3GPP TSG-RAN WG2 Meeting #109e R2-200xxxx

Online, 24 February – 6 March 2020

**Agenda item: 7.1.2**

**Source: Huawei (offline email discussion rapporteur)**

**Title: [AT109e][411][eMTC/NB-IoT] MT-EDT: Open issues (Huawei)**

**Document for: Report**

# 1 Scope of the offline email discussion

This document contains the summary of the offline email discussion “[AT109e][411][eMTC/NB-IoT] MT-EDT: Open issues”, as indicated below:

* [AT109e][411][eMTC/NB-IoT] MT-EDT: Open issues (Huawei)

Scope: Further discussion to address the remaining issues and identify potential agreements.

Intended outcome: Report with a list of proposals categorized as agreeable, need further discussion, postpone. The outcome can be provided in R2-2001876

Deadline: Tuesday, Mar 3rd 17:00 CET

MT-EDT in RAN2#109e based on was discussed from R2-2001861 [1] with the following agreements:

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| Agreements   * UE category information, i.e., Cat-M2 (Cat-NB2 for NB-IoT), is provided in the UE Radio Paging information container. FFS how the use of UE category information is captured in the specifications |

The document discusses the other remaining proposals and open issues in [1], except for the capability aspect that will be handled as part of TS 36.306 running CR e-mail discussions.

# 2 Discussion

## 2.1 How the use of UE category information is captured in the specifications

In [5], it was observed that allowing different MSG4 size for MT-EDT based on the UE category seems to contradict the concept ofthe default MAC and PHY configuration and that if it was allowed it needed to be clarified in the specification.

During the RAN2#109e online session, it was agreed to provide the UE category information, i.e., Cat-M2 (Cat-NB2 for NB-IoT) in the UE Radio Paging information container with a FFS how the use of UE category information is captured in the specifications.

In the session, it was commented that the goal of providing the category information in the paging message was to allow to trigger MT-EDT for message size beyond 1000 bits (cat M1) for eMTC and 680 bits (cat NB1) for NB-IoT and make usage of higher TBS in the DCI scheduling MSG4.

**Offline Discussion Point 1: Please confirm the above understanding and provide suggestions on how to capture in the specification.**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei, HiSilicon | we agree with the above understanding.  We propose to capture in stage 2 specification that the eNB uses the UE radio paging capabilities to decide when MT-EDT can be used.  We would like also to capture somewhere in RRC that even though PHY default configuration is used, MSG4 size is dependent of UE category. This could be clarified in a NOTE in 5.3.3. 3a for the User plane and 5.3.3.3b for the Control plane |
| Qualcomm | Agee with the understanding.  Ok with stage 2 clarification.  Regarding clarification in RRC, it should be already clear that PHY default configuration does not restrict the DL TBS size, which is indicated by DCI. In addition, 5.3.3.3a and 3b are for msg3 transmission. Not sure what is intended NOTE here. |
| Ericsson | Agree that intention of the category information is to decide whether MT-EDT should be triggered for a certain UE.  However, such behaviour doesn't seem to be contradicting what is currently captured in the specifications. TB size would be signalled in the DCI, thus default PHY configuration still works as intended. Therefore, we don't think a clarification in the specifications is needed in this case. |

Conclusion:

All companies agree with the understanding and two companies agree to capture in stage 2.

One company proposes to clarify in RRC that even though PHY default configuration is used, MSG4 size is dependent of UE category. The other companies think it is not needed.

Proposal:

**Proposal P1-1:** Capture in stage 2 that the eNB uses the UE category included in the S1 paging message to trigger MT-EDT for message size beyond cat M1/NB1.

## 2.2 Lower layer configuration for MT-EDT

There is a misalignment between NB-IoT and eMTC running CRs in section 5.3.3.3a on whether the lower layers should be configured with EDT for MT-EDT.

