t-Service***Time information on when a NTN quasi-Earth fixed cell is going to stop serving the area it is currently covering. |

| Conditional presence | Explanation |
| --- | --- |
| Qrxlevmin | This field is optionally present, Need OR, if *q-RxLevMin* is set to the minimum value. Otherwise the field is not present. |

|  |
| --- |
| Start of next change |

#### 6.7.3.1 NB-IoT System information blocks

<Unchanged text omitted >

#### – *SystemInformationBlockType22-NB*

The IE *SystemInformationBlockType22-NB* contains radio resource configuration for paging and random access procedure on non-anchor carriers.

*SystemInformationBlockType22-NB* information element

-- ASN1START

SystemInformationBlockType22-NB-r14 ::= SEQUENCE {

 dl-ConfigList-r14 DL-ConfigCommonList-NB-r14 OPTIONAL, -- Need OR

 ul-ConfigList-r14 UL-ConfigCommonList-NB-r14 OPTIONAL, -- Need OR

 pagingWeightAnchor-r14 PagingWeight-NB-r14 OPTIONAL, -- Cond pcch-config

 nprach-ProbabilityAnchorList-r14 NPRACH-ProbabilityAnchorList-NB-r14 OPTIONAL, -- Cond nprach-config

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...,

 [[ mixedOperationModeConfig-r15 SEQUENCE {

 dl-ConfigListMixed-r15 DL-ConfigCommonList-NB-r14 OPTIONAL, -- Cond dl-ConfigList

 ul-ConfigListMixed-r15 UL-ConfigCommonList-NB-r14 OPTIONAL, -- Cond ul-ConfigList

 pagingDistribution-r15 ENUMERATED {true} OPTIONAL, -- Need OR

 nprach-Distribution-r15 ENUMERATED {true} OPTIONAL -- Need OR

 } OPTIONAL, -- Need OR

 ul-ConfigList-r15 UL-ConfigCommonListTDD-NB-r15 OPTIONAL -- Cond TDD

 ]],

 [[ cbp-Config-r17 CBP-Config-NB-r17 OPTIONAL -- Need OR

 ]]

}

DL-ConfigCommonList-NB-r14 ::= SEQUENCE (SIZE (1.. maxNonAnchorCarriers-NB-r14)) OF

 DL-ConfigCommon-NB-r14

UL-ConfigCommonList-NB-r14 ::= SEQUENCE (SIZE (1.. maxNonAnchorCarriers-NB-r14)) OF

 UL-ConfigCommon-NB-r14

UL-ConfigCommonListTDD-NB-r15 ::= SEQUENCE (SIZE (1.. maxNonAnchorCarriers-NB-r14)) OF

 UL-ConfigCommonTDD-NB-r15

CBP-Config-NB-r17 ::= SEQUENCE {

 cbp-HystTimer-r17 ENUMERATED {ms2560, ms7680, ms12800, ms17920, ms23040, ms28160, ms33280, ms40960},

 cbp-ConfigList-r17 SEQUENCE (SIZE (1.. 2)) OF CBP-Config-NB-r17

}

CBP-Config-NB-r17 ::= SEQUENCE {

 nrsrpMin-r17 RSRP-Range,

 nB-r17 ENUMERATED {fourT, twoT, oneT, halfT, quarterT, one8thT, one16thT, one32ndT,

 one64thT, one128thT, one256thT, one512thT, one1024thT, spare3,

 spare2, spare1} OPTIONAL, -- Need OP

 ue-SpecificDRX-CycleMin-r17 ENUMERATED {rf32, rf64, rf128, rf256} OPTIONAL -- Need OR

}

DL-ConfigCommon-NB-r14 ::= SEQUENCE {

 dl-CarrierConfig-r14 DL-CarrierConfigCommon-NB-r14,

 pcch-Config-r14 PCCH-Config-NB-r14 OPTIONAL, -- Need OR

 ...,

 [[ wus-Config-r15 WUS-ConfigPerCarrier-NB-r15 OPTIONAL -- Cond WUS

 ]],

 [[ gwus-Config-r16 WUS-ConfigPerCarrier-NB-r15 OPTIONAL -- Cond GWUS

 ]],

 [[ pcch-Config-r17 PCCH-Config-NB-r17 OPTIONAL -- Cond pcch-config2

 ]]

}

PCCH-Config-NB-r14 ::= SEQUENCE {

 npdcch-NumRepetitionPaging-r14 ENUMERATED {

 r1, r2, r4, r8, r16, r32, r64, r128,

 r256, r512, r1024, r2048,

 spare4, spare3, spare2, spare1} OPTIONAL, -- Need OP

 pagingWeight-r14 PagingWeight-NB-r14 DEFAULT w1,

 ...

}

PCCH-Config-NB-r17 ::= SEQUENCE {

 cbp-Index-r17 INTEGER (1..2),

 npdcch-NumRepetitionPaging-r17 ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128},

 pagingWeight-r17 PagingWeight-NB-r14 DEFAULT w1,

 ...

}

PagingWeight-NB-r14 ::= ENUMERATED {w1, w2, w3, w4, w5, w6, w7, w8,

 w9, w10, w11, w12, w13, w14, w15, w16}

UL-ConfigCommon-NB-r14 ::= SEQUENCE {

 ul-CarrierFreq-r14 CarrierFreq-NB-r13,

 nprach-ParametersList-r14 NPRACH-ParametersList-NB-r14 OPTIONAL, -- Need OR

 ...,

 [[ nprach-ParametersListEDT-r15 NPRACH-ParametersList-NB-r14 OPTIONAL -- Cond EDT

 ]],

 [[ rsrp-ThresholdsPrachInfoList-r16 RSRP-ThresholdsNPRACH-InfoList-NB-r13 OPTIONAL -- Need OR

 ]]

}

UL-ConfigCommonTDD-NB-r15 ::= SEQUENCE {

 tdd-UL-DL-AlignmentOffset-r15 TDD-UL-DL-AlignmentOffset-NB-r15,

 nprach-ParametersListTDD-r15 NPRACH-ParametersListTDD-NB-r15 OPTIONAL, -- Need OR

 ...

}

NPRACH-ProbabilityAnchorList-NB-r14 ::= SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF

