**3GPP TSG- Meeting #**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** |  | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | Incorporate Rel-18 MAC Corrections agreed in the RAN2#125 to IoT NTN. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR captures agreements in IoT NTN Work Item of RAN2#125 includes:   * Legacy TAC MAC CE shall not be used for UL transmission extension timer T390 restart. We introduce a new zero-byte MAC CE only to extend X. * For DL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with disabled HARQ feedback, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PDSCH corresponding to the last scheduled TB plus 12 subframes plus deltaPDCCH. * For UL multiple TB scheduling for a NB-IoT UE, if only one of the HARQ processes is configured with HARQ mode B, UE starts drx-InactivityTimer in the subframe containing the last repetition of the PUSCH corresponding to the last scheduled TB plus 1 subframe plus deltaPDCCH. * GNSS validity duration reporting is cancelled if the UE has included the GNSS Validity Duration report MAC CE in a transmission. | | | | | | | | |
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| ***Consequences if not approved:*** | | Support for Release-18 enhancements for IoT NTN is not complete and incorrect. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.4.10, 5.7, 5.xx(new), 6.1.3.xx(new), 6.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 36.331 CR 4990 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

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| Start of fist change |

## 5.4 UL-SCH data transfer

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### 5.4.10 GNSS validity duration reporting

For a NB-IoT UE, a BL UE or a UE in enhanced coverage in a non-terrestrial network, an indication may be sent by upper layer to report the remaining GNSS measurement validity duration.

If the GNSS validity duration reporting procedure has been triggered and not cancelled:

- if the MAC entity has UL resources allocated for new transmission for this TTI, and;

- if the allocated UL resources can accommodate the GNSS Validity Duration Report MAC control element plus its subheader, as a result of logical channel prioritization:

- instruct the Multiplexing and Assembly procedure to generate the GNSS Validity Duration Report MAC control element as defined in clause 6.1.3.23.

- else:

- initiate a Random Access procedure (see clause 5.1).

All triggered GNSS validity duration reports shall be cancelled when a GNSS Validity Duration Report MAC control element is included in a MAC PDU for transmission.

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| Start of next change |

## 5.7 Discontinuous Reception (DRX)

The MAC entity may be configured by RRC with a DRX functionality that controls the UE's PDCCH monitoring activity for the MAC entity's C-RNTI, TPC-PUCCH-RNTI, TPC-PUSCH-RNTI, Semi-Persistent Scheduling C-RNTI (if configured), UL Semi-Persistent Scheduling V-RNTI (if configured), eIMTA-RNTI (if configured), SL-RNTI (if configured), SL-V-RNTI (if configured), CC-RNTI (if configured), SRS-TPC-RNTI (if configured), and AUL C-RNTI (if configured). When in RRC\_CONNECTED, if DRX is configured, the MAC entity is allowed to monitor the PDCCH discontinuously using the DRX operation specified in this clause; otherwise the MAC entity monitors the PDCCH continuously. When using DRX operation, the MAC entity shall also monitor PDCCH according to requirements found in other clauses of this specification. RRC controls DRX operation by configuring the timers *onDurationTimer*, *drx-InactivityTimer*, *drx-RetransmissionTimer* (for HARQ processes scheduled using 1ms TTI, one per DL HARQ process except for the broadcast process), *drx-RetransmissionTimerShortTTI* (for HARQ processes scheduled using short TTI, one per DL HARQ process), *drx-ULRetransmissionTimer* (for HARQ processes scheduled using 1ms TTI, one per asynchronous UL HARQ process), *drx-ULRetransmissionTimerShortTTI* (for HARQ processes scheduled using short TTI, one per asynchronous UL HARQ process), the *longDRX-Cycle*, the value of the *drxStartOffset* and optionally the *drxShortCycleTimer* and *shortDRX-Cycle*. A HARQ RTT timer per DL HARQ process (except for the broadcast process) and UL HARQ RTT Timer per asynchronous UL HARQ process is also defined (see clause 7.7). The HARQ mode per HARQ process can be configured in *uplinkHARQ-Mode*.