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| 2> if the UE is initiating UP-EDT for mobile originated calls in accordance with conditions in 5.3.3.1b:  3> configure the lower layers to use EDT;  2> else if the UE is initiating UP transmission using PUR:  3> configure the lower layers to use PUR; |

This aspect was discussed in [6] with the following proposal:

**Proposal: For MT-EDT for the user plane CIoT optimisation, lower layers are not configured for EDT.**

**Offline Discussion Point 2: Please indicate whether you agree or not with the proposal and provide justifications for your answer.**

|  |  |  |
| --- | --- | --- |
| **Company** | **do you agree with the proposal (yes/no)** | **Comments** |
| Huawei, HiSilicon | yes. | In legacy, i.e. non-EDT, the lower layers are configured with the default configuration in section 5.3.3.2 and nothing else is provided.:  1> apply the default physical channel configuration as specified in 9.2.4;  1> apply the default semi-persistent scheduling configuration as specified in 9.2.3;  1> apply the default MAC main configuration as specified in 9.2.2;  1> apply the CCCH configuration as specified in 9.1.1.2;  For EDT, additional configuration has been specified in section 5.3.3a:  PDCP: for SRBs/ DRBs  2> restore the PDCP state and re-establish PDCP entities for all SRBs and all DRBs;  ….  2> configure lower layers to resume ciphering and to apply the ciphering algorithm and the KUPenc key derived in this clause immediately to the user data sent and received by the UE;  MAC and PHY:  2> configure the lower layers to use EDT;  In TS 36.321 and TS 36.213, a number of EDT specific behaviours are specified. They are related to the use of EDT preambles and MSG3 TBS. None of them apply for MT-EDT as the legacy procedure is used for MSG3. Thus MAC and PHY shall not be configured to use EDT. |
| Qualcomm | Ok | Based on Huawei’s explanation – ok to add yellow highlighted text to eMTC CR. |
| Ericsson | Yes | Agree with HW, there doesn't seem to be any reason to configure lower layers for EDT in this case. |

Conclusion:

All companies agree with the proposal.

Proposal:

**Proposal P2-1:** In RRC section 5.3.3.3a, for UP MT-EDT, lower layers are not configured for EDT.

## 2.3 Handling mt-EDT indication in the paging message

During the CR alignment after RAN2#108, it was clarified that the *mt-EDT* indication was UE specific and thus only received by MT-EDT capable UE. This has been captured as below.

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| Upon receiving the *Paging* message, the UE may:  1> if the *mt-EDT* is included:  2> initiate EDT in accordance with conditions in 5.3.3.1b; |

In [6], it is proposed to clarify that the *mt-EDT* is the one included in the UE’s paging record.

**Proposal**: In 5.3.2.3, clarify that the *mt-EDT* is the one included in the UE’s paging record.

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| Upon receiving the *Paging* message, the UE may:  1> if the *ue-Identity* included in the *PagingRecord* matches one of the UE identities allocated by upper layers:  2> if the *mt-EDT* is included:  3> initiate EDT in accordance with conditions in 5.3.3.1b; |

**Offline Discussion Point 3: Do you agree with the proposal and do you have any comments on the suggested text**

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| --- | --- | --- |
| **Company** | **Do you agree with the proposal** | **Comments** |
| Huawei, HiSilicon | yes |  |
| Qualcomm | Ok | I wonder whether this is also needed “for each of the *PagingRecord*, if any, included in the *Paging* message”.  Also wonder whether 1> and 2> can be merged in one condition with “and”. |
| Ericsson | yes |  |

Conclusion:

All companies agree with the proposal. One company suggests some rewording.

Proposal:

**Proposal P3-1**: In RRC section 5.3.2.3, clarify that the *mt-EDT* is the one included in the UE’s paging record. Wording to be discussed with running RRC CRs.

# 3 Summary

**Conclusions:**

**Potential easy agreements**

**Proposal P1-1:** Capture in stage 2 that the eNB uses the UE category included in the S1 paging message to trigger MT-EDT for message size beyond cat M1/NB1.

**Proposal P2-1:** In RRC section 5.3.3.3a, for UP MT-EDT, lower layers are not configured for EDT.

**Proposal P3-1**: In RRC section 5.3.2.3, clarify that the *mt-EDT* is the one included in the UE’s paging record. Wording to be discussed with running RRC CRs.

# 4 List of referenced documents

[1] [R2-2001861](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2001861.zip) Summary of contributions on mobile-terminated (MT) early data transmission (EDT) BlackBerry UK Limited

[2] [R2-2000179](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2000179.zip) Cat. M2/NB2 indication in UERadioPagingInformation Qualcomm Incorporated

[3] [R2-2000397](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2000397.zip) Support of MT-EDT CIoT EPS optimisation (for CP and UP) BlackBerry UK Limited

[4] [R2-2001197](http://ftp.3gpp.org/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2001197.zip) Remaining FFSs for MT-EDT ZTE Corporation, Sanechips

[5] [R2-2000647](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e\Docs\R2-2000647.zip) Miscellaneous for NB-IoT and eMTC RRC CRs Huawei, HiSilicon