 NPRACH-ProbabilityAnchor-NB-r14

NPRACH-ProbabilityAnchor-NB-r14 ::= SEQUENCE {

 nprach-ProbabilityAnchor-r14 ENUMERATED {

 zero, oneSixteenth, oneFifteenth, oneFourteenth,

 oneThirteenth, oneTwelfth, oneEleventh, oneTenth,

 oneNinth, oneEighth, oneSeventh, oneSixth,

 oneFifth, oneFourth, oneThird, oneHalf}

 OPTIONAL -- Need OP

}

-- ASN1STOP

| *SystemInformationBlockType22-NB* field descriptions |
| --- |
| ***cbp-ConfigList***List of of coverage-based paging groups and associated configuration. |
| ***cbp-HystTimer***The minimum duration, in milliseconds, a UE configured with coverage-based paging uses the same carrier for paging, see TS 36.304 [4]. Value *ms2560* corresponds to 2560ms, value *ms7680* corresponds to 7680ms, and so on. |
| ***cbp-Index***Index to the coverage-based paging configuration associated with the downlink carrier. Value 1 corresponds to the first entry in *cbp-ConfigList*, value 2 corresponds to the second entry in the *cbp-ConfigList*. |
| ***dl-CarrierConfig***For FDD: Provides the configuration of the DL non-anchor carrier.For TDD: Provides the configuration of the non-anchor carrier. |
| ***dl-ConfigList, dl-ConfigListMixed***For FDD: List of DL non-anchor carriers and associated configuration that can be used for paging and/or random access. E-UTRAN configures DL non-anchor carriers operating in mixed operation mode only in *dl-ConfigListMixed* and only a UE that supports mixed operation mode uses the carriers in *dl-ConfigListMixed*. A given carrier is either signalled in the *dl-ConfigList* or in *dl-ConfigListMixed*.If *dl-ConfigListMixed* is present and at least one of the carriers in *dl-ConfigListMixed* is configured for paging:- If *pagingDistribution* is present, the UE supporting mixed operation mode creates a combined list of DL carriers for paging by appending *dl-ConfigListMixed* to the *dl-ConfigList* while maintaining the order among *dl-ConfigList* and *dl-ConfigListMixed*; the total number of signalled DL non-anchor carriers cannot be more than *maxNonAnchorCarriers-NB-r14*.- If *pagingDistribution* is absent, the UE supporting mixed operation mode uses the list of DL carriers for paging provided in *dl-ConfigListMixed* and considers *pagingWeightAncho*r being set to w0, i.e. the anchor carrier is not used*.*Otherwise, the *pagingDistribution* field is not applicable and the UE shall ignore the value.For TDD: List of non-anchor carriers and associated configuration that can be used for paging and/or random access. |
| ***gwus-Config***For FDD: Carrier specific GWUS Configuration.If both *gwus-Config* and *wus-Config* are present for the carrier, E-UTRAN configures the same value for both fields. |
| ***mixedOperationModeConfig***For FDD: Provides the configuration of DL and UL non-anchor carriers that can be used for paging and random access by a UE that supports mixed operation mode.For TDD: This parameter is absent. |
| ***nB***Parameter: nB is used as one of parameters to derive the Paging Frame and Paging Occasion according to TS 36.304 [4]. Value in multiples of 'T' as defined in TS 36.304 [4]. A value of fourT corresponds to 4 \* T, a value of twoT corresponds to 2 \* T and so on.If the field is absent, the value *of nB* configured in *SystemInformationBlockType2-NB* in IE *pcch-Config* applies. |
| ***npdcch-NumRepetitionPaging***Maximum number of repetitions for NPDCCH common search space (CSS) for paging, see TS 36.213 [23], clause 16.6.If the field is absent, the value *of npdcch-NumRepetitionPaging* configured in *SystemInformationBlockType2-NB* in IE *pcch-Config* applies. |
| ***nprach-Distribution***Indicates which UL carriers a UE supporting mixed operation mode uses for random access as defined in description of *ul-ConfigList, ul-ConfigListMixed*.  |
| ***nprach-ParametersList, nprach-ParametersList-EDT***Configure NPRACH parameters for each NPRACH resource on one non-anchor UL carrier. Up to three NPRACH resources can be configured on one non-anchor UL carrier. Each NPRACH resource is associated with a different number of NPRACH repetitions.NPRACH resources in *nprach-ParametersListEDT* are used to initiateEDT. Each NPRACH resource is associated with a maximum TBS signalled in the corresponding entry of *edt-TBS-InfoList* in *SystemInformationBlockType2-NB*.E-UTRAN includes the same number of entries, and listed in the same order, as in *nprach-ParametersList* in *SystemInformationBlockType2-NB*. |
| ***nprach-ParametersListTDD***For TDD: Configure NPRACH parameters for each NPRACH resource on one non-anchor UL carrier. Up to three NPRACH resources can be configured on one non-anchor UL carrier. Each NPRACH resource is associated with a different number of NPRACH repetitions.E-UTRAN includes the same number of entries in *nprach-ParametersListTDD*, and listed in the same order, as in *nprach-ParametersListTDD* in *SystemInformationBlockType2-NB*.. |
| ***nprach-ProbabilityAnchor***Configure the selection probability for the anchor carrier NPRACH resource, see TS 36.321 [6]. Value zero corresponds to a probability of 0, oneSixteenth corresponds to the probability of 1/16, oneFifteenth corresponds to the probability of 1/15, and so on.If the field is absent, the selection probability of the anchor carrier NPRACH resource is 1.All non-anchor carriers NPRACH resources have equal probability between them.If there is no NPRACH resource defined on the anchor carrier for one repetition level in *nprach-ParametersList-EDT*, (respectively *nprach-ParametersListFmt2*, *nprach-ParametersListFmt2-EDT*), the UE shall use the value 'zero' and ignore the signalled value of *nprach-ProbabilityAnchor* for this repetition level for the NPRACH resources defined by *nprach-ParametersList-EDT* (respectively *nprach-ParametersListFmt2*, *nprach-ParametersListFmt2-EDT*). |
| ***nprach-ProbabilityAnchorList***Configures the selection probability for each NPRACH resource on the anchor carrier.E-UTRAN includes the same number of entries, and listed in the same order, as in *nprach-ParametersList* in *SystemInformationBlockType2-NB.* |
| ***nrsrpMin***The minimum serving cell NRSRP applicable to the coverage-based paging carrier group, see TS 36.304 [4]. |
| ***pagingDistribution***Indicates which DL carriers a UE supporting mixed operation mode monitors for paging as defined in description of *dl-ConfigList, dl-ConfigListMixed*. |
| ***pagingWeight***Weight of the non-anchor paging carrier for uneven paging load distribution across the carriers. Value w1 corresponds to a relative weight of 1, w2 corresponds to a relative weight of 2, and so on.The paging load for a carrier 'i' is equal to w(i)/W where i is equal to 0 for the anchor carrier and equal to the index of the carrier in the *dl-ConfigList* / *dl-ConfigListMixed* for a non-anchor carrier, W is the sum of the weights of all paging carriers.To avoid correlation between paging carrier and paging occasion, the weights should be assigned such that: nB \* W <= 16384. |
| ***pagingWeightAnchor***Weight of the anchor carrier for uneven paging load distribution across the carriers. Value w1 corresponds to a relative weight of 1, w2 corresponds to a relative weight of 2, and so on.If the field is absent, the (default) value of w0 is applied, i.e. the anchor carrier is not used for paging. |
| ***pcch-Config***Configure the PCCH parameters for the non-anchor DL carrier. |
| ***rsrp-ThresholdsPrachInfoList***The criterion for UE to select an NPRACH resource on the non-anchor carrier. The threshold values are related to the anchor carrier NRSRP measurement. See TS 36.321 [6]. E-UTRAN includes the same number of entries, and listed in the same order, as in *rsrp-ThresholdsPrachInfoList* in *SystemInformationBlockType2-NB*.A UE that supports *powerClassNB-14dBm-r14* shall correct the RSRP threshold values before applying them as follows:RSRP threshold = Signalled RSRP threshold - min{0, (14-min(23, P-Max))} where P-Max*:*is the value of *p-Max* field in *SystemInformationBlockType1-NB.* |
| ***tdd-UL-DL-AlignmentOffset***Indicates the offset between the UL carrier frequency center with respect to DL carrier frequency center for the non-anchor carrier. |
| ***ue-SpecificDRX-CycleMin***Minimum UE specific DRX cycle for the coverage-based paging carrier group, see TS 36.304 [4]. Value *rf32* corresponds to 32 radio frames, *rf64* corresponds to 64 radio frames and so on.If present, E-UTRAN ensures PCCH configuration does not lead to CSS overlap for *ue-SpecificDRX-CycleMin*. |
| ***ul-CarrierFreq***For FDD: UL carrier frequency of the non-anchor carrier as defined in TS 36.101 [42], clause 5.7.3F.For TDD: This field is absent and the uplink carrier frequency is same as the downlink frequency. |
| ***ul-ConfigList, ul-ConfigListMixed***For FDD: List of UL non-anchor carriers and associated configuration that can be used for random access. E-UTRAN configures UL non-anchor carriers operating in mixed operation mode only in *ul-ConfigListMixed* and only a UE that supports mixed operation mode uses the carriers in *ul-ConfigListMixed*. A given carrier is either signalled in the *ul-ConfigList* or in *ul-ConfigListMixed*.If *ul-ConfigListMixed* is present and at least one of the carriers in *ul-ConfigListMixed* is configured for random access:- If *nprach-Distribution* is present, the UE supporting mixed operation mode creates a combined list of UL carriers for random access by appending *ul-ConfigListMixed* to the *ul-ConfigList* while maintaining the order among both *ul-ConfigList* and *ul-ConfigListMixed*; the total number of signalled UL non-anchor carriers cannot be more than *maxNonAnchorCarriers-NB-r14*.- If *nprach-Distribution* is absent, the UE supporting mixed operation mode uses the list of UL carriers for random access provided in *ul-ConfigListMixed* and considers *nprach-ProbabiliyAnchor* being set to zero for each NPRACH resource, i.e. the anchor carrier is not used for random access*.*Otherwise, the *nprach-Distribution* field is not applicable and the UE shall ignore the value.For TDD: E-UTRAN configures *ul-ConfigList-r15* and includes the same number of entries as in *dl-ConfigList*. The UL carrier frequency of the non-anchor carrier is same as the DL carrier frequency. |
| ***wus-Config***For FDD: Carrier specific WUS Configuration. |