When a DRX cycle is configured, the Active Time includes the time while:

*- onDurationTimer* or *drx-InactivityTimer* or *drx-RetransmissionTimer* or *drx-RetransmissionTimerShortTTI* or *drx-ULRetransmissionTimer* or *drx-ULRetransmissionTimerShortTTI* or *mac-ContentionResolutionTimer* (as described in clause 5.1.5) is running; or

- a Scheduling Request is sent on PUCCH/SPUCCH and is pending (as described in clause 5.4.4). If this Serving Cell is part of a non-terrestrial network, the Active Time is started after the Scheduling Request transmission that is performed when the *SR\_COUNTER* is 0 for all the SR configurations with pending SR(s) plus the UE-eNB RTT; or

- an uplink grant for a pending HARQ retransmission can occur and there is data in the corresponding HARQ buffer for synchronous HARQ process; or

- a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity has not been received after successful reception of a Random Access Response for the preamble not selected by the MAC entity (as described in clause 5.1.4) ; or

- *mpdcch-UL-HARQ-ACK-FeedbackConfig* is configured and repetitions within a bundle are being transmitted according to UL\_REPETITION\_NUMBER. If this Serving Cell is part of a non-terrestrial network, the Active Time starts after the first repetition within the bundle plus the UE-eNB RTT when repetitions within the bundle are being transmitted.

When DRX is configured, the MAC entity shall for each subframe:

- if a HARQ RTT Timer expires in this subframe:

- if the data of the corresponding HARQ process was not successfully decoded:

- start the *drx-RetransmissionTimer* or *drx-RetransmissionTimerShortTTI* for the corresponding HARQ process;

*-* if NB-IoT:

- if lower layers had indicated multiple TBs were scheduled for the associated expired HARQ RTT Timer:

- start or restart *drx-InactivityTimer* when all HARQ RTT Timers have expired;

- else:

- start or restart the *drx-InactivityTimer*.

- if an UL HARQ RTT Timer expires in this subframe:

- start the *drx-ULRetransmissionTimer* or *drx-ULRetransmissionTimerShortTTI* for the corresponding HARQ process.

- if NB-IoT:

- if lower layers had indicated multiple TBs were scheduled for the associated expired HARQ RTT Timer:

- start or restart *drx-InactivityTimer* when all HARQ RTT Timers have expired;

- else:

- start or restart the *drx-InactivityTimer*.

- if a DRX Command MAC control element or a Long DRX Command MAC control element is received:

- stop *onDurationTimer*;

- stop *drx-InactivityTimer*.

- if *drx-InactivityTimer* expires or a DRX Command MAC control element is received in this subframe:

- if the Short DRX cycle is configured:

- start or restart *drxShortCycleTimer*;

- use the Short DRX Cycle.

- else:

- use the Long DRX cycle.

- if *drxShortCycleTimer* expires in this subframe:

- use the Long DRX cycle.

- if a Long DRX Command MAC control element is received:

- stop *drxShortCycleTimer*;

- use the Long DRX cycle.

- If the Short DRX Cycle is used and [(SFN \* 10) + subframe number] modulo (*shortDRX-Cycle*) = (*drxStartOffset*) modulo (*shortDRX-Cycle*); or

- if the Long DRX Cycle is used and [(SFN \* 10) + subframe number] modulo (*longDRX-Cycle*) = *drxStartOffset*:

- if NB-IoT:

- if there is at least one HARQ process for which neither HARQ RTT Timer nor UL HARQ RTT Timer is running, start *onDurationTimer*.

- else:

- start onDurationTimer.

