3GPP TSG-RAN WG1 Meeting #114bis Draft R1-2310567

Xiamen, China, 7th – 13th October 2023

**Agenda Item: 8.4.1**

**Title: Agreed 38.213 TPs for Rel-18 RedCap UE complexity reduction**

**Source: Moderator (Ericsson)**

**Document for: Information**

# 1 Introduction

This document captures the text proposals (TPs) for 38.213 [1] agreed in RAN1#114bis for the Rel-18 eRedCap WI [2]. Further background information can be found in the feature lead summary in [3], and a RAN1 agreement summary for Rel-18 eRedCap can be found in [4].

# 2 Agreed 38.213 text proposal #1

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| ***Reason for change:*** | RAN1 discussed random access timeline for eRedCap UEs. The discussion is captured in Section 2.1 in the feature lead summary in [R1-2310328](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114b/Docs/R1-2310328.zip).  The current specification reads like only PRACH can be transmitted, but for 2-step RACH, the higher layers can indicate to the physical layer to transmit only PRACH according to Type-1 random access procedure or to transmit both PRACH and PUSCH according to Type-2 random access procedure. |
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| ***Summary of change:*** | It is clarified that the transmission is controlled by a request from higher layers. |
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| ***Consequences if not approved:*** | It may be unclear that the specified random access timeline applies also to the case when higher layers requests the physical layer to transmit both PRACH and PUSCH. |

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| 17.1A Second procedures for RedCap UE  In this clause, the term 'UE' refers to a RedCap UE that indicates *supportOfRedCap-r18*.  A UE that has not indicated FG 48-2 does not expect to transmit a PUSCH over a bandwidth that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, per hop in a slot.  A UE that has not indicated FG 48-2 does not expect to process a PDSCH reception that is scheduled by a DCI format with CRC scrambled by a C-RNTI, CS-RNTI, or MCS-C-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, in a slot.  A UE that has not indicated FG 48-2 is not required to process a PDSCH reception in slot that is scheduled by a DCI format with CRC scrambled by a G-RNTI for broadcast over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, when the PDSCH reception is with repetitions or when the UE receives another PDSCH in slot .  A UE is not required to process a PDSCH reception that is scheduled by a DCI format with CRC scrambled by a TC-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, in a slot.  A UE that indicated FG 48-2 does not expect to transmit a PUSCH over a bandwidth that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, per hop in a slot, where the PUSCH is scheduled by RAR UL grant or by a DCI scrambled by a TC-RNTI, or is configured for a Type-2 random access procedure.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by a RA-RNTI or a MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the PDSCH includes a RAR message with an RAR UL grant scheduling a Msg3 PUSCH transmission from the UE, as described in Clauses 8.2 and 8.2A  the UE transmits the Msg3 PUSCH if a time between the last symbol of a PDSCH reception conveying the RAR message and the first symbol of the Msg3 PUSCH transmission is not smaller than msec for 15 kHz SCS or msec for 30 kHz SCS where and are defined in clause 8.3; otherwise, the UE behaviour is based on UE implementation.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by a RA-RNTI or a MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the UE does not correctly receive the transport block provided by the PDSCH, or if the higher layers at the UE do not identify a RAPID associated with a corresponding PRACH transmission from the UE  if requested by higher layers, the UE shall be ready to transmit a PRACH no later than msec for 15 kHz SCS, or no later than msec for 30 kHz SCS, after the last symbol of the PDSCH reception, or after the last symbol of the window as described in Clauses 8.2 and 8.2A.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the PDSCH includes a RAR message that is for successRAR for the UE as described in Clause 8.2A  the UE transmits a PUCCH with HARQ-ACK information if a time between the last symbol of the PDSCH reception conveying the RAR message and the first symbol of the PUCCH transmission is not smaller than msec for 15 kHz SCS or msec for 30 kHz SCS; otherwise, the UE behaviour is based on UE implementation. |

