3GPP RAN WG2 Meeting #131-bis R2-25xxxxx

Prague, Czech, Oct 13th – 17th, 2025

Agenda Item: 8.9.1

Source: MediaTek. Inc

Title: Remaining MAC CR open issues in Rel-19 IoT NTN

Document for: Discussion, Decision

# Introduction

This paper is to discuss the identified open issues for the agreed MAC CR[1] in Rel-19 IoT NTN.

Companies are invited to provide feedback on open issue list by: Sep 30th 10:00 UTC

# Discusson

As far as the rapporteur is aware, the identified MAC CR open issues 1-20[2][3] from the previous disuccsion have all been addressed. There are currently no open issues for MAC CR.

Companies are invited to describe any other identified open issues regarding the agreed MAC CR. If the issue is straightforward, please suggest a solution; otherwise, provide possible solutions for further discussion.

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| **Company** | **Other identified open issues? (please describe)** | **Solutions** |
| Qualcomm | We suggest to prioritize CB-Msg3 EDT data over TA report MAC CE.  See example how we did it for DCQR. Its same for CQI report to be included in CB-Msg3 EDT for anchor carrier. | For the Logical Channel Prioritization procedure, the MAC entity shall take into account the following relative priority in decreasing order:  - MAC control element for C-RNTI or data from UL-CCCH;  - MAC control element for DPR;  - MAC control element for SPS confirmation;  - MAC control element for AUL confirmation;  - MAC control element for Timing Advance Report with exception of when Timing Advance Report is to be included in CB-Msg3 EDT;  - MAC control element for GNSS Validity Duration Report;  - MAC control element for BSR, with exception of BSR included for padding;  - MAC control element for PHR, Extended PHR, or Dual Connectivity PHR;  - MAC control element for Sidelink BSR, with exception of Sidelink BSR included for padding;  - MAC control element for DCQR and AS RAI, with exception of when DCQR is to be included in Msg3;  - data from any Logical Channel, except data from UL-CCCH;  - MAC control element for Timing Advance Report when Timing Advance Report is to be included in CB-Msg3 EDT;  - MAC control element for DCQR and AS RAI, when DCQR is to be included in Msg3;  - MAC control element for Recommended bit rate query;  - MAC control element for BSR included for padding;  - MAC control element for Sidelink BSR included for padding.  [Rapp] Agree with the intention. Let’s confirm with other companies. |
| NEC | Backoff parameter values are defined in milliseconds (refer to tables 7.2-1 and 7.2-2 for non-NB-IOT and NB-IOT) before CB-EDT was introduced. We suggest reviewing these values/units for CB-EDT. When cb-Msg3-TxWindow is configured, the UE selects the next CB-Msg3 window and randomly chooses PUSCH resources within it for msg3 transmission. Therefore, having two BI values within the same Tx window periodicity does not create a distinction. We should evaluate whether a new table with window periodicity as the unit is needed for CB-EDT. | We propose to use CB-Msg3 TX window periodicity as the unit for backoff parameter.  Since it has not been discussed before, good to collect views from other companies too  [Rapp] Agree with the intention but this requests some more discussion. |
| NEC | Before the CB-Msg3 transmission, the UE shall select the next upcoming CB-Msg3 transmission window, which can incur larger latency for CB-EDT procedure. Taking NB-IoT as an example, if the DSA window is configured as n512, the next DSA window may arrive after a maximum time of 5210ms, i.e., the UE performs CB-Msg3 Transmission after a very long time. For this case, we should consider a solution to reduce the latency. | We propose to select multiple replica occasions firstly. If the selected first occasion corresponding to current window is in future (not in past), the current DSA window is selected. otherwise, the next DSA window is selected.  [Rapp] RAN2 has already agreed select TX window first and then select the replica. I do not intend to revert previous agreement. |
| Samsung1 | For the completion of the CB-Msg3-EDT for the CP procedures without an RRC message:  *- if the C-RNTI field is absent in the corresponding CMR and no corresponding MAC SDU is present in CB-Msg4:*  *- indicate the successful completion of CB-Msg3-EDT procedure to the upper layers.*  The current description makes it seem as if the only way to complete the CB-Msg3-EDT procedures is by not including a C-RNTI field. A minor re-wording can greatly help a reader/implementer understand that this is a special case. | We propose that the wording is changed to better reflect that this is a special circumstance:  *- if the C-RNTI field is absent in the corresponding CMR and no corresponding MAC SDU is present in CB-Msg4:*  *- indicate to the upper layers that the CB-Msg3-EDT procedures have been successful completed without an RRC message.*  [Rapp] Okay, will include this in Rapp CR. |
| Samsung2 | CB-RNTI is only described as being used for CB-Msg4, while the intention is that it should also be used for CB-Msg3. | Some re-designing of the procedures required. I.e the CB-RNTI should not be selected during the CB-Msg4 reception procedure, but be determined before. Changes to table 7.1 also required.  [Qualcomm] It is not clear how it is applicable in Msg3. Same as legacy, RAN1 defines what scrambling RNTI is used for Msg3 PUSCH.  [Rapp] R1 has confirmed that there is no issue to use CB-RNTI for CB-Msg3 scrambling in reply LS R2-2506717. The question is that whether we want to capture this in RAN2 SPEC. |
| Samsung3 | The following has been agreed:   * Based on NW indication, it shall be possible for the UE to indicate during CB-Msg3-EDT procedure whether DL data following the UL data in CB-Msg3 is expected or not. RAI will be reused for this.   For AS RAI reporting for eMTC, it is triggered via “Msg3 DCQR”: 5.25 Transmission of Downlink Channel Quality Report The MAC entity of a BL UE or UE in enhanced coverage may be configured by upper layers to report DL channel quality in Msg3. DL channel quality in Msg3 in RRC\_CONNECTED is not reported.  If the UE is a BL UE or UE in enhanced coverage or an NB-IoT UE, a Downlink Channel Quality Report (DCQR) shall be triggered if any of the following events occur:  OMITTED  - for BL UE or UE in enhanced coverage, transmission of DCQR in Msg3 is configured by upper layers in *mpdcch-CQI-Reporting*, in which case DCQR is referred below to as "Msg3 DCQR".  OMITTED  If "Msg3 DCQR" has been triggered:  - if an uplink grant has been received on the PDCCH for MAC entity's RA-RNTI:  According to our understanding, it is only supported for Msg3 with random access. | The condition for triggering the Msg3 DCQR needs to be changed to accommodate CB-Msg3-EDT. We think that it can be something on the style of the example below can be used:  If "Msg3 DCQR" has been triggered:  - if an uplink grant has been received on the PDCCH for MAC entity's RA-RNTI or if the uplink grant is for CB-Msg3-EDT:  - if the allocated resources can accommodate a DCQR and AS RAI MAC control element plus its subheader as a result of logical channel prioritization:  [Rapp] Agree. Will include this in rapp’s CR. |
| Qualcomm 2 | In RAN1 LS, they have pointed out that using 2 bits for “HARQ ACK resource offset” in eMTC allows multiplexing only up to 4 users in the same response. | In NB-IoT, it is 4 bits and 16 users can be be multiplexed with HARQ resources.  Then it is not fair for eMTC which has higher bandwidth than NB-IoT. We suggest RAN2 to consider this and align size with NB-IoT.  [Rapp] We understand that R1 does not request R2 to change this. It seems require additional R1 SPEC change. Further discussion is needed. |
| Qualcomm 3 | New Msg4 format is introduced to reduce bottleneck issue for initial access. However, it is defined only for CB-EDT. | We suggest to discuss whether new Msg4 format can also be enabled for 4 step RACH/EDT, from where originally the bottleneck issue was brought up.  [Rapp] This is out of the scope of the WID objective. |

