3GPP TSG RAN WG2 Meeting #121 draft R2-2301964

**Athens, Greece, Feb 27 – March 03, 2023**

**Agenda item: 7.2.2**

**Source: MediaTek**

**Title:** **[offline 111] UP corrections (Mediatek)**

**Document for:**  **Discussion and decision**

# Introduction

This report summarizes the offline discussion below that took place during RAN2#121 meeting:

* [AT121][111][IoT NTN] UP corrections (Mediatek)

Scope: Discuss the MAC CRs

Intended outcome: offline summary (and agreeable CRs, if any)

Deadline for companies' feedback: Thursday 2023-03-02 22:00 EET

Deadline for rapporteur's summary (in R2-2301964): Friday 2023-03-03 08:00 EET

# Reference

The following documents are treated in this offline discussion:

[1] [R2-2300258](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2300258%20Misc%20corrections%20on%20MAC%20for%20IoT%20NTN.docx) Misc corrections on MAC for IoT NTN MediaTek Inc. CR Rel-17 36.321 17.3.0 1559 - A LTE\_NBIOT\_eMTC\_NTN-Core

* Offline 111

[2] [R2-2301878](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1563_%28Rel-17%29_R2-2301878%20-%20Correction%20for%20IoT%20NTN.docx) Correction for IoT NTN Ericsson CR Rel-17 36.321 17.3.0 1563 - F LTE\_NBIOT\_eMTC\_NTN

* Offline 111

[3] [R2-2301879](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx) R17 IoT NTN user plane corrections Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

* Offline 111

UE location Info in RLF report

Moved from 7.2.1

[4] [R2-2300886](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2300886%20UE%20location%20in%20RLF%20report%20for%20NB-IoT.doc) NB-IoT UE location Info in RLF report Qualcomm Incorporated discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

* Offline 111

[5] [R2-2300887](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36331_CR4906_%28Rel-17%29_R2-2300887%20RLF%20report.docx) Correction on UE location information in NB-IoT RLF report Qualcomm Incorporated CR Rel-17 36.331 17.3.0 4906 - F LTE\_NBIOT\_eMTC\_NTN

* Offline 111

Figure clarifying HARQ RTT timer

[6] [R2-2300888](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1561_%28Rel-17%29_R2-2300888%20RTT%20timer%20figure.docx) Correction on figure clarifying HARQ RTT timer Qualcomm Incorporated CR Rel-17 36.321 17.3.0 1561 - F LTE\_NBIOT\_eMTC\_NTN

* Offline 111

Generation of TA reporting

[7] [R2-2301051](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2301051%2036321_R17_Clarification%20on%20the%20generation%20of%20TA%20reporting%20for%20IoT%20NTN.docx) Clarification on the generation of TA reporting for IoT NTN ZTE Corporation, Sanechips CR Rel-17 36.321 17.3.0 1562 - F LTE\_NBIOT\_eMC\_NTN-Core

* Offline 111

# Contact information

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| **Company** | **Contact Name** | **Email** |
| MediaTek | Abhishek Roy | Abhishek.Roy@mediatek.com |
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# Discussion

## Misc corrections

[1] [R2-2300258](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2300258%20Misc%20corrections%20on%20MAC%20for%20IoT%20NTN.docx) Misc corrections on MAC for IoT NTN MediaTek Inc. CR Rel-17

**Reason for change:**

The delaying of start the pur-ResponseWindowTimer for NTN operation is an optional feature with a UE radio access capability parameter. It is possible that UE supports PUR and NTN, but UE does not support delaying of start the pur-ResponseWindowTimer. However, the MAC specification does not correctly reflect that possibility.

**Corresponding Changes in 36.321**

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| 5.4.7 Preconfigured Uplink Resource5.4.7.1 Transmission using PURTransmission using PUR is initiated by the RRC layer. When transmission using PUR is initiated, RRC layer provides MAC with the following information:- PUR-RNTI;- Duration of PUR response window *pur-ResponseWindowTimer*;- UL grant information.If the MAC entity has a PUR-RNTI, the MAC entity shall for each TTI for which RRC layer has provided uplink grant for transmission using PUR:- deliver the uplink grant, and the associated HARQ information to the HARQ entity for this TTI.After transmission using PUR, the MAC entity shall monitor PDCCH identified by PUR-RNTI in the PUR response window using timer *pur-ResponseWindowTimer*:- if PUR was transmitted in a non-terrestrial network and UE supports delaying the start of the pur-ResponseWindowTimer:- the MAC entity shall start *pur-ResponseWindowTimer* at the subframe that contains the end of the corresponding PUSCH transmission plus 4 subframes plus UE-eNB RTT.- else:- the MAC entity shall start *pur-ResponseWindowTimer* at the subframe that contains the end of the corresponding PUSCH transmission plus 4 subframes*.*While *pur-ResponseWindowTimer* is running, the MAC entity shall:- if the PDCCH transmission is addressed to the PUR-RNTI and contains an UL grant for a retransmission:- if PUR was transmitted in a non-terrestrial network and UE supports delaying the start of the pur-ResponseWindowTimer:- restart *pur-ResponseWindowTimer* at the last subframe of a PUSCH transmission corresponding to the retransmission indicated by the UL grant plus 4 subframes plus UE-eNB RTT.- else:- restart *pur-ResponseWindowTimer* at the last subframe of a PUSCH transmission corresponding to the retransmission indicated by the UL grant plus 4 subframes. |