# 3 Agreed 38.213 text proposal #2

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| ***Reason for change:*** | RAN1 discussed MBS broadcast for eRedCap UEs. The discussion is captured in Section 2.4 in the feature lead summary in [R1-2310328](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114b/Docs/R1-2310328.zip).  According to the current specification, for an eRedCap UE with UE BB bandwidth reduction (i.e., a UE that has not indicated FG 48-2), certain restrictions apply to PDSCH scheduled with G-RNTI for broadcast. Similar restrictions should apply also for MCCH-RNTI. |
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| ***Summary of change:*** | It is clarified that the mentioned restrictions apply also for PDSCH scheduled with MCCH-RNTI. |
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| ***Consequences if not approved:*** | The UE behavior regarding reception of PDSCH scheduled with MCCH-RNTI is not clear for eRedCap UEs with UE BB bandwidth reduction. |

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| 17.1A Second procedures for RedCap UE  In this clause, the term 'UE' refers to a RedCap UE that indicates *supportOfRedCap-r18*.  A UE that has not indicated FG 48-2 does not expect to transmit a PUSCH over a bandwidth that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, per hop in a slot.  A UE that has not indicated FG 48-2 does not expect to process a PDSCH reception that is scheduled by a DCI format with CRC scrambled by a C-RNTI, CS-RNTI, or MCS-C-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, in a slot.  A UE that has not indicated FG 48-2 is not required to process a PDSCH reception in slot that is scheduled by a DCI format with CRC scrambled by a G-RNTI for broadcast or a MCCH-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, when the PDSCH reception is with repetitions or when the UE receives another PDSCH in slot .  A UE is not required to process a PDSCH reception that is scheduled by a DCI format with CRC scrambled by a TC-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, in a slot.  A UE that indicated FG 48-2 does not expect to transmit a PUSCH over a bandwidth that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS, per hop in a slot, where the PUSCH is scheduled by RAR UL grant or by a DCI scrambled by a TC-RNTI, or is configured for a Type-2 random access procedure.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by a RA-RNTI or a MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the PDSCH includes a RAR message with an RAR UL grant scheduling a Msg3 PUSCH transmission from the UE, as described in Clauses 8.2 and 8.2A  the UE transmits the Msg3 PUSCH if a time between the last symbol of a PDSCH reception conveying the RAR message and the first symbol of the Msg3 PUSCH transmission is not smaller than msec for 15 kHz SCS or msec for 30 kHz SCS where and are defined in clause 8.3; otherwise, the UE behaviour is based on UE implementation.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by a RA-RNTI or a MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the UE does not correctly receive the transport block provided by the PDSCH, or if the higher layers at the UE do not identify a RAPID associated with a corresponding PRACH transmission from the UE  the UE shall be ready to transmit a PRACH no later than msec for 15 kHz SCS, or no later than msec for 30 kHz SCS, after the last symbol of the PDSCH reception, or after the last symbol of the window as described in Clauses 8.2 and 8.2A.  When  - a UE receives a PDSCH scheduled by a DCI format with CRC scrambled by MsgB-RNTI over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS or larger than 12 PRBs for 30 kHz SCS, and  - the PDSCH includes a RAR message that is for successRAR for the UE as described in Clause 8.2A  the UE transmits a PUCCH with HARQ-ACK information if a time between the last symbol of the PDSCH reception conveying the RAR message and the first symbol of the PUCCH transmission is not smaller than msec for 15 kHz SCS or msec for 30 kHz SCS; otherwise, the UE behaviour is based on UE implementation. |

# References

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| [1] | [TS 38.213 V18.0.0](https://www.3gpp.org/ftp/Specs/archive/38_series/38.213/38213-i00.zip) | NR; Physical layer procedures for control (Release 18) | 3GPP |
| [2] | [RP-232671](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_101/Docs/RP-232671.zip) | Revised WID on Enhanced support of reduced capability NR devices | Ericsson |
| [3] | [R1-2310568](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114b/Docs/R1-2310568.zip) | FL summary #4 on Rel-18 RedCap UE complexity reduction | Moderator (Ericsson) |
| [4] | [R1-2310329](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Docs/R1-2310329.zip) | RAN1 agreements for Rel-18 NR RedCap | Rapporteur (Ericsson) |