- during the Active Time, for a PDCCH-subframe, if the subframe is not required for uplink transmission for half-duplex FDD UE operation, and if the subframe is not a half-duplex guard subframe, as specified in TS 36.211 [7], and if the subframe is not part of a configured measurement gap and if the subframe is not part of a configured Sidelink Discovery Gap for Reception, and for NB-IoT if the subframe is not required for uplink transmission or downlink reception other than on PDCCH; or

- during the Active Time, for a subframe other than a PDCCH-subframe and for a UE capable of simultaneous reception and transmission in the aggregated cells, if the subframe is a downlink subframe indicated by a valid eIMTA L1 signalling for at least one serving cell not configured with *schedulingCellId*, as specified in TS 36.331 [8] and if the subframe is not part of a configured measurement gap and if the subframe is not part of a configured Sidelink Discovery Gap for Reception; or

- during the Active Time, for a subframe other than a PDCCH-subframe and for a UE not capable of simultaneous reception and transmission in the aggregated cells, if the subframe is a downlink subframe indicated by a valid eIMTA L1 signalling for the SpCell and if the subframe is not part of a configured measurement gap and if the subframe is not part of a configured Sidelink Discovery Gap for Reception:

- monitor the PDCCH;

- if the PDCCH indicates a DL transmission or if a DL assignment has been configured for this subframe:

- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:

- if the HARQ feedback is disabled by lower layers when *downlinkHARQ-FeedbackDisabled* is not configured for the corresponding HARQ process; or

- if the HARQ feedback is disabled by *downlinkHARQ-FeedbackDisabled* for the corresponding HARQ process; or

- if the HARQ feedback is enabled by downlinkHARQ-FeedbackDisabled for the corresponding HARQ process and further reversed to disabled by lower layers:

*-* if NB-IoT:

- if the UE is configured with a single DL and UL HARQ process:

- start or restart *drx-InactivityTimer* in the subframe containing the last repetition of the corresponding PDSCH reception + 12 subframes + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe containing the last repetition of the corresponding PDSCH reception plus 12 subframes to the first subframe of the next PDCCH occasion.

- if lower layers have indicated scheduling of transmission of multiple TBs:

- start or restart *drx-InactivityTimer* in the subframe containing the last repetition of the PDSCH reception corresponding to the last scheduled TB + 12 subframes + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe containing the last repetition PDSCH reception corresponding to the last scheduled TB plus 12 subframes to the first subframe of the next PDCCH occasion.

- else if the HARQ feedback is enabled for the corresponding HARQ process:

- if lower layers have indicated scheduling of transmission of multiple TBs:

- start the HARQ RTT Timers for all HARQ processes which the HARQ feedback are enabled corresponding to the scheduled TBs in the subframe containing the last repetition of the PDSCH corresponding to the last scheduled TB;

- else:

- start the HARQ RTT Timer for the corresponding HARQ process in the subframe containing the last repetition of the corresponding PDSCH reception;

- else:

- start the HARQ RTT Timer for the corresponding HARQ process;

- stop the *drx-RetransmissionTimer* or *drx-RetransmissionTimerShortTTI* for the corresponding HARQ process.

- if NB-IoT, stop *drx-ULRetransmissionTimer* for all UL HARQ processes.

- if the PDCCH indicates an UL transmission for an asynchronous HARQ process or if an UL grant has been configured for an asynchronous HARQ process for this subframe, or if the PDCCH indicates an UL transmission for an autonomous HARQ process or;

- if the uplink grant is a configured grant for the MAC entity's AUL C-RNTI and if the corresponding PUSCH transmission has been performed in this subframe:

- if *mpdcch-UL-HARQ-ACK-FeedbackConfig* is not configured; and

- if the corresponding HARQ process is not configured with HARQ mode B:

- if lower layers have indicated scheduling of transmission of multiple TBs:

- start the UL HARQ RTT Timers for all scheduled HARQ processes which are not configured with HARQ mode B in the subframe containing the last repetition of the PUSCH corresponding to the last scheduled TB;

- else:

- start the UL HARQ RTT Timer for the corresponding HARQ process in the subframe containing the last repetition of the corresponding PUSCH transmission;