**Question 1:** Do companies agree on the proposed change in R2-2300258 for TS 36.321 R17?

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| **Company** | **Yes/No** | **Additional comments** |
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[2] [R2-2301878](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1563_%28Rel-17%29_R2-2301878%20-%20Correction%20for%20IoT%20NTN.docx) Correction for IoT NTN Ericsson CR Rel-17 36.321 17.3.0 1563 - F LTE\_NBIOT\_eMTC\_NTN

[3] [R2-2301879](file:///C%3A%5C%5CData%5C%5C3GPP%5C%5CExtracts%5C%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx%22%20%5Co%20%22C%3AData3GPPExtractsR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx) R17 IoT NTN user plane corrections Ericsson discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

**Reason for change:**

In discussion paper R2-2301879 [3], company proposed:

[Observation 1 A normative element shall contain all characteristics.](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518407)

[Observation 2 Notes shall not contain characteristics needed for normative elements.](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518408)

[Proposal 1 The information in NOTE 1 and NOTE 2 at the end of section 7.7 in 36.321 shall be moved from NOTE to normative text.](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518409)

[Proposal 2 Replace “NOTE 1” in 7.7 of 36.321 with a normative text in beginning of 7.7 “The parameter RTToffset is set to 0 in terrestrial networks and RTToffset is set to UE-eNB RTT in Non-terrestrial networks.”](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518410)

[Proposal 3 Replace “NOTE 2” in 7.7 of 36.321 with a normative text in beginning of 7.7 “The parameter DLoffset is set to 0 in terrestrial networks and DLoffset is set to Koffset + *k-Mac* in Non-terrestrial networks where Koffset is defined in TS 36.213 [2].”](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518411)

[Proposal 4 Add a sentence explaining what RTToffset and DL offset are used for, for example “The parameters RTToffset and DLoffset provides offsets for determining the HARQ round trip time.”](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518412)

[Proposal 5 Change the reference in 6.1.3.21 in MAC spec from “see TS 36.213 [2], clause 4.2.3” to “see TS 36.213 [2]”.](file:///D%3A%5CNBIOT%5CTdocReview%5CR2-121%5CDocs%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx#_Toc127518413)