| Conditional presence | Explanation |
| --- | --- |
| *dl-ConfigList* | This field is optionally present, Need OR, if the field *dl-ConfigList* is present. Otherwise the field is not present. |
| *EDT* | The field is optionally present, Need OR, if *edt-Parameters* in *SystemInformationBlockType2-NB* is present; otherwise the field is not present and the UE shall delete any existing value for this field. |
| *GWUS* | This field is optionally present, Need OR, if g*wus-Config-r16* is present in *SystemInformationBlockType2-NB*. Otherwise the field is not present. |
| *pcch-config* | This field is optionally present, Need OP, if the field *dl-ConfigList* is present and at least one of the carriers in *dl-ConfigList* is configured for paging. Otherwise the field is not present and only the anchor carrier is used for paging. |
| *pcch-config2* | This field is optionally present, need OR, if the field *pcch-Config-r14* is not present for the same carrier and *coverageBasedPagingConfig* is present. Otherwise the field is not present and the UE shall delete any existing value for this field. |
| *nprach-config* | This field is mandatory present, if the field *ul-ConfigList* is present and at least one of the carriers in *ul-ConfigList* is configured for random access. Otherwise the field is not present and only the anchor carrier is used for random access. |
| *TDD* | This field is optionally present, Need OR, for TDD. Otherwise the field is not present. |
| *ul-ConfigList* | This field is optionally present, Need OR, if the field *ul-ConfigList* is present. Otherwise the field is not present. |
| *WUS* | This field is mandatory present, if the field *wus-Config* is present in *SystemInformationBlockType2-NB*. Otherwise the field is not present, Need OR. |

|  |
| --- |
| Start of next change |

#### 6.7.3.2 NB-IoT Radio resource control information elements

<Unchanged text omitted >

#### – *NPDSCH-Config-NB*

The IE *NPDSCH-ConfigCommon-NB* is used to specify the common NPDSCH configuration. The IE *NPDSCH-ConfigDedicated-NB* is used to specify the UE specific NPDSCH configuration.

*NPDSCH-Config-NB* information element

-- ASN1START

NPDSCH-ConfigCommon-NB-r13 ::= SEQUENCE {

 nrs-Power-r13 INTEGER (-60..50)

}

NPDSCH-ConfigDedicated-NB-r16 ::= SEQUENCE {

 npdsch-MultiTB-Config-r16 NPDSCH-MultiTB-Config-NB-r16 OPTIONAL -- Cond twoHARQ

}

NPDSCH-MultiTB-Config-NB-r16 ::= SEQUENCE {

 multiTB-Config-r16 ENUMERATED {interleaved, nonInterleaved},

 harq-AckBundling-r16 ENUMERATED {true} OPTIONAL -- Cond interleaved

}

NPDSCH-16QAM-Config-NB-r17 ::=SEQUENCE{

 nrs-PowerRatio-r17 ENUMERATED {dB-6, dB-4dot77, dB-3, dB-1dot77, dB0, dB1, dB2, dB3} OPTIONAL -- Need OR,

 nrs-PowerRatioWithCRS-r17 ENUMERATED {dB-6, dB-4dot77, dB-3, dB-1dot77, dB0, dB1, dB2, dB3} OPTIONAL -- Cond InBand

}

-- ASN1STOP

| *NPDSCH-Config-NB* field descriptions |
| --- |
| ***multiTB-Config***For FDD: Activation of multiple TBs scheduling in DL, see TS 36.213 [23]. Value *interleaved* indicates that multiple TBs scheduling with interleaved transmission is enabled, value *nonInterleaved* indicates that multiple TBs scheduling without interleaved transmission is enabled. |
| ***harq-AckBundling***For FDD: Activation of HARQ ACK bundling for DL multiple TBs scheduling with interleaved transmission, see TS 36.213 [23]. |
| ***npdsch-16QAM-Config***Activation of 16QAM for DL, see TS 36.213 [23]. |
| ***nrs-Power***Provides the downlink narrowband reference-signal EPRE, see TS 36.213 [23], clause 16.2. The actual value in dBm. |
| ***nrs-PowerRatio***The power ratio of NPDSCH EPRE to NRS EPRE in symbols without NRS for standalone and guardband deployments, or in symbols without NRS nor CRS for in-band deployments. See TS 36.213 [23]. |
| ***nrs-PowerRatioWithCRS***The power ratio of NPDSCH EPRE to NRS EPRE in symbols with CRS for inband deployments, see TS 36.213 [23]. |

| Conditional presence | Explanation |
| --- | --- |
| *InBand* | The field is mandatory present if carrier is inband; otherwise, the field is not present and the UE shall delete any existing value for this field. |
| *interleaved* | The field is optionally present, Need OR, if *multiTB-Config* is set to *interleaved*; otherwise the field is not present and the UE shall delete any existing value for this field. |
| *twoHARQ* | The field is optionally present, Need OR, if *twoHARQ-ProcessesConfig* is configured; otherwise the field is not present and the UE shall delete any existing value for this field. |

|  |
| --- |
| Start of next change |

#### 6.7.3.2 NB-IoT Radio resource control information elements

<Unchanged text omitted >

#### – *PUR-Config-NB*

The IE *PUR-Config-NB* is used to specify PUR configuration.

*PUR-Config-NB* information element

-- ASN1START

PUR-Config-NB-r16 ::= SEQUENCE {

 pur-ConfigID-r16 PUR-ConfigID-NB-r16 OPTIONAL, --Need OR

 pur-TimeAlignmentTimer-r16 INTEGER (1..8) OPTIONAL, --Need OR

 pur-NRSRP-ChangeThreshold-r16 SetupRelease {PUR-NRSRP-ChangeThreshold-NB-r16}

 OPTIONAL, --Need ON

 pur-ImplicitReleaseAfter-r16 ENUMERATED {n2, n4, n8, spare} OPTIONAL, --Need OR

 pur-RNTI-r16 C-RNTI OPTIONAL, --Need ON

 pur-ResponseWindowTimer-r16 ENUMERATED {pp1, pp2, pp3, pp4, pp8, pp16, pp32, pp64}

 OPTIONAL, --Need ON

 pur-StartTimeParameters-r16 SEQUENCE {

 periodicityAndOffset-r16 PUR-PeriodicityAndOffset-NB-r16,

 startSFN-r16 INTEGER (0..1023),

 startSubframe-r16 INTEGER (0..9),

 hsfn-LSB-Info-r16 BIT STRING (SIZE(1))

 } OPTIONAL, --Need ON

 pur-NumOccasions-r16 ENUMERATED {one, infinite},

 pur-PhysicalConfig-r16 SEQUENCE {

 carrierConfig-r16 CarrierConfigDedicated-NB-r13,

 npusch-NumRUsIndex-r16 INTEGER (0..7),

 npusch-NumRepetitionsIndex-r16 INTEGER (0..7),

 npusch-SubCarrierSetIndex-r16 CHOICE {

 khz15 INTEGER (0..18),

 khz3dot75 INTEGER (0..47)

 },

 npusch-MCS-r16 CHOICE {

 singleTone INTEGER (0..10),

 multiTone INTEGER (0..13)

 },

 p0-UE-NPUSCH-r16 INTEGER (-8..7),

 alpha-r16 ENUMERATED {al0, al04, al05, al06,

 al07, al08, al09, al1},

 npusch-CyclicShift-r16 ENUMERATED {n0, n6},

 npdcch-Config-r16 NPDCCH-ConfigDedicated-NB-r13

 } OPTIONAL, -- Need ON

 ...,

 [[

 pur-PhysicalConfig-v1650 SEQUENCE {

 ack-NACK-NumRepetitions-r16 ACK-NACK-NumRepetitions-NB-r13

 } OPTIONAL --Need ON

 ]],

 [[

 pur-PhysicalConfig-v1700 SEQUENCE {

 pur-UL-16QAM-Config-r17 SetupRelease {PUR-UL-16QAM-Config-NB-r17} OPTIONAL, -- Need ON

 pur-DL-16QAM-Config-r17 SetupRelease {NPDSCH-16QAM-Config-NB-r17} OPTIONAL -- Need ON

 } OPTIONAL -- Need ON

 ]]

