**3GPP TSG RAN WG1 Meeting #114 R1-230xxxx**

Toulouse, France, August 21 – 25, 2023

**Agenda item: 9.17**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Summary on email discussion on Red Cap enhancements**

**Document for: Discussion and Decision**

# 1 Introduction

This thread will discuss the draft CR to 38.214 for the Red Cap enhancements.

First checkpoint for this discussion: **September 5th, 6:00am UTC**!

# 2 Discussion – first round

The comments in this section are based on version 0 of the the draft CR available in the **Post RAN1#114 discussion.**

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| Company | Comments | Editor reply/Notes |
| CATT | Thank you very much for the update! The two RAN1#114 agreements on ‘RA-RNTI/MSGB-RNTI vs unicast RNTI’ are only ‘For UE BB bandwidth reduction’,

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| Agreement: [RAN1#114]For UE BB bandwidth reduction, when PDSCH scheduled with RA-RNTI or MSGB-RNTI is not greater than 25/12 PRBs with 15/30kHz SCS, 38.214 clause 5.1 still applies, i.e.:…Agreement: [RAN1#114]For UE BB bandwidth reduction, when PDSCH scheduled with RA-RNTI or MSGB-RNTI is greater than 25/12 PRBs with 15/30kHz SCS, support the following UE behavior:… |

So the spec restriction should only apply to UE ‘that indicates supportOfRedCap-r18 capability but does not indicate FG 48-2’. In our understanding, RANP#99 conclusion ‘Same as Rel-18 eRedCap UE capable of BW3/PR3 + PR1’ only applies for initial access (Note 4: The initial access procedure of Rel-18 eRedCap UE capable of 20MHz + PR1 is realized by following)’, but this two agreements touches C-RNTI which means it is not ‘initial access’ but already in RRC\_CONNECTED model. Network already knows FG 48-2 is indicated or not.Suggest the following update by adding ‘but does not indicate FG 48-2’:The UE is not expected to decode a PDSCH scheduled with C-RNTI, MCS-C-RNTI, G-RNTI for multicast or broadcast, MCCH-RNTI, G-CS-RNTI or CS-RNTI if another PDSCH in the same cell scheduled with RA-RNTI or MSGB-RNTI, where the PDSCH scheduled with RA-RNTI or MSGB-RNTI for a reduced capability UE that indicates *supportOfRedCap-r18* but does not indicate FG 48-2 is allocated no more than 25 PRBs when configured with SCS  = 0 or no more than 12 PRBs when configured with SCS  = 1, partially or fully overlap in time. A UE indicating *supportOfRedCap-r18* capability but does not indicate FG 48-2 is not expected to decode a PDSCH scheduled with C-RNTI, MCS-C-RNTI, G-RNTI for multicast or broadcast, MCCH-RNTI, G-CS-RNTI or CS-RNTI in the same or next slot if another PDSCH in the same cell is scheduled with RA-RNTI or MSGB-RNTI, where the PDSCH scheduled with RA-RNTI or MSGB-RNTI is allocated more than 25 PRBs when configured with SCS  = 0 or more than 12 PRBs when configured with SCS  = 1. |  |
| Huawei, HiSilicon | Thanks for the draft CR.**//Comment#1**A clarification for the maximum number of PRBs for the following text seems necessary. It could be either referring to the FG 48-1 or be explicitly described.A UE that indicates *supportOfRedCap-r18* capability but does not indicate FG 48-2, during a process of P-RNTI triggered SI acquisition, when the total number of PRBs for the PDSCH scheduled with SI-RNTI and the PDSCH scheduled with C-RNTI, MCS-C-RNTI, or CS-RNTI scheduled in the slot is larger than the maximum number of PRBs that the UE can process per slot, the UE may skip decoding of the scheduled PDSCH with C-RNTI, MCS-C-RNTI, or CS-RNTI.

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| FG 48-112. Maximum number of PDSCH/PUSCH PRBs that can be scheduled for unicast per slot of 25 PRBs for 15 kHz SCS and 12 PRBs for 30 kHz SCS |