**Corresponding Changes in 36.321, R2-2301878 [2]:**

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| 7.7 HARQ RTT TimersThe parameters RTToffset and DLoffset provides offsets for determining the HARQ round trip time. The parameter RTToffset is set to 0 in terrestrial networks and RTToffset is set to UE-eNB RTT in Non-terrestrial networks. The parameter DLoffset is set to 0 in terrestrial networks and DLoffset is set to Koffset + *k-Mac* in Non-terrestrial networks where Koffset is defined in TS 36.213 [2].For each serving cell, in case of FDD configuration not configured with *subframeAssignment-r15* and in case of Frame Structure Type 3 configuration on the serving cell which carries the HARQ feedback for this serving cell the HARQ RTT Timer is set to 8 subframes. For each serving cell, in case of TDD configuration or FDD with *subframeAssignment-r15* configured on the serving cell which carries the HARQ feedback for this serving cell the HARQ RTT Timer is set to k + 4 subframes, where k is the interval between the downlink transmission and the transmission of associated HARQ feedback, as indicated in clauses 10.1 and 10.2 of TS 36.213 [2], and for an RN configured with *rn-SubframeConfig*, as specified in TS 36.331 [8] and not suspended, as indicated in Table 7.5.1-1 of TS 36.216 [11].For each serving cell, for HARQ processes scheduled using Short Processing Time (TS 36.331 [8]) the HARQ RTT Timer is set to 6 subframes for FDD and Frame Structure Type 3 and set to k + 3 subframes for TDD, where k is the interval between the downlink transmission and the transmission of associated HARQ feedback, as indicated in clauses 10.1 and 10.2 of TS 36.213 [2].For each serving cell, for HARQ processes scheduled using short TTI (TS 36.331 [8]) the HARQ RTT Timer is set to 8 TTIs if the TTI length is one slot or if *proc-Timeline* is set to n+4 set1, to 12 TTIs if *proc-Timeline* is set to n+6 set1 or n+6 set2 and to 16 TTIs if *proc-Timeline* is set to n+8 set2 for FDD and Frame Structure Type 3.For TDD short TTI the HARQ RTT Timer is set to k + 4 TTIs, where k is the interval between the downlink transmission and the transmission of associated HARQ feedback, as indicated in clauses 10.1 and 10.2 of TS 36.213 [2].For BL UEs and UEs in enhanced coverage, when single TB is scheduled by PDCCH the HARQ RTT Timer corresponds to 7 + N subframes plus DLoffset, where N is the used PUCCH repetition factor, where only valid (configured) UL subframes as configured by upper layers in *fdd-UplinkSubframeBitmapBR* are counted for N. In case of TDD, HARQ RTT Timer corresponds to 3 + k + N subframes plus RTToffset, where k is the interval between the last repetition of downlink transmission and the first repetition of the transmission of associated HARQ feedback, and N is the used PUCCH repetition factor, where only valid UL subframes are counted for N as indicated in clauses 10.1 and 10.2 of TS 36.213 [2].For BL UEs and UEs in enhanced coverage, when multiple TBs are scheduled by PDCCH and HARQ-ACK bundling is not configured, the HARQ RTT Timer corresponds to 7 + m \* N subframes plus DLoffset, where N is the used PUCCH repetition factor and m is the number of scheduled TBs as indicated in PDCCH, where only valid (configured) UL subframes as configured by upper layers in *fdd-UplinkSubframeBitmapBR* are counted for m \* N.For BL UEs and UEs in enhanced coverage, when multiple TBs are scheduled by PDCCH and HARQ-ACK bundling is configured the HARQ RTT Timer corresponds to 7 + M \* N subframes plus DLoffset, where N is the used PUCCH repetition factor and M is the number of TB bundles as specified in clause 7.3 of TS 36.213 [2], where only valid (configured) UL subframes as configured by upper layers in *fdd-UplinkSubframeBitmapBR* are counted for M \* N.For NB-IoT, when single TB is scheduled by PDCCH or when multiple TBs are scheduled for the interleaved case when HARQ-ACK bundling is configured the HARQ RTT Timer is set to k+3+N subframes plus RTToffset + deltaPDCCH, where k is the interval between the last subframe of the downlink transmission and the first subframe of the associated HARQ feedback transmission and N is the transmission duration in subframes of the associated HARQ feedback, and deltaPDCCH is the interval starting from the subframe following the last subframe of the associated HARQ feedback transmission plus 3 subframes plus RTToffset to the first subframe of the next PDCCH occasion.For NB-IoT, when multiple TBs are scheduled by PDCCH for the non-interleaved case or for the interleaved case when HARQ-ACK bundling is not configured, the HARQ RTT Timer is set to k+2\*N+1 subframes plus RTToffset + deltaPDCCH where k is the interval between the last subframe of the downlink transmission and the first subframe of the first HARQ feedback transmission and N is the transmission duration in subframes of the associated HARQ feedback, and deltaPDCCH is the interval starting from the subframe following the last subframe of the last HARQ feedback transmission plus 1 subframe plus RTToffset to the first subframe of the next PDCCH occasion.Except for NB-IoT and for HARQ processes scheduled using Short Processing Time and for short TTI, UL HARQ RTT Timer length is set to 4 subframes plus RTToffset for FDD and Frame Structure Type 3, and set to kULHARQRTT subframes plus RTToffset for TDD, where kULHARQRTT equals to the kPHICH value indicated in Table 9.1.2-1 of TS 36.213 [2] if the UE is not configured with upper layer parameter *symPUSCH-UpPts* for the serving cell, otherwise the kPHICH value is indicated in Table 9.1.2-3.For NB-IoT, when single TB is scheduled by PDCCH the UL HARQ RTT timer length is set to 4 subframes plus RTToffset + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe following the last subframe of the PUSCH transmission plus 3 subframes plus RTToffset to the first subframe of the next PDCCH occasion.For NB-IoT, when multiple TBs are scheduled by PDCCH the UL HARQ RTT timer length is set to 1 subframe plus RTToffset + deltaPDCCH, where deltaPDCCH is the interval starting from the subframe following the last subframe of the PUSCH transmission plus 1 subframe plus RTToffset to the first subframe of the next PDCCH occasion.For HARQ processes scheduled using Short Processing Time (TS 36.331 [8]), the UL HARQ RTT Timer length is set to 3 subframes for FDD and for Frame Structure Type 3, and set to kULHARQRTT subframes for TDD, where kULHARQRTT equals the value indicated in Table 7.7-1 and Table 7.7-2.For HARQ processes scheduled using short TTI (TS 36.331 [8]), the UL HARQ RTT Timer length is set to 8 TTIs if the TTI length is one slot or if *proc-Timeline* is set to n+4 set1, to 12 TTIs if *proc-Timeline* is set to n+6 set1 or n+6 set2 and to 16 TTIs if *proc-Timeline* is set to n+8 set2 for FDD and Frame Structure Type 3. For TDD short TTI the UL HARQ RTT Timer is set to kULHARQRTT TTIs, where kULHARQRTT equals the value indicated in Table 7.7-3, Table 7.7-4 and Table 7.7-5.Table 7.7-1: kULHARQRTT for TDD Short Processing Time when special subframe configurations 0~9 is configured

|  |  |
| --- | --- |
| **TDD UL/DLConfiguration** | **subframe index *n*** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| 0 |  |  | 3 | 3 | 6 |  |  | 3 | 3 | 6 |
| 1 |  |  | 3 | 3 |  |  |  | 3 | 3 |  |
| 2 |  |  | 3 |  |  |  |  | 3 |  |  |
| 3 |  |  | 3 | 3 | 3 |  |  |  |  |  |
| 4 |  |  | 3 | 3 |  |  |  |  |  |  |
| 5 |  |  | 3 |  |  |  |  |  |  |  |
| 6 |  |  | 3 | 3 | 5 |  |  | 3 | 3 |  |