}

PUR-NRSRP-ChangeThreshold-NB-r16 ::= SEQUENCE {

 increaseThresh-r16 NRSRP-ChangeThresh-NB-r16,

 decreaseThresh-r16 NRSRP-ChangeThresh-NB-r16 OPTIONAL --Need OP

}

PUR-UL-16QAM-Config-NB-r17 ::= SEQUENCE {

 uplinkPowerControlDedicated-r17 UplinkPowerControlDedicated-NB-v1700

}

NRSRP-ChangeThresh-NB-r16 ::= ENUMERATED {dB4, dB6, dB8, dB10, dB14, dB18, dB22, dB26, dB30, dB34, spare6, spare5, spare4, spare3, spare2, spare1}

-- ASN1STOP

| *PUR-Config-NB* field descriptions |
| --- |
| ***ack-NACK-NumRepetitions***Number of repetitions for the ACK NACK resource unit carrying HARQ response to NPDSCH, see TS 36.213 [23], clause 16.4.2. If this field is absent and no value was configured via *pur-Config*, the value of *ack-NACK-NumRepetitions* used for HARQ response to NPDSCH containing this *RRCConnectionRelease-NB* message applies. |
| ***alpha***Parameter: *αc*(3). See TS 36.213 [23], clause 16.2.1.1.1. |
| ***carrierConfig***Carrier used for PUR. |
| ***hsfn-LSB-Info***LSB of the H-SFN corresponding to the last subframe of the first transmission of *RRCConnectionRelease* message containing *pur-Config*. |
| ***npdcch-Config***NPDCCH configuration for PUR. |
| ***npusch-CyclicShift***Parameter: $n\_{cs}$. See TS 36.211 [21], clause 10.1.4.1.2. Value *n0* corresponds to value 0 and value *n6* corresponds to value 6. |
| ***npusch-MCS***Index to tables specified in TS 36.213 [23], Table 16.5.1.2-1 and Table 16.5.1.2-2 for single tone and multi tone respectively, that defines modulation and TBS index for NPUSCH for PUR. If 16QAM UL for PUR is configured, the MCS is derived as follows:- For guardband and standalone: Actual value = *multiTone* field value + 14- For inband: Actual value = *multiTone* field value + 11. |
| ***npusch-NumRepetitionsIndex***Index to a table specified in TS 36.213 [23], Table 16.5.1.1-3, that defines number of repetitions for NPUSCH for PUR. |
| ***npusch-NumRUsIndex***Index to a table specified in TS 36.213 [23], Table 16.5.1.1-2, that defines number of resource units for NPUSCH for PUR. |
| ***npusch-SubCarrierSetIndex***For NPUSCH transmission with subcarrier spacing 3.75 kHz, indicates the subcarrier used for PUR specified in TS 36.213 [23].For NPUSCH transmission with subcarrier spacing 15 kHz, index to a table specified in TS 36.213 [23], Table 16.5.1.1-1, that defines the set of subcarriers for NPUSCH for PUR. |
| ***p0-UE-NPUSCH***Parameter: . See TS 36.213 [23], clause 16.2.1.1.1, unit dB.  |
| ***pur-DL-16QAM-Config***Activation of 16QAM for downlink, see TS 36.213 [23]. |
| ***pur-ImplicitReleaseAfter***Number of consecutive PUR occasions that can be skipped before implicit release of PUR configuration. Value *n2* corresponds to 2 PUR occasions, value *n4* corresponds to 4 PUR occasions, and so on. |
| ***pur-NRSRP-ChangeThreshold***Threshold(s) of change in serving cell NRSRP in dB for TA validation. Value *dB4* corresponds to 4 dB, value *dB6* corresponds to 6 dB, and so on. When *pur-NRSRP-ChangeThreshold* is set to *setup*, if *decreaseThrsh* is absent the value of *increaseThresh* is also used for *decreaseThresh*. |
| ***pur-NumOccasions***Number of PUR occasions. Value *one* corresponds to 1 PUR occasion, and value *infinite* corresponds to an infinite number of PUR occasions. |
| ***pur-PeriodicityAndOffset***Indicates the periodicity for the PUR occasions and time offset until the first PUR occasion. |
| ***pur-ResponseWindowTimer***Duration of the PUR response window in TS 36.321 [6]. Value in PDCCH periods. Value *pp2* corresponds to 2 PDCCH periods, *pp3* corresponds to 3 PDCCH periods, and so on.The value considered by the UE is: *pur-ResponseWindowTimer* = Min (signaled value x PDCCH period, 10.24s). |
| ***pur-TimeAlignmentTimer***Value of the time alignment timer for PUR. Value in number of periodicity of PUR. |
| ***pur-UL-16QAM-Config***Activation of 16QAM for uplink, see TS 36.213 [23]. |

|  |
| --- |
| Start of next change |

#### 6.7.3.6 NB-IoT Other information elements

<Unchanged text omitted >

#### – *UE-Capability-NB*

The IE *UE-Capability-NB* is used to convey the NB-IoT UE Radio Access Capability Parameters, see TS 36.306 [5]. The IE *UE-Capability-NB* is transferred in NB-IoT only.

*UE-Capability-NB* information element

-- ASN1START

UE-Capability-NB-r13 ::= SEQUENCE {

 accessStratumRelease-r13 AccessStratumRelease-NB-r13,

 ue-Category-NB-r13 ENUMERATED {nb1} OPTIONAL,

 multipleDRB-r13 ENUMERATED {supported} OPTIONAL,

 pdcp-Parameters-r13 PDCP-Parameters-NB-r13 OPTIONAL,

 phyLayerParameters-r13 PhyLayerParameters-NB-r13,

 rf-Parameters-r13 RF-Parameters-NB-r13,

 dummy SEQUENCE {} OPTIONAL

}

UE-Capability-NB-Ext-r14-IEs ::= SEQUENCE {

 ue-Category-NB-r14 ENUMERATED {nb2} OPTIONAL,

 mac-Parameters-r14 MAC-Parameters-NB-r14 OPTIONAL,

 phyLayerParameters-v1430 PhyLayerParameters-NB-v1430 OPTIONAL,

 rf-Parameters-v1430 RF-Parameters-NB-v1430,

 nonCriticalExtension UE-Capability-NB-v1440-IEs OPTIONAL

}

UE-Capability-NB-v1440-IEs ::= SEQUENCE {

 phyLayerParameters-v1440 PhyLayerParameters-NB-v1440 OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v14x0-IEs OPTIONAL

}

UE-Capability-NB-v14x0-IEs ::= SEQUENCE {

-- Following field is only to be used for late REL-14 extensions

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v1530-IEs OPTIONAL

}

UE-Capability-NB-v1530-IEs ::= SEQUENCE {

 earlyData-UP-r15 ENUMERATED {supported} OPTIONAL,

 rlc-Parameters-r15 RLC-Parameters-NB-r15,

 mac-Parameters-v1530 MAC-Parameters-NB-v1530,

 phyLayerParameters-v1530 PhyLayerParameters-NB-v1530 OPTIONAL,

 tdd-UE-Capability-r15 TDD-UE-Capability-NB-r15 OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v15x0-IEs OPTIONAL

}

UE-Capability-NB-v15x0-IEs ::= SEQUENCE {

-- Following field is only to be used for late REL-15 extensions

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v1610-IEs OPTIONAL

}

UE-Capability-NB-v1610-IEs ::= SEQUENCE {

 earlySecurityReactivation-r16 ENUMERATED {supported} OPTIONAL,

 earlyData-UP-5GC-r16 ENUMERATED {supported} OPTIONAL,

 pur-Parameters-r16 PUR-Parameters-NB-r16 OPTIONAL,

 mac-Parameters-v1610 MAC-Parameters-NB-v1610,

 phyLayerParameters-v1610 PhyLayerParameters-NB-v1610 OPTIONAL,

 son-Parameters-r16 SON-Parameters-NB-r16 OPTIONAL,

 meas-Parameters-r16 Meas-Parameters-NB-r16,

 tdd-UE-Capability-v1610 TDD-UE-Capability-NB-v1610 OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v16x0-IEs OPTIONAL

}

UE-Capability-NB-v16x0-IEs ::= SEQUENCE {

-- Following field is only to be used for late REL-16 extensions

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 nonCriticalExtension UE-Capability-NB-v1700-IEs OPTIONAL

}

UE-Capability-NB-v1700-IEs ::= SEQUENCE {

 coverageBasedPaging-r17 ENUMERATED {supported} OPTIONAL,

 phyLayerParameters-v1700 PhyLayerParameters-NB-v1700 OPTIONAL,

 measParameters-NB-v17xy MeasParameters-NB-v17xy OPTIONAL,

 ntn-Parameters-r17 NTN-Parameters-NB-r17 OPTIONAL,

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

TDD-UE-Capability-NB-r15 ::= SEQUENCE {

 ue-Category-NB-r15 ENUMERATED {nb2} OPTIONAL,

 phyLayerParametersRel13-r15 PhyLayerParameters-NB-r13 OPTIONAL,

 phyLayerParametersRel14-r15 PhyLayerParameters-NB-v1430 OPTIONAL,

 phyLayerParameters-v1530 PhyLayerParameters-NB-v1530 OPTIONAL,

 ...