- stop the *drx-ULRetransmissionTimer* or *drx-ULRetransmissionTimerShortTTI* for the corresponding HARQ process;

- if *mpdcch-UL-HARQ-ACK-FeedbackConfig* is configured and an UL HARQ-ACK feedback has not been received on PDCCH until the last repetition of the corresponding PUSCH transmission:

- if the corresponding HARQ process is not configured with HARQ mode B:

- start or restart the *drx-ULRetransmissionTimer* for the corresponding HARQ process in the subframe containing the last repetition of the corresponding PUSCH transmission;

*-* if NB-IoT:

- if the UE is configured with single UL and DL HARQ process and if the corresponding HARQ process is configured with HARQ mode B:

- start or restart *drx-InactivityTimer* in the subframe containing the last repetition of the corresponding PUSCH transmission + 1 subframe + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe containing the last repetition of the corresponding PUSCH transmission plus 1 subframes to the first subframe of the next PDCCH occasion.

- if lower layers have indicated scheduling of transmission of multiple TBs:

- start or restart *drx-InactivityTimer* in the subframe containing the last repetition of the PUSCH transmission corresponding to the last scheduled TB + 1 subframe + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe containing the last repetition of the PUSCH transmission corresponding to the last scheduled TB plus 1 subframes to the first subframe of the next PDCCH occasion.

- if NB-IoT, stop *drx-RetransmissionTimer* for all DL HARQ processes.

- if the PDCCH indicates a new transmission (DL, UL or SL):

- if the UE is an NB-IoT UE:

- if the UE is configured with more than one HARQ process and PDCCH indicate the transmission is for a single TB:

- start or restart *drx-InactivityTimer*.

- else:

- start or restart *drx-InactivityTimer*.

- if the PDCCH indicates a transmission (DL, UL) for an NB-IoT UE:

- if the NB-IoT UE is configured with a single DL and UL HARQ process; or

- if the PDCCH indicates the transmission is for multiple TBs:

- stop *drx-Inactivity*Timer.

- stop *onDurationTimer.*

- if the PDCCH indicates an UL HARQ-ACK feedback for an asynchronous UL HARQ process for a UE configured with *mpdcch-UL-HARQ-ACK-FeedbackConfig*:

- if the lower layer had indicated scheduling of transmission of multiple TBs:

- stop *drx-ULRetransmissionTimer* for the corresponding UL HARQ process(es).

- else if the PUSCH transmission is completed:

- stop *drx-ULRetransmissionTimer* for all UL HARQ processes.

- if the PDCCH indicates HARQ feedback for one or more HARQ processes for which UL HARQ operation is autonomous:

- stop the *drx-ULRetransmissionTimer* for the corresponding HARQ process(es).

- in current subframe n, if the MAC entity would not be in Active Time considering grants/assignments/DRX Command MAC control elements/Long DRX Command MAC control elements received and Scheduling Request sent until and including subframe n-5 when evaluating all DRX Active Time conditions as specified in this clause, type-0-triggered SRS, as specified in TS 36.213 [2], shall not be reported.

- if CQI masking (*cqi-Mask*) is setup by upper layers:

- in current TTI n, if *onDurationTimer* would not be running considering grants/assignments/DRX Command MAC control elements/Long DRX Command MAC control elements received until and including TTI n-5 when evaluating all DRX Active Time conditions as specified in this clause, CQI/PMI/RI/PTI/CRI on PUCCH shall not be reported.

- else:

- in current TTI n, if the MAC entity would not be in Active Time considering grants/assignments/DRX Command MAC control elements/Long DRX Command MAC control elements received and Scheduling Request sent until and including TTI n-5 when evaluating all DRX Active Time conditions as specified in this clause, CQI/PMI/RI/PTI/CRI on PUCCH shall not be reported.

For NB-IoT, *onDurationTimer* may start within a PDCCH period and end within a PDCCH period. The UE shall monitor NPDCCH during these partial PDCCH periods while *onDurationTimer* is running.