Table 7.7-2: kULHARQRTT for TDD Short Processing Time applied when special subframe configuration 10 is configured

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| --- | --- |
| **TDD UL/DLConfiguration** | **subframe index n** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| 0 |  | 4 | 3 | 3 | 6 |   | 4 | 3 | 3 | 6 |
| 1 |  | 3 | 3 | 3 |   |   | 3 | 3 | 3 |   |
| 2 |  | 3 | 3 |  |  |  | 3 | 3 |  |   |
| 3 |  | 4 | 3 | 3 | 3 |  |  |  |  |   |
| 4 |  | 3 | 3 | 3 |  |  |  |  |  |   |
| 5 |  | 3 | 3 |  |  |  |  |  |  |   |
| 6 |  | 4 | 3 | 3 | 5 |  | 3 | 3 | 3 |   |

Table 7.7-3: kULHARQRTT for TDD short TTI applied when special subframe configurations 1, 2, 3, 4, 6, 7 and 8 are configured

|  |  |
| --- | --- |
| **TDD UL/DLConfiguration** | **sTTI index *n*** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| 0 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 4 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 4 |
| 1 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |  |  |  |  | 4 | 4 | 4 | 4 |  |  |
| 2 |  |  |  |  | 4 | 4 |  |  |  |  |  |  |  |  | 4 | 4 |  |  |  |  |
| 3 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 4 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |

Table 7.7-4: kULHARQRTT for TDD short TTI applied when special subframe configurations 0, 5 and 9 are configured

|  |  |
| --- | --- |
| **TDD UL/DLConfiguration** | **sTTI index *n*** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| 0 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 11 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 11 |
| 1 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |  |  |  |  | 4 | 4 | 4 | 4 |  |  |
| 2 |  |  |  |  | 4 | 4 |  |  |  |  |  |  |  |  | 4 | 4 |  |  |  |  |
| 3 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  | 6 | 5 | 4 | 4 | 4 | 9 |  |  |  |  | 4 | 4 | 4 | 4 |  |  |

Table 7.7-5: kULHARQRTT for TDD short TTI applied when special subframe configuration 10 is configured

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| --- | --- |
| **TDD UL/DLConfiguration** | **sTTI index *n*** |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** |
| 0 |  |  |  | 7 | 6 | 5 | 4 | 4 | 4 | 11 |  |  |  | 7 | 6 | 5 | 4 | 4 | 4 | 11 |
| 1 |  |  |  | 5 | 4 | 4 | 4 | 4 |  |  |  |  |  | 5 | 4 | 4 | 4 | 4 |  |  |
| 2 |  |  |  | 4 | 4 | 4 |  |  |  |  |  |  |  | 4 | 4 | 4 |  |  |  |  |
| 3 |  |  |  | 7 | 6 | 5 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  | 5 | 4 | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  | 4 | 4 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  | 7 | 6 | 5 | 4 | 4 | 4 | 9 |  |  |  | 5 | 4 | 4 | 4 | 4 |  |  |

NOTE 1: Void.NOTE 2: Void.*START OF CHANGE*6.1.3.21 Differential Koffset MAC Control ElementThe Differential Koffset MAC CE is identified by MAC subheader with LCID as specified in Table 6.2.1-1.It has a fixed size and consists of a single octet defined as follows (Figure 6.1.3.21-1):- R: Reserved bit, set to 0;- Differential Koffset: This field indicates the differential Koffset in subframes (see TS 36.213 [2]). The length of the field is 6 bits.Figure 6.1.3.21-1: Differential Koffset MAC CE |

**Question 2:** Do companies agree p1- p4 in [3] [R2-2301879](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx) and correspond changes in [2] [R2-2301878](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1563_%28Rel-17%29_R2-2301878%20-%20Correction%20for%20IoT%20NTN.docx)?

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| **Company** | **Yes/No** | **Additional comments** |
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**Question 3:** Do companies agree p5 in [3] [R2-2301879](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2301879%20-%20R17%20IoT%20NTN%20user%20plane%20corrections.docx) and correspond changes in [2] [R2-2301878](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1563_%28Rel-17%29_R2-2301878%20-%20Correction%20for%20IoT%20NTN.docx)?

|  |  |  |
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| **Company** | **Yes/No** | **Additional comments** |
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## UE location Info in RLF report

[4] [R2-2300886](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2300886%20UE%20location%20in%20RLF%20report%20for%20NB-IoT.doc) NB-IoT UE location Info in RLF report Qualcomm Incorporated discussion Rel-17 LTE\_NBIOT\_eMTC\_NTN

[5] [R2-2300887](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36331_CR4906_%28Rel-17%29_R2-2300887%20RLF%20report.docx) Correction on UE location information in NB-IoT RLF report Qualcomm Incorporated CR Rel-17 36.331 17.3.0 4906 - F LTE\_NBIOT\_eMTC\_NTN

**Reason for change:**

In discussion paper R2-2300886[4], company proposed:

**Proposal 1** In NTN, the NB-IoT UE does not include UE location information in RLF report without user consent. Discuss which one of the following is considered as solution.