}

TDD-UE-Capability-NB-v1610 ::= SEQUENCE {

 slotSymbolResourceResvDL-r16 ENUMERATED {supported} OPTIONAL,

 slotSymbolResourceResvUL-r16 ENUMERATED {supported} OPTIONAL,

 subframeResourceResvDL-r16 ENUMERATED {supported} OPTIONAL,

 subframeResourceResvUL-r16 ENUMERATED {supported} OPTIONAL

}

AccessStratumRelease-NB-r13 ::= ENUMERATED {rel13, rel14, rel15, rel16, rel17, spare3, spare2, spare1, ...}

PDCP-Parameters-NB-r13 ::= SEQUENCE {

 supportedROHC-Profiles-r13 SEQUENCE {

 profile0x0002 BOOLEAN,

 profile0x0003 BOOLEAN,

 profile0x0004 BOOLEAN,

 profile0x0006 BOOLEAN,

 profile0x0102 BOOLEAN,

 profile0x0103 BOOLEAN,

 profile0x0104 BOOLEAN

 },

 maxNumberROHC-ContextSessions-r13 ENUMERATED {cs2, cs4, cs8, cs12} DEFAULT cs2,

 ...

}

RLC-Parameters-NB-r15 ::= SEQUENCE {

 rlc-UM-r15 ENUMERATED {supported} OPTIONAL

}

MAC-Parameters-NB-r14 ::= SEQUENCE {

 dataInactMon-r14 ENUMERATED {supported} OPTIONAL,

 rai-Support-r14 ENUMERATED {supported} OPTIONAL

}

MAC-Parameters-NB-v1530 ::= SEQUENCE {

 sr-SPS-BSR-r15 ENUMERATED {supported} OPTIONAL

}

MAC-Parameters-NB-v1610 ::= SEQUENCE {

 rai-SupportEnh-r16 ENUMERATED {supported} OPTIONAL

}

NTN-Parameters-NB-r17 ::= SEQUENCE {

 ntn-Connectivity-EPC-r17 ENUMERATED {supported} OPTIONAL,

 ntn-TA-Report-r17 ENUMERATED {supported} OPTIONAL,

 ntn-PUR-TimerEnhancement-r17 ENUMERATED {supported} OPTIONAL

}

Meas-Parameters-NB-r16 ::= SEQUENCE {

 dl-ChannelQualityReporting-r16 ENUMERATED {supported} OPTIONAL

}

Meas-Parameters-NB-v17xy ::= SEQUENCE {

 connModeMeasIntraFreq-r17 ENUMERATED {supported} OPTIONAL,

 connModeMeasInterFreq-r17 ENUMERATED {supported} OPTIONAL

}

PhyLayerParameters-NB-r13 ::= SEQUENCE {

 multiTone-r13 ENUMERATED {supported} OPTIONAL,

 multiCarrier-r13 ENUMERATED {supported} OPTIONAL

 }

PhyLayerParameters-NB-v1430 ::= SEQUENCE {

 multiCarrier-NPRACH-r14 ENUMERATED {supported} OPTIONAL,

 twoHARQ-Processes-r14 ENUMERATED {supported} OPTIONAL

}

PhyLayerParameters-NB-v1440 ::= SEQUENCE {

 interferenceRandomisation-r14 ENUMERATED {supported} OPTIONAL

}

PhyLayerParameters-NB-v1530 ::= SEQUENCE {

 mixedOperationMode-r15 ENUMERATED {supported} OPTIONAL,

 sr-WithHARQ-ACK-r15 ENUMERATED {supported} OPTIONAL,

 sr-WithoutHARQ-ACK-r15 ENUMERATED {supported} OPTIONAL,

 nprach-Format2-r15 ENUMERATED {supported} OPTIONAL,

 additionalTransmissionSIB1-r15 ENUMERATED {supported} OPTIONAL,

 npusch-3dot75kHz-SCS-TDD-r15 ENUMERATED {supported} OPTIONAL

}

PhyLayerParameters-NB-v1610 ::= SEQUENCE {

 npdsch-MultiTB-r16 ENUMERATED {supported} OPTIONAL,

 npdsch-MultiTB-Interleaving-r16 ENUMERATED {supported} OPTIONAL,

 npusch-MultiTB-r16 ENUMERATED {supported} OPTIONAL,

 npusch-MultiTB-Interleaving-r16 ENUMERATED {supported} OPTIONAL,

 multiTB-HARQ-AckBundling-r16 ENUMERATED {supported} OPTIONAL,

 slotSymbolResourceResvDL-r16 ENUMERATED {supported} OPTIONAL,

 slotSymbolResourceResvUL-r16 ENUMERATED {supported} OPTIONAL,

 subframeResourceResvDL-r16 ENUMERATED {supported} OPTIONAL,

 subframeResourceResvUL-r16 ENUMERATED {supported} OPTIONAL

}

PUR-Parameters-NB-r16 ::= SEQUENCE {

 pur-CP-EPC-r16 ENUMERATED {supported} OPTIONAL,

 pur-CP-5GC-r16 ENUMERATED {supported} OPTIONAL,

 pur-UP-EPC-r16 ENUMERATED {supported} OPTIONAL,

 pur-UP-5GC-r16 ENUMERATED {supported} OPTIONAL,

 pur-NRSRP-Validation-r16 ENUMERATED {supported} OPTIONAL,

 pur-CP-L1Ack-r16 ENUMERATED {supported} OPTIONAL

}

PhyLayerParameters-NB-v1700 ::= SEQUENCE {

 npdsch-16QAM-r17 ENUMERATED {supported} OPTIONAL,

 npusch-16QAM-r17 ENUMERATED {supported} OPTIONAL

}

RF-Parameters-NB-r13 ::= SEQUENCE {

 supportedBandList-r13 SupportedBandList-NB-r13,

 multiNS-Pmax-r13 ENUMERATED {supported} OPTIONAL

}

RF-Parameters-NB-v1430 ::= SEQUENCE {

 powerClassNB-14dBm-r14 ENUMERATED {supported} OPTIONAL

}

SupportedBandList-NB-r13 ::= SEQUENCE (SIZE (1..maxBands)) OF SupportedBand-NB-r13

