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

**Toulouse, France, August 21st – 25th, 2023**

**Agenda item:** 9.17

**Source:** Samsung

**Title:** Summary of email discussions [114-R18-38.213-NR\_redcap\_enh]

**Document for:** Discussion and decision

# Introduction

The purpose of this document is to collect inputs/comments on the draft CR for TS 38.213 [draftCR\_38213 eRedCap](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_redcap_enh/R1-230xxxx%20draftCR_38213%20eRedCap.docx) on the introduction of support for enhanced reduced capability NR devices. If a comment on a particular aspect has been made by another company, please do not repeat it until, if needed, after a response.

The first checkpoint is on September 5, UTC 13:00.

# First Round Discussion

Please provide your comments on the draft CR for TS 38.213 [draftCR\_38213 eRedCap](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_redcap_enh/R1-230xxxx%20draftCR_38213%20eRedCap.docx).

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| Company | Comments |
| MediaTek | As we commented last time, like FG 48-1 UE, FG 48-2 UE does not expect Msg3 PUSCH, Msg A PUSCH, and Msg4 with TC-RNTI to be larger than 25/12 PRBs for 15/30 kHz SCS. For Msg4 with TC-RNTI, it has been captured in the current CR draft. But for Msg3 and MsgA PUSCH, it is missing. Hence, we suggest add the following paragraph to Clause 17.1A. * A UE that indicates 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.

The reasons behind the above proposal are listed below:1. At RAN#99, it was agreed that FG 48-2 UE should follow the same initial access procedure as FG 48-1 UE.
2. RAN1 and RAN2 have both agreed that FG 48-2 UE shares the same early indication in Msg1/Msg3/MsgA PUSCH.
	* 1. NW hence cannot distinguish FG 48-2 UE from FG 48-1 until it receives UE capability reporting.
		2. In other words, the scheduling restriction during a RACH procedure should apply to both UEs except for Msg4 with C-RNTI.

[Aris]: No issue with the justification but was expecting RAN1 to officially note/endorse the above since it was pending from the previous CR review. Anyway, it is hopefully non-controversial and will be reflected in the next update (but will be removed if any objection). |
| vivo | **Comment:** For the newly added description for handling the Broadcast MBS PDSCH, we think it is based on the following agreementsAgreement: * For UE BB bandwidth reduction, the number of PRBs scheduled in DCI can be larger than 25 PRBs for 15 kHz SCS and 12 PRBs for 30 kHz SCS for:
	+ Broadcast MBS PDSCH without any PDSCH in next slot
	+ Broadcast MBS PDSCH without MBS PDSCH repetition

Although no explicit agreements for the cases of “Broadcast MBS PDSCH with another PDSCH in next slot” and “Broadcast MBS PDSCH with MBS PDSCH repetition”, we are fine with the current description used by editor for handling above cases. But it should be applied for a UE that has not indicated FG48-2. Proposed Modification:“A UE that has not indicated FG 48-2 is not required to process a PDSCH reception in slot n 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 n+1.” [Aris]: Yes.  |
| FUTUREWEI | Thank you for the draft CR1. We have a similar understanding as Mediatek regarding the size of Msg3 PUSCH and PUSCH scheduled by TC-RNTI for a UE supporting FG 48-2. During initial access, the UE has not indicated it supports FG 48-2. This UE must use the PUSCH size limits as a UE supporting 48-1.
2. Regarding the titles for 17.1 and 17.1A, the intent is clear for the body of the clause but the title seems misleading. There can be two interpretation of the title: “ ‘Second RedCap UE’ procedures” as opposed to “Second ‘RedCap UE procedures’ ”. Maybe a small wording suggestion to indicate the latter reading, such as “Second procedures for RedCap UE”?