#1: If the network has not obtained user consent, network will never set bit for RLF request in UEInformationRequest-NB message (i.e., no user consent, no RLF report).

#2: In NTN, it is assumed the user consent is implicit, i.e., connectivity to NTN is assumed the user consent has been implicitly provided.

#3: Introduce a new indication in UEInformationRequest-NB message whether network has obtained user consent and UE should include the UE location information in RLF report.

#4: The UE location information is not included in RLF report.

**Corresponding Changes in 36.321 R2-2300887[5] based on the option 4:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5.3.11.3 Detection of radio link failureThe UE shall:1> in case any DAPS bearer is configured, only the target PCell is considered in the following;1> upon T310 expiry; or1> upon T312 expiry; or1> upon T318 expiry; or1> upon random access problem indication from MCG MAC while neither T300, T301, T304 nor T311 is running; or1> upon indication from MCG RLC, which is allowed to be send on PCell, that the maximum number of retransmissions has been reached for an SRB or DRB:2> consider radio link failure to be detected for the MCG i.e. RLF;2> discard any segments of segmented RRC messages received;2> store the following radio link failure information in the *VarRLF-Report* (*VarRLF-Report-NB* in NB-IoT) by setting its fields as follows:3> clear the information included in *VarRLF-Report* (*VarRLF-Report-NB* in NB-IoT), if any;3> set the *plmn-IdentityList* to include the list of EPLMNs stored by the UE (i.e. includes the RPLMN);3> set the *measResultLastServCell* to include the RSRP and RSRQ, if available, of the PCell based on measurements collected up to the moment the UE detected radio link failure;3> except for NB-IoT, set the *measResultNeighCells* to include the best measured cells, other than the PCell, ordered such that the best cell is listed first, and based on measurements collected up to the moment the UE detected radio link failure, and set its fields as follows;4> if the UE was configured to perform measurements for one or more EUTRA frequencies, include the *measResultListEUTRA*;4> if the UE was configured to perform measurement reporting for one or more neighbouring UTRA frequencies, include the *measResultListUTRA*;4> if the UE was configured to perform measurement reporting for one or more neighbouring GERAN frequencies, include the *measResultListGERAN*;4> if the UE was configured to perform measurement reporting for one or more neighbouring CDMA2000 frequencies, include the *measResultsCDMA2000*;4> if the UE was configured to perform measurement reporting, not related to NR sidelink communication, for one or more neighbouring NR frequencies, include the *measResultListNR*;4> for each neighbour cell included, include the optional fields that are available;NOTE 1: The measured quantities are filtered by the L3 filter as configured in the mobility measurement configuration. The measurements are based on the time domain measurement resource restriction, if configured. Exclude-listed cells are not required to be reported.3> except for NB-IoT, if available, set the *logMeasResultListWLAN* to include the WLAN measurement results, in order of decreasing RSSI for WLAN APs;3> except for NB-IoT, if available, set the *logMeasResultListBT* to include the Bluetooth measurement results, in order of decreasing RSSI for Bluetooth beacons;3> except for NB-IoT, if detailed location information is available, set the content of the *locationInfo* as follows:4> include the *locationCoordinates*;4> include the *horizontalVelocity*, if available;3> set the *failedPCellId* to the global cell identity, if available, and otherwise , except for NB-IoT, to the physical cell identity and carrier frequency of the PCell where radio link failure is detected;3> except for NB-IoT, set the *tac-FailedPCell* to the tracking area code, if available, of the PCell where radio link failure is detected;3> except for NB-IoT, if an *RRCConnectionReconfiguration* message including the *mobilityControlInfo* was received before the connection failure:4> if the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo* concerned an intra E-UTRA handover:5> include the *previousPCellId* and set it to the global cell identity of the PCell where the last *RRCConnectionReconfiguration* message including *mobilityControlInfo* was received;5> set the *timeConnFailure* to the elapsed time since reception of the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo*;4> if the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo* concerned a handover to E-UTRA from UTRA and if the UE supports Radio Link Failure Report for Inter-RAT MRO:5> include the *previousUTRA-CellId* and set it to the physical cell identity, the carrier frequency and the global cell identity, if available, of the UTRA Cell in which the last *RRCConnectionReconfiguration* message including *mobilityControlInfo* was received;5> set the *timeConnFailure* to the elapsed time since reception of the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo*;4> if the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo* concerned