SupportedBand-NB-r13 ::= SEQUENCE {

 band-r13 FreqBandIndicator-NB-r13,

 powerClassNB-20dBm-r13 ENUMERATED {supported} OPTIONAL

}

SON-Parameters-NB-r16 ::= SEQUENCE {

 anr-Report-r16 ENUMERATED {supported} OPTIONAL,

 rach-Report-r16 ENUMERATED {supported} OPTIONAL

}

-- ASN1STOP

| *UE-Capability-NB* field descriptions | *FDD/TDD appl* | *FDD/TDD diff* |
| --- | --- | --- |
| ***accessStratumRelease***Set to rel17 in this version of the specification. | FDD/TDD | No |
| ***additionalTransmissionSIB1***Indicates whether the UE supports additional SIB1 transmission as specified in TS 36.213 [23]. | FDD | - |
| ***anr-Report***Indicates whether the UE supports ANR measurements in RRC\_IDLE. | FDD/TDD | No |
| ***connModeMeasIntraFreq, connModeMeasInterFreq***Indicates whether the UE in RRC\_CONNECTED supports neighbour cell measurements. | FDD/TDD | No |
| ***coverageBasedPaging***Indicates whether the UE in RRC\_IDLE supports coverage based paging carrier selection as defined in TS 36.304 [4]. | FDD/TDD | No |
| ***dataInactMon***Indicates whether the UE supports the data inactivity monitoring as specified in TS 36.321 [6]. | FDD/TDD | No |
| ***dl-ChannelQualityReporting-r16***Indicates whether the UE supports DL channel quality reporting in connected mode as specified in TS 36.321 [6]. | FDD | - |
| ***dummy***This field is not used in the specification. It shall not be sent by the UE. | NA | NA |
| ***earlyData-UP, earlyData-UP-5GC***Indicates whether the UE supports EDT for User plane CIoT EPS/5GS optimisations, as defined in TS 24.301 [35] and 24.501 [95] respectively. | FDD | - |
| ***earlySecurityReactivation***Indicates whether the UE supports early security reactivation when resuming a suspended RRC connection. | FDD/TDD | No |
| ***interferenceRandomisation***For FDD: Indicates whether the UE supports interference randomisation in connected mode as defined in TS.36.211 [21]. | FDD | - |
| ***maxNumberROHC-ContextSessions***Set to the maximum number of concurrently active ROHC contexts supported by the UE, excluding context sessions that leave all headers uncompressed. cs2 corresponds with 2 (context sessions), cs4 corresponds with 4 and so on. The network ignores this field if the UE supports none of the ROHC profiles in *supportedROHC-Profiles*. | FDD/TDD | No |
| ***mixedOperationMode***Defines whether the UE supports multi-carrier operation with mixed operation mode, standalone or inband/guardband, between the anchor carrier and the non-anchor carrier for unicast, paging, and random access as specified in TS 36.300 [9]. | FDD | - |
| ***multiCarrier***Defines whether the UE supports multi -carrier operation. | FDD/TDD | Yes |
| ***multicarrier-NPRACH***Defines whether the UE supports NPRACH on non-anchor carrier as specified in TS 36.321 [6]. | FDD/TDD | Yes |
| ***multipleDRB***Defines whether the UE supports multiple DRBs. | FDD/TDD | No |
| ***multiNS-Pmax***Defines whether the UE supports the mechanisms defined for NB-IoT cells broadcasting *NS-PmaxList-NB*. | FDD/TDD | No |
| ***multiTB-HARQ-AckBundling***Indicates whether the UE supports HARQ ACK bundling for interleaved transmission for DL.If *multiTB-HARQ-AckBundling* is included, the UE shall also indicate support for *npdsch-MultiTB-Interleaving*. | FDD | - |
| ***multiTone***Defines whether the UE supports UL multi-tone transmissions on NPUSCH. | FDD/TDD | Yes |
| ***npdsch-16QAM***Indicates whether the UE supports 16QAM for DL unicast as defined in TS 36.213 [23]. | FDD/TDD | Yes |
| ***npdsch-MultiTB***Indicates whether the UE supports multiple TBs scheduling in RRC\_CONNECTED for DL.If *npdsch-MultiTB* is included, the UE shall also indicate support for *twoHARQ-Processes*. | FDD | - |
| ***npdsch-MultiTB-Interleaving***Indicates whether the UE supports interleaved transmission when multiple TBs is scheduled in RRC\_CONNECTED for DL. | FDD | - |
| ***nprach-Format2***Defines whether the UE supports NPRACH resources using preamble format 2. | FDD | - |
| ***npusch-16QAM***Indicates whether the UE supports 16QAM for UL unicast as defined in TS 36.213 [23]. | FDD/TDD | Yes |
| ***npusch-3dot75kHz-SCS-TDD***Indicates whether the UE supports NPUSCH with 3.75kHz SCS for TDD. | TDD | - |
| ***npusch-MultiTB***Indicates whether the UE supports multiple TBs scheduling in RRC\_CONNECTED for UL.If *npusch-MultiTB* is included, the UE shall also indicate support for *twoHARQ-Processes*. | FDD | - |
| ***npusch-MultiTB-Interleaving***Indicates whether the UE supports interleaved transmission when multiple TBs is scheduled in RRC\_CONNECTED for UL. | FDD | - |
| ***ntn-Connectivity-EPC***Indicates whether the UE supports NTN access when connected to EPC. If the UE indicates this capability, the UE shall support all NTN essential features as specified in TS 36.306 [5]. | FDD | - |
| ***ntn-PUR-TimerEnhancement***Indicates whether the UE supports PUR timer enhancement for NTN, see TS 36.321 [6]. | - |  |
| ***ntn-TA-report***Indicates whether the UE supports time advance reporting in RRC\_CONNECTED, see TS 36.321 [6]. | FDD | - |
| ***powerClassNB-14dBm***Defines whether the UE supports power class 14dBm in all the bands supported by the UE as specified in TS 36.101 [42].If *powerClassNB-20dBm* is included, the UE shall not include the field *powerClassNB-14dBm*. | FDD/TDD | No |
| ***powerClassNB-20dBm***Defines whether the UE supports power class 20dBm in NB-IoT for the band, as specified in TS 36.101 [42]. If neither *powerClassNB-14dBm* nor *powerClassNB-20dBm* is included, UE supports power class 23 dBm in the NB-IoT band. | FDD/TDD | No |
| ***pur-CP-EPC*, *pur-CP-5GC***Indicates whether the UE supports transmission using PUR for Control plane CIoT EPS/5GS optimisations, as defined in TS 24.301 [35] and TS 24.501 [95] respectively. | FDD | - |
| ***pur-CP-L1Ack***Indicates whether UE supports L1 acknowledgement in response to CP transmission using PUR.If *pur-CP-L1Ack* is included, the UE shall also indicate support for *pur-CP-EPC* or *pur-CP-5GC*. | FDD | - |
| ***pur-NRSRP-Validation***Indicates whether UE supports serving cell NRSRP for TA validation for transmission using PUR.If *pur-NRSRP-Validation* is included, the UE shall also indicate support for *pur-CP-EPC*, *pur-CP-5GC*, *pur-UP-EPC* or *pur-CP-5GC*. | FDD | - |
| ***pur-UP-EPC*, *pur-UP-5GC***Indicates whether the UE supports transmission using PUR for User plane CIoT EPS/5GS optimisations, as defined in TS 24.301 [35] and TS 24.501 [95] repectively. | FDD | - |
| ***rach-Report***Indicates whether the UE supports delivery of *rach-Report*. | FDD/TDD | No |
| ***rai-Support***Defines whether the UE supports release assistance indication (RAI) as specified in TS 36.321 [6]. | FDD/TDD | No |
| ***rai-SupportEnh***Indicates whether the UE supports AS Release Assistance Indication via the DCQR and AS RAI MAC CE when connected to EPC as specified in TS 36.321 [6]. | FDD/TDD | No |
| ***rlc-UM***Defines whether the UE supports RLC UM as specified in TS 36.322 [7]. | FDD/TDD | No |
| ***slotSymbolResourceResvDL***Indicates whether the UE supports slot/symbol-level time-domain DL resource reservation, e.g. for NB-IoT coexistence with NR.If *slotSymbolResourceResvDL* is included, the UE shall also indicate support for *subframeResourceResvDL*. | FDD/TDD | Yes |
| ***slotSymbolResourceResvUL***Indicates whether the UE supports slot/symbol-level time-domain UL resource reservation, e.g. for NB-IoT coexistence with NR.If *slotSymbolResourceResvUL* is included, the UE shall also indicate support for *subframeResourceResvUL*. | FDD/TDD | Yes |
| ***supportedBandList***Includes the supported NB-IoT bands as defined in TS 36.101 [42]. | FDD/TDD | No |
| ***sr-SPS-BSR*** Defines whether the UE supports SR using SPS BSR as specified in TS 36.321 [6]. | FDD | - |
| ***sr-withHARQ-ACK*** Defines whether the UE supports physical layer SR with HARQ ACK as specified in TS 36.213 [23]. | FDD | - |
| ***sr-withoutHARQ-ACK*** Defines whether the UE supports physical layer SR without HARQ ACK as specified in TS 36.211 [21] and TS 36.213 [23]. | FDD | - |
| ***subframeResourceResvDL***Indicates whether the UE supports subframe-level time-domain DL resource reservation, e.g. for NB-IoT coexistence with NR. | FDD/TDD | Yes |
| ***subframeResourceResvUL***Indicates whether the UE supports subframe-level time-domain UL resource reservation, e.g. for NB-IoT coexistence with NR. | FDD/TDD | Yes |
| ***supportedROHC-Profiles***List of supported ROHC profiles as defined in TS 36.323 [8]. | FDD/TDD | No |
| ***twoHARQ-Processes***Defines whether the UE supports two HARQ processes operation in DL and UL as specified in TS 36.212 [22] and TS 36.213 [23]. | FDD/TDD | Yes |
| ***ue-Category-NB***UE category as defined in TS 36.306 [5]. Value nb1 corresponds to UE category NB1, value nb2 corresponds to UE category NB2.A UE shall always include the field *ue-Category-NB-r13* in this version of the specification. | FDD/TDD | Yes |

NOTE 1: The IE *UE-Capability-NB* does not include AS security capability information, since these are the same as the security capabilities that are signalled by NAS. Consequently AS need not provide "man-in-the-middle" protection for the security capabilities.

