3GPP TSG-RAN WG1 Meeting #108-e R1-2xxxxxx

e-Meeting, February 21st – March 3rd, 2022

Agenda Item: 8.9.2

Source: Moderator (Ericsson)

Title: Moderator Summary [108-e-R17-NB-IoT-eMTC-02]

Document for: Discussion and Decision

# 1 Introduction

As part of the Work Item (WI) on “Additional enhancements for NB-IoT and LTE-MTC” [1] the following enhancement for LTE-MTC was specified in Rel-17:

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| * Support additional PDSCH scheduling delay for introduction of 14-HARQ processes in DL, for HD-FDD Cat M1 UEs. [LTE-MTC] [RAN1] |

This document summarizes remaining issues on the introduction of 14 HARQ processes in DL for HD-FDD Cat M1 UEs according with [2-5].

# 2 Moderator summary on 14 HARQ processes in DL in LTE-MTC

## 2.1 Usability of the “Repetition number” field

During RAN1# 107-e, the following agreement on the “Repetition number” field was reached [2]:

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| **Agreement**  **In Rel-17, for the 14 HARQ processes feature the “Repetition number” field is:**  ·         **Opt-3: 2-bits as in legacy**  **Note: Further optimization for using Repetition number” field is not pursued** |

Towards the end of RAN1# 107-e, the following potential conclusion was drafted as to be resolved during the maintenance phase [3]:

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| **Potential Conclusion:**   * **Alt-A:**   **In Rel-17 for the 14 HARQ processes feature, the usage of the “Repetition Number” field follows the legacy behavior where if the “HARQ-ACK bundling flag” field is set to 1 the UE shall assume that the PDSCH repetitions equal 1.**   * + **Note 1: There is no impact on TS 36.212.**   + **Note 2: TS 36.213 to capture that the above legacy behavior also applies for the 14 HARQ processes feature.**      * **Alt-B:**   **In Rel-17 for the 14 HARQ processes feature, the usage of the “Repetition Number” field is left up to the eNodeB to handle.** |

Table 1 summarizes the observations and proposals as in [2-6]:

**Table 1: HARQ-ACK delay sets for Alt-2e according with [2-6]**

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| **Company** | **Compendium of views on the usability of the “Repetition number” field [2], [4-5].** |
| Huawei, Hi-silicon | Proposal 1: For the 14 HARQ processes feature, the usage of the “Repetition Number” field is left up to the eNodeB to handle. |
| Nokia, Nokia Shanghai Bell | Conclusion: In Rel-17 for the 14 HARQ processes feature, the usage of the “Repetition Number” field follows the legacy behavior where if the “HARQ-ACK bundling flag” field is set to 1 the UE shall assume that the PDSCH repetitions equal 1.  • Note 1: There is no impact on TS 36.212.  • Note 2: TS 36.213 to capture that the above legacy behavior also applies for the 14 HARQ processes feature. |
| Ericsson | Proposal 1 RAN1 needs to ponder the importance of the extra “mixed” scenarios that would be possible to address with Alt-B, versus the benefits that Alt-A brings in terms of certainty to all entities (e.g., importance for the IODT phase). |

Companies are encouraged to consider the pros and cons on Alt-A and Alt-B as to provide their views towards selecting one of the two alternatives.

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| **Company** | **Please state your views/arguments on which option you prefer: Alt-A or Alt-B** | **Comments** |
| Qualcomm | Alt-A | There is unclear need to modify the legacy behavior. |
| Lenovo, MotoM | Alt-A | We slightly prefer to follow the legacy behavior that if the “HARQ-ACK bundling flag” field is set to 1 the UE shall assume that the PDSCH repetitions equal 1, and “Repetition Number” field is pending as legacy. |

## 2.2 TP on TS 36.211: Editorial on a HL parameter name

The TP on TS 36.211 as presented in [3], basically aims at performing an editorial change to write “ce” instead of “CE” in the higher layer parameter name “*ce-PDSCH-14HARQ-Config*”.