a handover to E-UTRA from NR and if the UE supports Radio Link Failure Report for Inter-RAT MRO NR:5> include the *previousNR-PCellId* and set it to the global cell identity of the PCell where the last *RRCConnectionReconfiguration* message including *mobilityControlInfo* was received embedded in NR RRC message *MobilityFromNRCommand* message as specified in TS 38.331 [82] clause 5.4.3.3;5> set the *timeConnFailure* to the elapsed time since reception of the last *RRCConnectionReconfiguration* message including the *mobilityControlInfo* embedded in NR RRC message *MobilityFromNRCommand* message as specified in TS 38.331 [82] clause 5.4.3.3.3> except for NB-IoT, if the UE supports QCI1 indication in Radio Link Failure Report and has a DRB for which QCI is 1:4> include the *drb-EstablishedWithQCI-1*;3> except for NB-IoT, set the *connectionFailureType* to *rlf*;3> except for NB-IoT, set the *c-RNTI* to the C-RNTI used in the PCell;3> except for NB-IoT, set the *rlf-Cause* to the trigger for detecting radio link failure;2> if the UE is configured with (NG)EN-DC; and2> if T316 is configured; and2> if SCG transmission is not suspended; and2> if the SCG is not deactivated; and2> if neither NR PSCell change nor NR PSCell addition is ongoing (i.e. T304 for the NR PSCell is not running as specified in TS 38.331 [82], clause 5.3.5.5.2, in (NG)EN-DC):3> initiate the MCG failure information procedure as specified in 5.6.26 to report MCG radio link failure;2> else:3> if AS security has not been activated:4> if the UE is a NB-IoT UE:5> if the UE is connected to EPC and the UE supports RRC connection re-establishment for the Control Plane CIoT EPS optimisation; or5> if the UE is connected to 5GC, the UE supports RRC connection re-establishment for the Control Plane CIoT 5GS optimisation and the UE is configured with a truncated 5G-S-TMSI:6> initiate the RRC connection re-establishment procedure as specified in 5.3.7;5> else:6> perform the actions upon leaving RRC\_CONNECTED as specified in 5.3.12, with release cause 'RRC connection failure';4> else:5> perform the actions upon leaving RRC\_CONNECTED as specified in 5.3.12, with release cause 'other';3> else:4> initiate the connection re-establishment procedure as specified in 5.3.7;In case of DC or NE-DC, the UE shall:1> upon T313 expiry; or1> upon random access problem indication from SCG MAC; or1> upon indication from SCG RLC, which is allowed to be sent on PSCell, that the maximum number of retransmissions has been reached for an SCG, for a split DRB or for a split SRB:2> consider radio link failure to be detected for the SCG i.e. SCG-RLF;2> if the UE is configured with DC; or2> if the UE is configured with NE-DC and MCG transmission is not suspended:3> initiate the SCG failure information procedure as specified in 5.6.13 to report SCG radio link failure;2> else:3> initiate the connection re-establishment procedure as specified in TS 38.331 [82], clause 5.3.7.In case of CA PDCP duplication, the UE shall:1> upon indication from an RLC entity, which is restricted to be sent on SCell only, that the maximum number of retransmissions has been reached:2> initiate the failure information procedure as specified in 5.6.21 to report RLC failure of type duplication;If any DAPS bearer is configured and T304 is running, the UE shall:1> upon T310 expiry for the source PCell; or1> upon random access problem indication from source MCG MAC; or1> upon indication from source MCG RLC, which is allowed to be sent on source PCell, that the maximum number of retransmissions has been reached for an DRB:2> consider radio link failure to be detected for the source MCG;2> suspend the transmission of all DRBs in the source MCG;2> reset MAC for the source MCG;2> release the source connection;The UE may discard the radio link failure information, i.e. release the UE variable *VarRLF-Report* (*VarRLF-Report-NB* in NB-IoT), 48 hours after the radio link failure is detected, upon power off or upon detach, and for NB-IoT, upon entering another RAT.<<skipped>>6.7.2 NB-IoT Message definitions<<skipped>>– *UEInformationRequest-NB*The *UEInformationRequest-NB* is the command used by E-UTRAN to retrieve information from the UE.Signalling radio bearer: SRB1RLC-SAP: AMLogical channel: DCCHDirection: E‑UTRAN to UE***UEInformationRequest-NB message***-- ASN1STARTUEInformationRequest-NB-r16 ::= SEQUENCE { rrc-TransactionIdentifier RRC-TransactionIdentifier, criticalExtensions CHOICE { ueInformationRequest-r16 UEInformationRequest-NB-r16-IEs, criticalExtensionsFuture SEQUENCE {} }}UEInformationRequest-NB-r16-IEs ::= SEQUENCE { rach-ReportReq-r16 BOOLEAN, rlf-ReportReq-r16 BOOLEAN, anr-ReportReq-r16 BOOLEAN, lateNonCriticalExtension OCTET STRING OPTIONAL, nonCriticalExtension SEQUENCE {} OPTIONAL}-- ASN1STOP

| ***UEInformationRequest-NB* field descriptions** |
| --- |
| ***anr-ReportReq***Indicates whether the UE shall report, if available, ANR measurement information. |
| ***rach-ReportReq***Indicates whether the UE shall report, if available, information about the random access procedure. |
| ***rlf-ReportReq***Indicates whether the UE shall report, if available, information about radio link failure. |