NOTE 2: The column 'FDD/TDD appl' indicates the applicability to the xDD mode: 'FDD' means applicable to FDD only, 'TDD' means applicable to TDD only and 'FDD/TDD' means applicable to FDD and TDD.

NOTE 3: The column 'FDD/TDD diff' indicates if the UE is allowed to signal a different value for FDD and TDD when the capability applies to both FDD and TDD modes. '-' is used when the capability applies to one mode only, 'No' is used for dual mode capabilities where a common value is signalled for both modes, and 'Yes' is used for dual mode capabilities where a separate value is signalled for each mode. Common capabilities and FDD capabilities are reported in the fields of *UE-Capability-NB* except field *tdd-UE-Capability.* TDD capabilities are reported in *tdd-UE-Capability*.

|  |
| --- |
| Start of next change |

### 7.3.1 Timers (Informative)

| Timer | Start | Stop | At expiry |
| --- | --- | --- | --- |
| T300NOTE1 | Transmission of *RRCConnectionRequest* or *RRCConnectionResumeRequest* or *RRCEarlyDataRequest* | Reception of *RRCConnectionSetup*, *RRCConnectionReject* or *RRCConnectionResume* or *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT, cell re-selection and upon abortion of connection establishment by upper layers | Perform the actions as specified in 5.3.3.6 |
| T301NOTE1 | Transmission of *RRCConnectionReestabilshmentRequest* | Reception of *RRCConnectionReestablishment* or *RRCConnectionReestablishmentReject* message as well as when the selected cell becomes unsuitable | Go to RRC\_IDLE |
| T302 | Reception of *RRCConnectionReject* while performing RRC connection establishment or reception of *RRCConnectionRelease* including *waitTime* | Upon entering RRC\_CONNECTED and upon cell re-selection, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR, or upon reception of *RRCConnectionReject* message for E-UTRA/5GC. | Inform upper layers about barring alleviation as specified in 5.3.3.7 |
| T303 | Access barred while performing RRC connection establishment for mobile originating calls | Upon entering RRC\_CONNECTED and upon cell re-selection, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Inform upper layers about barring alleviation as specified in 5.3.3.7 |
| T304 | Reception of *RRCConnectionReconfiguration* message including the *MobilityControl Info* orreception of *MobilityFromEUTRACommand* message including *CellChangeOrder* or upon conditional reconfiguration execution i.e. when applying a stored *RRCConnectionReconfiguration* message including the *MobilityControl Info*. | Criterion for successful completion of handover within E-UTRA, handover to E-UTRA or cell change order is met (the criterion is specified in the target RAT in case of inter-RAT) | In case of cell change order from E-UTRA or intra E-UTRA handover, initiate the RRC connection re-establishment procedure; In case of handover to E-UTRA, perform the actions defined in the specifications applicable for the source RAT; If any DAPS bearer is configured and if there is no RLF in source PCell, initiate the failure information procedure. |
| T305 | Access barred while performing RRC connection establishment for mobile originating signalling | Upon entering RRC\_CONNECTED and upon cell re-selection, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Inform upper layers about barring alleviation as specified in 5.3.3.7 |
| T306 | Access barred while performing RRC connection establishment for mobile originating CS fallback. | Upon entering RRC\_CONNECTED and upon cell re-selection, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Inform upper layers about barring alleviation as specified in 5.3.3.7 |
| T307 | Reception of *RRCConnectionReconfiguration* message including *MobilityControlInfoSCG* | Successful completion of random access on the PSCell, upon initiating re-establishment and upon SCG release | Initiate the SCG failure information procedure as specified in 5.6.13. |
| T308 | Access barred due to ACDC while performing RRC connection establishment subject to ACDC | Upon entering RRC\_CONNECTED and upon cell re-selection, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Inform upper layers about barring alleviation for ACDC as specified in 5.3.3.7 |
| T309NOTE1 | When access attempt is barred at access barring check for an Access Category. The UE shall maintain one instance of this timer per Access Category. | Upon entering RRC\_CONNECTED, upon cell (re)selection, upon reception of *RRCConnectionRelease,* upon change of PCell while in RRC\_CONNECTED, or upon reception of *MobilityFromEUTRACommand*. | Perform the actions as specified in 5.3.16.4. |
| T310NOTE1NOTE2 | Upon detecting physical layer problems for the PCell i.e. upon receiving N310 consecutive out-of-sync indications from lower layers | Upon receiving N311 consecutive in-sync indications from lower layers for the PCell, upon triggering the handover procedure, upon initiating the connection re-establishment procedure, and upon initiating the MCG failure information procedure. | If security is not activated and the UE is not a NB-IoT UE that supports RRC connection re-establishment for the Control Plane CIoT EPS/5GS optimisation: go to RRC\_IDLE else: initiate the MCG failure information procedure as specified in 5.6.26 or the connection re-establishment procedure as specified in 5.3.7. |
| T311NOTE1 | Upon initiating the RRC connection re-establishment procedure | Selection of a suitable E-UTRA cell or a cell using another RAT. | Go to RRC\_IDLE |
| T312NOTE2 | Upon triggering a measurement report for a measurement identity for which T312 has been configured and *useT312* has been set to true, while T310 is running | Upon receiving N311 consecutive in-sync indications from lower layers, upon triggering the handover procedure, upon initiating the connection re-establishment procedure, upon initiating the MCG failure information procedure, and upon the expiry of T310 | Initiate the MCG failure information procedure as specified in 5.6.26 or the connection re-establishment procedure as specified in 5.3.7. |
| T313NOTE2 | Upon detecting physical layer problems for the PSCell i.e. upon receiving N313 consecutive out-of-sync indications from lower layers | Upon receiving N314 consecutive in-sync indications from lower layers for the PSCell, upon initiating the connection re-establishment procedure, upon SCG release and upon receiving *RRCConnectionReconfiguration* including *MobilityControlInfoSCG* | Inform E-UTRAN about the SCG radio link failure by initiating the SCG failure information procedure as specified in 5.6.13. |
| T316 | Upon transmission of the *MCGFailureInformation* message | Upon receiving *RRCConnectionRelease*, *RRCConnectionReconfiguration* with *mobilityControlInfo, MobilityFromEUTRACommand*, or upon initiaitng the re-establishment procedure, | Perform the actions as specified in 5.6.26.5. |
| T320 | Upon receiving *t320* or upon cell (re)selection to E-UTRA from another RAT with validity time configured for dedicated priorities (in which case the remaining validity time is applied). | Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT (in which case the timer is carried on to the other RAT) , or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Discard the cell reselection priority information provided by dedicated signalling. |
| T321 | Upon receiving *measConfig* including a *reportConfig* with the *purpose* set to *reportCGI* | Upon acquiring the information needed to set all fields of *cellGlobalId* for the requested cell, upon receiving *measConfig* that includes removal of the *reportConfig* with the *purpose* set to *reportCGI* and upon detecting that a cell is not broadcasting SIB1. | Initiate the measurement reporting procedure, stop performing the related measurements and remove the corresponding *measId* |
| T322NOTE1 | Upon receiving *redirectedCarrierOffsetDedicated* included in *RedirectedCarrierInfo* | Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, or upon cell (re)selection to another frequency or RAT, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Release *redirectedCarrierOffsetDedicated*. |
| T323 | Upon receiving *t323*. | Upon entering RRC\_CONNECTED, when PLMN selection is performed on request by NAS, when the UE enters RRC\_IDLE from RRC\_INACTIVE, or upon cell (re)selection to another RAT, or upon reception of *RRCEarlyDataComplete* or *RRCConnectionRelease* for UP-EDT or *RRCConnectionRelease* for UP transmission using PUR. | Discard the *altFreqPriorities* provided by dedicated signalling. UE shall apply the cell reselection priority information broadcast in the system information via *cellReselectionPriority* and *cellReselectionSubPriority*. |
| T325 | Timer (re)started upon receiving *RRCConnectionReject* message with *deprioritisationTimer*. |  | Stop deprioritisation of all frequencies or E-UTRA signalled by *RRCConnectionReject.* |
| T330 | Upon receiving *LoggedMeasurementConfiguration* message | Upon log volume exceeding the suitable UE memory, upon initiating the release of *LoggedMeasurementConfiguration* procedure | Perform the actions specified in 5.6.6.4 |
| T331 | Upon receiving *RRCConnectionRelease* message including *measIdleConfig.* | Upon receiving *RRCConnectionSetup, RRCConnectionResume, RRCConnectionRelease* with an idle/inactive measurement configuration or indication to release the configuration, if *validityArea* is configured, upon cell selection/reselection to a cell that does not belong to the *validityArea* (if configured)*,* or upon reselecting to an inter-RAT cell. | Perform the actions specified in 5.6.20.3. |
| T340NOTE2 | Upon transmitting *UEAssistanceInformation* message with *powerPrefIndication* set to *normal* | Upon releasing *powerPrefIndication* during the connection re-establishment procedure | No action. |
| T341NOTE2 | Upon transmitting *UEAssistanceInformation* message with *bw-Preference.* | Upon resuming an RRC connection or upon releasing *bw-Preference* during the connection re-establishment procedure | No action. |
| T342NOTE2 | Upon transmitting *UEAssistanceInformation* message with *delayBudgetReport*. | Upon releasing *delayBudgetReportingConfig* during the connection re-establishment and connection resume procedures | No action. |
| T350 | Upon entering RRC\_IDLE if *t350* has been received in wlan-OffloadInfo. | Upon entering RRC\_CONNECTED, or upon cell reselection. | Perform the actions specified in 5.6.12.4. |
| T351 | Reception of *RRCConnectionReconfiguration* message including the association*Timer* in *WLAN-MobilityConfig*. | Upon successful connection to WLAN, upon WLAN connection failure, upon leaving RRC\_CONNECTED, upon triggering the handover procedure, or upon initiating the connection re-establishment procedure. | Perform WLAN Connection Status Reporting specified in 5.6.15.2. |
| T360 | Upon performing the redistribution target selection as specified in TS 36.304 [4]. | Upon entering RRC\_CONNECTED, upon receiving a Paging message including *redistributionIndication*; upon reselecting a cell not belonging to the redistribution target. | Stop considering a frequency or cell to be redistribution target, and perform the redistribution target selection if the condition specified in TS 36.304 [4] is met. |
| T370 | Upon receiving *SL-DiscConfig* including a *discSysInfoToReportConfig* set to *setup.* | Upon initiating the transmission of *SidelinkUEInformation* including *discSysInfoReportFreqList*, upon receiving *SL-DiscConfig* including *discSysInfoToReportConfig* set to *release*, upon handover and re-establishment*.* | Release *discSysInfoToReportConfig*. |
| T314NOTE2 | Upon early detecting physical layer problems for the PCell i.e. upon receiving N310 consecutive "early-out-of-sync" indications from lower layers. | Upon receiving N311 consecutive in-sync indications from lower layers for the PCell, upon triggering the handover procedure and upon initiating the connection re-establishment procedure | Initiate the UE Assistance Information procedure to report early detection of physical layer problems in accordance with 5.6.10. |
| T315NOTE2 | Upon detecting physical layer improvements of the PCell i.e. upon receiving N311 consecutive "early-in-sync" indications from lower layers. | Upon receiving N310 consecutive "early-out-of-sync" indications from lower layers for the PCell. | Initiate the UE Assistance Information procedure to report detection of physical layer improvements in accordance with 5.6.10. |
| T343NOTE2 | Upon transmitting *UEAssistanceInformation* message with *RLM-Report* including *earlyOutOfSync*. | Upon initiating the connection re-establishment procedure | No action. |
| T344NOTE2 | Upon transmitting *UEAssistanceInformation* message with *RLM-Report* including *earlyInSync*. | Upon initiating the connection re-establishment procedure | No action. |
| T345  | Upon transmitting *UEAssistanceInformation* message with *overheatingAssistance*  | Upon releasing *overheatingAssistance* during the connection re-establishment procedure, or connection resume procedure. | No action. |
| T346 | Upon transmitting UEAssistanceInformation message with *scg-DeactivationPreference* | Upon releasing *scg-DeactivationPreferenceConfig* during the RRC connection establishment or re-establishment procedures, or upon reconfiguration of *scg-DeactivationPreferenceConfig* to *release*. | No action. |
| T380 | Upon reception of *periodic-RNAU-timer* in RRCConnectionRelease. | Upon reception of *RRCConnectionResume*, *RRCConnectionRelease* or *RRCConnectionSetup*. | Initiate the RAN notification area update procedure |
| T326NOTE1 | Upon entering RRC\_CONNECTED, upon update to NRSRPRef . | Upon leaving RRC\_CONNECTED. | Stop performing connected mode neighbour cell measurement. |
| T317NOTE1 | Upon acquisition of *SystemInformationBlockType31* |  | In RRC\_CONNECTED mode, initiate acquisition of *SystemInformationBlockType31* in accordance with 5.3.3.21. |
| T318NOTE1 | Upon starting acquisition of *SystemInformationBlockType31* in RRC\_CONNECTED | Upon successful acquisition of *SystemInformationBlockType31*in RRC\_CONNECTED | If security is not activated and the UE is not a NB-IoT UE that supports RRC connection re-establishment for the Control Plane CIoT EPS optimisation: go to RRC\_IDLE else: initiate the connection re-establishment procedure as specified in 5.3.7. |
| NOTE1: Only the timers marked with "NOTE1" are applicable to NB-IoT.NOTE2: The behaviour as specified in 7.3.2 applies. |