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| **~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ Start of text proposal to 36.211 ~~~~~~~~~~~~~~~~~~~~~~~~~~~**  ***-----------------------------< Start of the 1st Change >------------------------------*** 5.4.3 Mapping to physical resources < Unchanged parts are omitted >  For BL/CE UEs, PUCCH is transmitted with  repetitions.  - The BL/CE UE is not expected to transmit with when *ce-PDSCH-14HARQ-Config* is configured.  < Unchanged parts are omitted >  **~~~~~~~~~~~~~~~~~~~~~~~~~~~~~End of text proposal to 36.211 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~** |

Companies are encouraged to provide their views.

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| **Company** | **OK with the Editorial TP on TS 36.211?** | **Comments** |
| Qualcomm |  | We would suggest to wait till RAN2 has finalized the ASN.1 before making editorial changes. |
| Lenovo, MotoM | OK |  |

## 2.3 TP on TS 36.213: More specific description on the PDSCH scheduling delay value

The TP on TS 36.213 as presented in [3], intends to add a more specific description on clause 7.1.11 for the cited PDSCH scheduling delay value.

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| **~~~~~~~~~~~~~~~~~~~~~~~~~~~ Start of text proposal to 36.213 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~**  ***-----------------------------< Start of the 1st Change >------------------------------*** 7.1.11 PDSCH subframe assignment for BL/CE UE A BL/CE UE shall upon detection of a MPDCCH with DCI format 6-1A/6-1B/6-2 intended for the UE, decode the corresponding PDSCH in subframe(s) *n+ki* with *i = 0, 1, …, NTBN-1* according to the MPDCCH, where  < Unchanged parts are omitted >  - otherwise,  - subframe(s) *ni* = *n+ki* with *i=0,1,…, NTBN-1* are *NTBN* consecutive BL/CE DL subframe(s), where , and subframe *n+x* is the *j*th BL/CE DL subframe after subframe *n*, and *j* is given by the value of the PDSCH scheduling delay options as defined in [4] if the UE is configured with CEModeA and 'PDSCH scheduling delay and HARQ-ACK delay for 14 HARQ' field is present in the corresponding DCI, *j*=2 otherwise.  < Unchanged parts are omitted >  **~~~~~~~~~~~~~~~~~~~~~~~~~~~~End of text proposal to 36.213 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~** |

Companies are encouraged to provide their views.

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| **Company** | **OK with the TP on TS 36.213?** | **Comments** |
| Lenovo, MotoM | OK |  |

# 5 References

1. [RP-201306](http://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_88e/Docs/RP-201306.zip), “WID revision: Additional enhancements for NB-IoT and LTE-MTC”, RAN #88e, Electronic Meeting, June 29th – July 3rd, 2020.
2. [R1-2200977](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_108-e/Docs/R1-2200977.zip), “Support of 14-HARQ processes in DL for HD-FDD MTC UEs,” Huawei, Hisilicon, RAN1# 108-e, e-Meeting, February 21st – March 3rd, 2022.
3. [R1-2201894](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_108-e/Docs/R1-2201894.zip), “Remaining issues for introduction of 14-HARQ processes in DL for eMTC,” ZTE, Sanechips, RAN1# 108-e, e-Meeting, February 21st – March 3rd, 2022.
4. [R1-2202278](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_108-e/Docs/R1-2202278.zip), “Support of 14 HARQ processes in DL in LTE-MTC,” Ericsson, RAN1# 108-e, e-Meeting, February 21st – March 3rd, 2022.
5. [R1-2202369](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_108-e/Docs/R1-2202369.zip), “Support of 14-HARQ processes in DL for eMTC,” Nokia, Nokia Shanghai Bell, RAN1# 108-e, e-Meeting, February 21st – March 3rd, 2022.