– *UEInformationResponse-NB*The *UEInformationResponse-NB* message is used by the UE to transfer the information requested by the E-UTRAN.Signalling radio bearer: SRB1RLC-SAP: AMLogical channel: DCCHDirection: UE to E-UTRAN***UEInformationResponse-NB message***-- ASN1STARTUEInformationResponse-NB-r16 ::= SEQUENCE { rrc-TransactionIdentifier RRC-TransactionIdentifier, criticalExtensions CHOICE { ueInformationResponse-r16 UEInformationResponse-NB-r16-IEs, criticalExtensionsFuture SEQUENCE {} }}UEInformationResponse-NB-r16-IEs ::= SEQUENCE { rach-Report-r16 RACH-Report-NB-r16 OPTIONAL, rlf-Report-r16 RLF-Report-NB-r16 OPTIONAL, anr-MeasReport-r16 ANR-MeasReport-NB-r16 OPTIONAL, lateNonCriticalExtension OCTET STRING OPTIONAL, nonCriticalExtension SEQUENCE {} OPTIONAL}RACH-Report-NB-r16 ::= SEQUENCE { numberOfPreamblesSent-r16 INTEGER (1..64), contentionDetected-r16 BOOLEAN, initialNRSRP-Level-r16 INTEGER (0..2), edt-Fallback-r16 BOOLEAN}RLF-Report-NB-r16 ::= SEQUENCE { failedPCellId-r16 CellGlobalIdEUTRA, reestablishmentCellId-r16 CellGlobalIdEUTRA OPTIONAL, locationInfo-r16 LocationInfo-r10 OPTIONAL, measResultLastServCell-r16 SEQUENCE { nrsrpResult-r16 NRSRP-Range-NB-r14, nrsrqResult-r16 NRSRQ-Range-NB-r14 OPTIONAL }, timeSinceFailure-r16 TimeSinceFailure-r11 OPTIONAL}-- ASN1STOP

| ***UEInformationResponse-NB* field descriptions** |
| --- |
| ***anr-MeasReport***Indicates the ANR measurement information. |
| ***contentionDetected***Value TRUE indicates that contention was detected for at least one of the transmitted preambles, see TS 36.321 [6].  |
| ***edt-Fallback***Value TRUE indicates that EDT fallback indication was received from the lower layers, see TS 36.321 [6]. |
| ***failedPCellId***Indicates the PCell in which RLF is detected. |
| ***initialNRSRP-Level***Indicates the NRSRP level of the NPRACH resource selected for the first preamble transmission. |
| ***locationInfo***The UE does not include this field in this release of the specification. |
| ***measResultLastServCell***Refers to the last measurement results taken in the PCell, where radio link failure happened. |
| ***numberOfPreamblesSent***Indicates the number of RACH preambles that were transmitted. Corresponds to parameter PREAMBLE\_TRANSMISSION\_COUNTER in TS 36.321 [6]. |
| ***reestablishmentCellId***Indicates the cell in which the re-establishment attempt was made after connection failure. |
| ***timeSinceFailure***Indicates the time that elapsed since the connection failure. Value in seconds. The maximum value 172800 means 172800s or longer. |

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**Question 4:** Which option in P1, provided in R2-2300886 [4], do companies prefer?

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| **Company** | **Option 1/ Option 2 / Option 3 / Option 4** | **Additional comments** |
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**Question 5:** If companies prefer option 4, do company agree the corresponding changes in R2-2300887[5]?

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| **Company** | **Yes/No** | **Additional comments** |
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## Figure clarifying HARQ RTT timer

[6] [R2-2300888](file:///C%3A%5CData%5C3GPP%5CExtracts%5C36321_CR1561_%28Rel-17%29_R2-2300888%20RTT%20timer%20figure.docx) Correction on figure clarifying HARQ RTT timer Qualcomm Incorporated CR

**Reason for change:**

Currently HARQ RTT timer is calculated taking into account UE-eNB RTT time. However, the way HARQ RTT timer length and deltaPDCCH are described is not very clear. The following definition adds confusion whether the RTToffset is added twice in the HARQ RTT timer, one together with 3 (i.e., 3+RTToffset) and the other for deltaPDCCH definition.

For NB-IoT, when single TB is scheduled by PDCCH or when multiple TBs are scheduled for the interleaved case when HARQ-ACK bundling is configured the HARQ RTT Timer is set to k+3+N subframes plus RTToffset + deltaPDCCH, where k is the interval between the last subframe of the downlink transmission and the first subframe of the associated HARQ feedback transmission and N is the transmission duration in subframes of the associated HARQ feedback, and deltaPDCCH is the interval starting from the subframe following the last subframe of the associated HARQ feedback transmission plus 3 subframes plus RTToffset to the first subframe of the next PDCCH occasion.

To avoid this confusion, illustrative figure was added in Annex C, however, it is missing RTToffset adding the same confusion of whether RTToffset is added twice.

To avoid any possible confusion in future, it is better to clarify the figure.