Regardless of whether the MAC entity is monitoring PDCCH or not, the MAC entity receives and transmits HARQ feedback and transmits type-1-triggered SRS, as specified in TS 36.213 [2], when such is expected. The MAC entity monitors PDCCH addressed to CC-RNTI for a PUSCH trigger B, as specified in TS 36.213 [2], on the corresponding SCell even if the MAC entity is not in Active Time. when such is expected.

When the BL UE or the UE in enhanced coverage or NB-IoT UE receives PDCCH, the UE executes the corresponding action specified in this clause in the subframe following the subframe containing the last repetition of the PDCCH reception where such subframe is determined by the starting subframe and the DCI subframe repetition number field in the PDCCH specified in TS 36.213 [2], unless explicitly stated otherwise.

NOTE 1: The same Active Time applies to all activated serving cell(s).

NOTE 2: In case of downlink spatial multiplexing, if a TB is received while the HARQ RTT Timer is running and the previous transmission of the same TB was received at least N subframes before the current subframe (where N corresponds to the HARQ RTT Timer), the MAC entity should process it and restart the HARQ RTT Timer.

NOTE 3: The MAC entity does not consider PUSCH trigger B, as specified in TS 36.213 [2], to be an indication of a new transmission.

NOTE 4: For NB-IoT, for operation in FDD mode, and for operation in TDD mode with a single HARQ process, DL and UL transmissions will not be scheduled in parallel, i.e. if a DL transmission has been scheduled an UL transmission will not be scheduled until HARQ RTT Timer of the DL HARQ process has expired (and vice versa).

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| Start of next change |

## 5.27 GNSS measurement

The network may request a NB-IoT UE, a BL UE or a UE in enhanced coverage in a non-terrestrial network to perform GNSS measurement or configure a GNSS measurement gap for UE autonomous GNSS measurement by sending the GNSS Measurement Command MAC CE described in clause 6.1.3.22.

The MAC entity shall:

- if the MAC entity receives a GNSS Measurement Command MAC CE:

- indicate the GNSS measurement gap length configuration to upper layers;

- if the Type field indicates network-triggered GNSS measurement:

- indicate to upper layers a request to perform GNSS measurement.

## 5.xx UL Transmission Extension

The network may request a NB-IoT UE, a BL UE or a UE in enhanced coverage in a non-terrestrial network to update the UL transmission extension by sending the UL Transmission Extension Update MAC CE described in clause 6.1.3.xx.

The MAC entity shall:

- if the MAC entity receives an UL Transmission Extension Update MAC CE:

- indicate to upper layers to extend the UL transmission.

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| Start of next change |

## 6.1 Protocol Data Units

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### 6.1.3 MAC Control Elements

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#### 6.1.3.23 GNSS Validity Duration Report MAC Control Element

The GNSS Validity Duration Report MAC Control Element is identified by a MAC PDU subheader with LCID as specified in table 6.2.1-2.

It has a fixed size and consists of a single octet defined as follows (Figure 6.1.3.23-1):

- R: Reserved bit, set to 0;

- GNSS Validity Duration: the field corresponds to the remaining GNSS validity duration defined in the TS 36.331 [8].



Figure 6.1.3.23-1: GNSS Validity Duration Report MAC control element

#### 6.1.3.xx UL Transmission Extension Update MAC Control Element

UL Transmission Extension Update MAC Control Element is identified by a MAC PDU subheader with LCID as specified in Table 6.2.1-1

It has a fixed size of zero bits.