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| --- |
| Start of next change |

### 10.6.2 Message definitions

<Unchanged text omitted >

#### – *UEPagingCoverageInformation-NB*

This message is used to transfer UE paging coverage information for NB-IoT, covering both upload to and download from the EPC/5GC.

Direction: eNB to/from EPC/5GC

*UEPagingCoverageInformation-NB* message

-- ASN1START

UEPagingCoverageInformation-NB ::= SEQUENCE {

 criticalExtensions CHOICE {

 c1 CHOICE{

 uePagingCoverageInformation-r13 UEPagingCoverageInformation-NB-IEs,

 spare3 NULL, spare2 NULL, spare1 NULL

 },

 criticalExtensionsFuture SEQUENCE {}

 }

}

UEPagingCoverageInformation-NB-IEs ::= SEQUENCE {

-- the possible value(s) can differ from those sent on Uu

 npdcch-NumRepetitionPaging-r13 INTEGER (1..2048) OPTIONAL,

 nonCriticalExtension UEPagingCoverageInformation-NB-v1700-IEs OPTIONAL

}

UEPagingCoverageInformation-NB-v1700-IEs ::= SEQUENCE {

 cbp-Index-r17 INTEGER (1..2) OPTIONAL, -- Cond CB-Paging

 nonCriticalExtension SEQUENCE {} OPTIONAL

}

-- ASN1STOP

| *UEPagingCoverageInformation-NB* field descriptions |
| --- |
| ***cbp-Index***Index to the coverage-based paging carrier group signalled to the UE during RRC connection release. Value 1 corresponds to the first paging carrier group and value 2 corresponds to the second paging carrier group. |
| ***npdcch-NumRepetitionPaging***Number of repetitions for NPDCCH, see TS 36.211 [21].This value is an estimate of the required number of repetitions for NPDCCH. |

| Conditional presence | Explanation |
| --- | --- |
| *CB-Paging* | This field is mandatory present if *cbp-Config* has been provided to UE via dedicated signaling (see *RRCConnectionRelease-NB* and *RRCEarlyDataComplete-NB*). Otherwise this field is not present. |

|  |
| --- |
| End of changes |