**Corresponding Changes in 36.321**

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| Annex C (informative):Intended UE behaviour for DRX TimersWhen a DRX timer is set to a value of X, and n denotes the subframe in which the related event is triggered according to the clause 5.7, the intended behaviours of each DRX timer are presented in the Table C-1 below:Table C-1: Intended UE behaviour for DRX timers

|  |  |
| --- | --- |
| DRX Timers | Intended UE behaviour ([x, y] means including subframe x and y) |
| drx-InactivityTimer | The MAC entity monitors PDCCH in PDCCH-subframes during the subframes [n+1, n+m].The MAC entity starts or restarts drxShortCycleTimer, and uses Short DRX Cycle in the subframe n+m+1, if configured. |
| drx-InactivityTimerSCPTM | The MAC entity monitors PDCCH in PDCCH-subframes during the subframes [n+1, n+m]. |
| mac-ContentionResolutionTimer or mac-ContentionResolutionTimer for the corresponding enhanced coverage level, if it exists | The MAC entity monitors PDCCH in PDCCH-subframes during the subframes [n+1, n+X]. |
| drx-RetransmissionTimer or drx-ULRetransmissionTimer | The MAC entity monitors PDCCH in PDCCH-subframes during the subframes [n, n+m-1]. |
| onDurationTimer or onDurationTimerSCPTM | The MAC entity monitors PDCCH in PDCCH-subframes during the subframes [n, n+m-1]. |
| drxShortCycleTimer | The MAC entity uses the Short DRX Cycle during the subframes [n, n+X-1].The MAC entity starts to use the Long DRX Cycle in the subframe n+X. |
| HARQ RTT Timer | The MAC entity starts drx-RetransmissionTimer in the subframe n+X, if needed. |
| UL HARQ RTT Timer | The MAC entity starts drx-ULRetransmissionTimer in the subframe n+X, if needed. |
| NOTE 1: For FDD, m is equal to X; for TDD, m is equal to the minimum number of subframes so that X PDCCH-subframes are included during the subframes [x, y].NOTE 2: A MAC entity configured with eIMTA monitors PDCCH in some subframe(s) in addition to PDCCH-subframes, as specified in clause 5.7.NOTE 3: For BL UE or UE in enhanced coverage, m is equal to the minimum number of subframes so that X PDCCH-subframes are included during the subframes [x, y]. |

For drx-InactivityTimerSCPTM, drx-InactivityTimer, drx-RetransmissionTimer and drx-ULRetransmissionTimer, if X=0, the timer does not make the MAC entity to monitor the PDCCH.The intended UE behaviours in Table C-1 are not applicable for NB-IoT.For NB-IoT, the intended UE behaviour regarding setting the HARQ RTT Timer is shown in Figure C-1 and for the UL HARQ RTT Timer is shown in Figure C-2.Figure C-1: Setting the HARQ RTT Timer for NB-IoTFigure C-2: Setting the UL HARQ RTT Timer for NB-IoT |

**Question 6:** Do companies agree on the proposed change in R2-2300888 for TS 36.321 R17?

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| **Company** | **Yes/No** | **Additional comments** |
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## Generation of TA reporting

[7] [R2-2301051](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2301051%2036321_R17_Clarification%20on%20the%20generation%20of%20TA%20reporting%20for%20IoT%20NTN.docx) Clarification on the generation of TA reporting for IoT NTN ZTE Corporation, Sanechips CR Rel-17 36.321 17.3.0 1562 - F

**Reason for change:**

TA reporting has been supported for IoT NTN. Let’s assume the event of TA reporting is generated at T1 and the available UL resources for TA reporting MAC CE transmission is at T2. If the interval between T1 and T2 is large, the difference of TA value that UE estimates at T1 and T2 may be large. If TA report generated at T1 is reported to the eNB, this may cause the TA reporting received by eNB is not so accurate. Therefore, a clarification is needed to mention that TA reporting should be based on the latest estimation.

**Corresponding Changes in 36.321**

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| 5.4.9 Timing Advance ReportingThe UE may be configured to report information about UE specific timing advance during a Random Access procedure and in RRC\_CONNECTED Mode.The Timing Advance reporting procedure is used in a non-terrestrial network to provide the eNB with an estimate of the UE's Timing Advance, see TTA in TS 36.211 [7] clause 8.1.Timing Advance reporting shall be triggered if any of the following events occur:- if triggered by upper layers;- upon configuration of *offsetThresholdTA* by upper layers, if the UE has not previously reported Timing Advance value to current Serving Cell;- if the variation between current information about Timing Advance and the last reported information about Timing Advance is equal to or larger than *offsetThresholdTA*, if configured.If the Timing Advance reporting procedure determines that at least one Timing Advance Report 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 Timing Advance Report MAC control element plus its subheader, as a result of logical channel prioritization:- instruct the Multiplexing and Assembly procedure to generate the Timing Advance report MAC control element as defined in clause 6.1.3.20.A MAC PDU shall contain at most one Timing Advance Report MAC CE, even when multiple events have triggered a Timing Advance report. The Timing Advance Report MAC CE shall be generated based on the latest available estimate of the UE's Timing Advance value before a MAC PDU is assembled.All triggered Timing Advance reports shall be cancelled when a Timing Advance Report MAC CE is included in a MAC PDU for transmission. |

**Question 7:** Do companies agree on the proposed change in R2-2301051 for TS 36.321 R17?

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| **Company** | **Yes/No** | **Additional comments** |
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# Conclusion

<To be updated based on inputs from different companies>