**Proposed changes:**A UE that indicates *supportOfRedCap-r18* capability but does not indicate FG 48-2, during a process of P-RNTI triggered SI acquisition, when the total number of PRBs for the PDSCH scheduled with SI-RNTI and the PDSCH scheduled with C-RNTI, MCS-C-RNTI, or CS-RNTI scheduled in the slot is larger than 25 PRBs if configured with SCS  = 0 or larger than 12 PRBs if configured with SCS  = 1 ~~the maximum number of PRBs that the UE can process per slot~~, the UE may skip decoding of the scheduled PDSCH with C-RNTI, MCS-C-RNTI, or CS-RNTI. |  |
| Ericsson | When the number PRBs allocated for RA-RNTI/MSGB-RNTI is no more than 25/12 PRBs, the behaviour for an eRedCap UE is same as that of the legacy case. Therefore, we think that there is no need to explicitly mention this case in the paragraph where legacy case is specified. Based on the above consideration, we propose the following update (incorporating also the update proposed by CATT):----------------------------Start of text----------------------------------------The UE is not expected to decode a PDSCH scheduled with C-RNTI, MCS-C-RNTI, G-RNTI for multicast or broadcast, MCCH-RNTI, G-CS-RNTI or CS-RNTI if another PDSCH in the same cell scheduled with RA-RNTI or MSGB-RNTI ~~, where the PDSCH scheduled with RA-RNTI or MSGB-RNTI for a reduced capability UE that indicates~~ *~~supportOfRedCap-r18~~* ~~is allocated no more than 25 PRBs when configured with SCS  = 0 or no more than 12 PRBs when configured with SCS  = 1,~~ partially or fully overlap in time.Furthermore, a ~~A~~ UE indicating *supportOfRedCap-r18* capability but not indicating FG 48-2 is not expected to decode a PDSCH scheduled with C-RNTI, MCS-C-RNTI, G-RNTI for multicast or broadcast, MCCH-RNTI, G-CS-RNTI or CS-RNTI in the same or next slot if another PDSCH in the same cell is scheduled with RA-RNTI or MSGB-RNTI, ~~where~~ when the PDSCH scheduled with RA-RNTI or MSGB-RNTI is allocated more than 25 PRBs when configured with SCS  = 0 or more than 12 PRBs when configured with SCS  = 1.----------------------------End of text----------------------------------------We are also fine with HW/HiSi’s proposed update. |  |
| xiaomi1 | **Comment#1**Share the similar view with other companies that all the simultaneous reception restrictions discussed in Rel-18 RedCap WI is only applicable for FG 48-1; while, for FG 48-2, the legacy spec is reused. So, we also suggest to add “but not indicating FG 48-2”. Furthermore, Ericsson’s version is more preferred by us. **Comment#2 on the “Summary of change”*** The third bullet, “For two PDSCHs each scheduled with SI-RNTI, P-RNTI, RA-RNTI or TC-RNTI, eRedCap UE will only decode Msg4 scheduled by TC-RNTI if Msg4 is not larger than 25 PRBs for 15 kHz SCS and 12 PRBs for 30 kHz SCS”, is a bit ambitious for us. For the simultaneous scheduling of Msg4 and broadcast channels, both two channels should be decoded by the FG 48-1 only UE. So, we suggest to revise as follows:

For two simultenaous PDSCHs each scheduled with SI-RNTI, P-RNTI, RA-RNTI or TC-RNTI, eRedCap UE will ~~only~~ decode ~~Msg4 scheduled by TC-RNTI~~ both two channels if Msg4 sheduled by TC-RNTI is not larger than 25 PRBs for 15 kHz SCS and 12 PRBs for 30 kHz SCS. |  |
| QC | Thanks editor’s great effort to put together the CR. We have the following feedback for editor to consider:1. Regarding the first two paragraphs in the CR, we agree with CATT/Ericsson on the point of ‘that indicates supportOfRedCap-r18 capability but does not indicate FG 48-2’. Between CATT TP and Ericsson TP, we slightly prefer Ericsson’s version which is more concise.
2. Similarly, for the following, the restriction seems only applies to FG48-1 UE, but not to FG48-2 UE. One might argue NW cannot differentiate FG48-1 vs FG48-2 UE in RRC\_IDLE. But in RRC inactive, after Msg3, NW seems able to distinguish FG48-1 vs FG48-2 UE (assuming the UE reported capability previously in RRC\_active state). Therefore, we can add “but does not indicate FG 48-2” in the following at least for UE in RRC\_INACTIVE? I’d like to hear companies view about this.

The UE in RRC\_IDLE and RRC\_INACTIVE modes shall be able to decode two PDSCHs each scheduled with SI-RNTI, P-RNTI, RA-RNTI or TC-RNTI, where the PDSCH scheduled with TC-RNTI for a reduced capability UE that indicates *supportOfRedCap-r18*  is allocated no more than 25 PRBs when configured with SCS m = 0 or no more than 12 PRBs when configured with SCS m = 1, |  |
| Nokia, NSB | We are fine with the proposed updates from Ericsson and Huawei.On QC’s second comment, our preference is not to introduce different handling for 48-2 UE in the case of UE in RRC\_INACTIVE. Therefore we prefer to apply the same restriction to both 48-1 and 48-2 UE both in RRC\_IDLE and RRC\_INACTIVE. |  |