## 6.2 Formats and parameters

### 6.2.1 MAC header for DL-SCH, UL-SCH and MCH

The MAC header is of variable size and consists of the following fields:

- LCID: The Logical Channel ID field identifies the logical channel instance of the corresponding MAC SDU or the type of the corresponding MAC control element or padding as described in tables 6.2.1-1, 6.2.1-2 and 6.2.1-4 for the DL-SCH, UL-SCH and MCH respectively. There is one LCID field for each MAC SDU, MAC control element or padding included in the MAC PDU. In addition to that, one or two additional LCID fields are included in the MAC PDU, when single-byte or two-byte padding is required but cannot be achieved by padding at the end of the MAC PDU. If the LCID field is set to "10000", an additional octet is present in the MAC PDU subheader containing the eLCID field and this additional octet follows the octet containing LCID field. A UE of Category 0, as specified in TS 36.306 [12], except when in enhanced coverage, and *unicastFreqHoppingInd-r13* is indicated in the BR version of SI message carrying *SystemInformationBlockType2*, and UE supports frequency hopping for unicast, as specified in TS 36.306 [12], shall indicate CCCH using LCID "01011", a BL UE with support for frequency hopping for unicast, as specified in TS 36.306 [12], and a UE in enhanced coverage with support for frequency hopping for unicast, as specified in TS 36.306 [12], shall if *unicastFreqHoppingInd-r13* is indicated in the BR version of SI message carrying *SystemInformationBlockType2* indicate CCCH using LCID "01100", otherwise the UE shall indicate CCCH using LCID "00000". A short DCQR may be included in the MAC PDU subheader with LCID set to "00000", "01011", "01100" or "01101". The LCID field size is 5 bits;

- eLCID: The extended Logical Channel ID field identifies the logical channel instance of the corresponding MAC SDU or the type of the corresponding MAC control element as described in tables 6.2.1-1a and 6.2.1-2a for the DL-SCH and UL-SCH respectively. The size of the eLCID field is 6 bits.

- L: The Length field indicates the length of the corresponding MAC SDU or variable-sized MAC control element in bytes. There is one L field per MAC PDU subheader except for the last subheader and subheaders corresponding to fixed-sized MAC control elements. The size of the L field is indicated by the F field and F2 field;

- F: The Format field indicates the size of the Length field as indicated in table 6.2.1-3. There is one F field per MAC PDU subheader except for the last subheader and subheaders corresponding to fixed-sized MAC control elements and except for when F2 is set to 1. The size of the F field is 1 bit. If the F field is included; if the size of the MAC SDU or variable-sized MAC control element is less than 128 bytes, the value of the F field is set to 0, otherwise it is set to 1;

- F2: Except when this field is used for short DCQR, the Format2 field indicates the size of the Length field as indicated in table 6.2.1-3. For short DCQR, the mapping of F2 field to short DCQR value is described in table 6.2.1-5. There is one F2 field per MAC PDU subheader. The size of the F2 field is 1 bit. Except when this field is used for short DCQR, if the size of the MAC SDU or variable-sized MAC control element is larger than 32767 bytes, and if the corresponding subheader is not the last subheader, the value of the F2 field is set to 1, otherwise it is set to 0;

- E: The Extension field is a flag indicating if more fields are present in the MAC header or not. The E field is set to "1" to indicate another set of at least R/F2/E/LCID fields. The E field is set to "0" to indicate that either a MAC SDU, a MAC control element or padding starts at the next byte;

- R: Except when this field is used for short DCQR, reserved bit, set to "0". For short DCQR, the mapping of R field to short DCQR value is described in table 6.2.1-5.

The MAC header and subheaders are octet aligned.

Table 6.2.1-1 Values of LCID for DL-SCH

|  |  |
| --- | --- |
| Codepoint/Index | LCID values |
| 00000 | CCCH |
| 00001-01010 | Identity of the logical channel |
| 01011-01100 | Reserved |
| 01101 | UL Transmission Extension Update |
| 01110 | GNSS Measurement Command |
| 01111 | Differential Koffset |
| 10000 | Extended logical channel ID field |
| 10001 | DCQR Command |
| 10010 | Activation/Deactivation of PDCP Duplication |
| 10011 | Hibernation (1 octet) |
| 10100 | Hibernation (4 octets) |
| 10101 | Activation/Deactivation of CSI-RS |
| 10110 | Recommended bit rate |
| 10111 | SC-PTM Stop Indication |
| 11000 | Activation/Deactivation (4 octets) |
| 11001 | SC-MCCH, SC-MTCH (see note) |
| 11010 | Long DRX Command |
| 11011 | Activation/Deactivation (1 octet) |
| 11100 | UE Contention Resolution Identity |
| 11101 | Timing Advance Command |
| 11110 | DRX Command |
| 11111 | Padding |
| NOTE: Both SC-MCCH and SC-MTCH cannot be multiplexed with other logical channels in the same MAC PDU except for Padding and SC-PTM Stop Indication | |