# Conclusions

**Proposal 1: For CB-Msg3 transmission, the UE shall prioritize CB-Msg3 EDT data over TA report MAC CE.**

**Proposal 2: RAN2 to discuss whether to define the backoff parameter in CB-Msg4 in unit of CB-Msg3 transmission window periodicity.**

**Proposal 3: RAN2 to discuss whether to capture CB-Msg3 scrambling with CB-RNTI as below**

* **Move the CB-RNTI dervivation description from clause 5.1x.3 CB-Msg4 reception to clause 5.1x.2 CB-Msg3 transmission.**
* **In Table 7.1-2: RNTI usage, define CB-RNTI is used for CB-Msg3 scrambling**

**Proposal 4: RAN2 to discuss whether to change “HARQ ACK resource” field in CB-MSG4 from 2 bits to 4 bits for eMTC.**

# Reference

[1] R2-2506493 Introduction of IoT NTN enhancements phase 3 MediaTek Inc. CR Rel-19 36.321 18.4.0 1591 1 B IoT\_NTN\_Ph3-Core

[2] R2-2504526 Remaining MAC open issues in IoT NTN MediaTek Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core

[3] R2-2505555 Remaining MAC open issues in IoT NTN MediaTek Inc. discussion Rel-19 IoT\_NTN\_Ph3-Core