Table 6.2.1-1a Values of eLCID for DL-SCH

|  |  |  |
| --- | --- | --- |
| Codepoint | Index | LCID values |
| 000000-000110 | 32-38 | Identity of the logical channel |
| 000111-111111 | 39-95 | Reserved |

For NB-IoT only the following LCID values for DL-SCH are applicable: CCCH, Identity of the logical channel, DCQR Command, SC-PTM Stop Indication, SC-MCCH/SC-MTCH, UE Contention Resolution Identity, Timing Advance Command, DRX Command, Differential Koffset, GNSS Measurement Command, UL Transmission Extension Update and Padding.

Table 6.2.1-2 Values of LCID for UL-SCH

|  |  |
| --- | --- |
| Codepoint/Index | LCID values |
| 00000 | CCCH |
| 00001-01010 | Identity of the logical channel |
| 01011 | CCCH |
| 01100 | CCCH |
| 01101 | CCCH and Extended Power Headroom Report |
| 01110 | GNSS Validity Duration Report |
| 01111 | Timing Advance Report |
| 10000 | Extended logical channel ID field |
| 10001 | DCQR and AS RAI |
| 10010 | AUL confirmation (4 octets) |
| 10011 | AUL confirmation (1 octet) |
| 10100 | Recommended bit rate query |
| 10101 | SPS confirmation |
| 10110 | Truncated Sidelink BSR |
| 10111 | Sidelink BSR |
| 11000 | Dual Connectivity Power Headroom Report |
| 11001 | Extended Power Headroom Report |
| 11010 | Power Headroom Report |
| 11011 | C-RNTI |
| 11100 | Truncated BSR |
| 11101 | Short BSR |
| 11110 | Long BSR |
| 11111 | Padding |

Table 6.2.1-2a Values of eLCID for UL-SCH

|  |  |  |
| --- | --- | --- |
| Codepoint | Index | LCID values |
| 000000-000110 | 32-38 | Identity of the logical channel |
| 000111-111111 | 39-95 | Reserved |

For NB-IoT only the following LCID values for UL-SCH are applicable: CCCH (LCID "00000"), Identity of the logical channel, CCCH and Extended Power Headroom Report, DCQR and AS RAI, SPS confirmation, C-RNTI, Short BSR, Timing Advance Report, GNSS Validity Duration Report and Padding.

Table 6.2.1-3 Values of F and F2 fields:

|  |  |  |
| --- | --- | --- |
| Index of F2 | Index of F | Size of Length field (in bits) |
| 0 | 0 | 7 |
| 1 | 15 |
| 1 | - | 16 |

Table 6.2.1-4 Values of LCID for MCH

|  |  |
| --- | --- |
| Index | LCID values |
| 00000 | MCCH (see note) |
| 00001-11100 | MTCH |
| 11101 | Reserved |
| 11110 | MCH Scheduling Information or Extended MCH Scheduling Information |
| 11111 | Padding |
| NOTE: If there is no MCCH on MCH, an MTCH could use this value. | |

Table 6.2.1-5: Values of R and F2 fields for short DCQR

|  |  |  |
| --- | --- | --- |
| Index of R | Index of F2 | Short DCQR value |
| 0 | 0 | No short DCQR |
| 0 | 1 | Short DCQR 1 |
| 1 | 0 | Short DCQR 2 |
| 1 | 1 | Short DCQR 3 |