[Aris]: OK. |
| CATT | Thanks for the update! We have some comments:1) Same understanding as MTK on Msg3. Since both ‘FG 48-1 only’ or ‘FG 48-1 + FG 48-2’ eRedCap UE shall share the same RACH procedure, the following text can be considered in Clause 17.1A:A UE does not expect to transmit a PUSCH scheduled by RAR UL grant, or by a DCI scrambled by a TC-RNTI, or configured for Type-2 random access procedure, 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.2) Agree with vivo. ‘that has not indicated FG 48-2’ should be added for newly added MBS text.[Aris]: Please see previous responses. |
| Huawei, HiSilicon | Thanks for the updated CR.**//Comment#1**Broadcast PDSCH can be scheduling by MCCH-RNTI as well. Additionally, agreed on vivo’s proposed change.**Proposed changes:**A UE that has not indicated FG 48-2 is not required to process a PDSCH reception in slot $n$ that is scheduled by a DCI format with CRC scrambled by a G-RNTI or MCCH-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 $n+1$.**//Comment#2**Similar comment as MediaTek, Futurewei and CATT for Msg3. Better to capture it.[Aris]: Please see previous responses. Yes, MCCH-RNTI was missed (will be included after “broadcast” as, unlike G-RNTI, MCCH-RNTI is only for broadcast). |
| Ericsson | Is the red color in Clause 17.1 intentional? :) |
| Xiaomi | **Comment#1**Share similar view as MediaTek and other companies for Msg3 CBW restriction of FG 48-2. **Comment#2** Agree with Huawei’s version with adding “that has not indicated FG 48-2” and “or MCCH-RNTI” for broadcast MBS PDSCH CBW.[Aris]: Actually, “MCCH-RNTI” will not be included for now. It needs to be clarified how a UE can indicate FG 48-2 in such case. |
| QC | Thank Aris for the great effort to put together the CR. I have a following comments or rather questions for clarification. The three “when…” cases for timeline relaxation were agreed for PR3 UE (not indicated FG 48-2) only. For PR1 UE (indicated FG48-2), the timeline relaxation is not needed. I understand there is an argument that NW cannot distinguish PR1 vs PR3 UE in random access. So the CR currently capture the 3 timeline relaxations for both PR1 and PR3 UEs. But I am wondering are we over-generalizing things. For example, for the second “when”, this is about UE restart PRACH procedure. A PR1 UE does not need the timeline relaxation at all. NW should be able to take the advantage to receive this PRACH from PR1 UE as if it is a Rel-17 Redcap UE. So, I think for the second “when”, the timeline relaxation only applies to “A UE that has not indicated FG 48-2”.For the third “when”, for a UE in RRC\_inactive, after NW receive MsgA PUSCH, can NW link this UE with its capability previous reported in RRC\_active and figure out the UE is PR1 or PR3? It seems doable to me at first look. If so, then for PR1 UE in RRC\_inactive and RRC\_active, the third timeline relaxation is not needed. Of course, I might miss something here. Please let me know. [Aris]: If the group is OK (seems unlikely), the condition “has not indicated FG 48-2” can be added. However, I think the whole issue is an optimization (my opinion – the extend is of course arguable) as it may save some time for FG 48-2 capable UEs when they perform RA after establishing RRC connection and indicating a capability – that is not a frequent event or something that can probably have a QoS impact on the UE (it is unlikely to have for a NW that supports a mixture of Rel-17/18 RedCap UEs). Can continue the discussion, if any preference, after the draft CR update.  |
| MediaTek | 1. For Msg3/MsgA PUSCH scheduling restriction, we are also fine with CATT’s version.
2. For broadcast MBS PDSCH, a clarification question for the group: Can gNB distinguish FG 48-2 UEs from FG 48-1 UEs when broadcasting MBS PDSCH?

[Aris]: It is possible for G-RNTI but it is not possible for MCCH-RNTI (will not be included). But then it is unclear why the agreement mentions only broadcast and does not mention multicast.1. On relaxed timeline, we think all three “when” should apply to both FG 48-2 and FG 48-1 UE including the second “when” on PRACH retransmission. “Note 4” *(copied below for reference)* in the RAN#99 clearly states the “PR1” (i.e. FG 48-2) UE should follow the same initial access as “PR3/BW3” (i.e. FG 48-1) UE which was a compromise from the other camp who did not want to support “PR1” UE at all. We should hence respect the (compromise) agreements we have made.

[Aris]: ACK for the comment.*Note 4: The initial access procedure of Rel-18 eRedCap UE capable of 20MHz + PR1 is realized by following: [*[*RP-230778*](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_99/Docs/RP-230778.zip)*]** *Same as Rel-18 eRedCap UE capable of BW3/PR3 + PR1*
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| NTT DOCOMO | Thanks for the updated CR.We tend to agree with QC that UE supports FG48-2 can proceed/transmit PDSCH/PUSCH as Rel-17 RedCap UE without processing timeline relaxation for RAR and/or restriction on Msg3 PUSCH/MsgA PUSCH/Msg4 bandwidth, and hence such timeline relaxation and scheduling restriction is not necessary. However, it was agreed at the RAN1 #114 in the UE feature session that the processing timeline relaxation for RAR is supported by UE supports FG48-2 **during initial access** as follows.**Agreement*** Component 13 in FG 48-1 is supported by FG 48-2 during initial access. Revisit component 13 for FG 48-2 if RAN2 agrees on differentiation of barring for Rel-18 eRedCap UEs

If suggested text by MTK is added, similar restriction as the above agreement for UE feature, i.e., “during initial access”, should be considered at least for MsgA PUSCH, e.g., MsgA PUSCH configured by *RACH-ConfigDedicated* can be larger bandwidth than 5MHz for UE indicates FG48-2.[Aris]: ACK for the comment – no further action for now, may continue discussion after the draft CR update. |
| Nokia, NSB | Thanks for the updated CR. For the timeline relaxation, our preference is similar to MediaTek that they should be applied to both 48-1 and 48-2 UE. Also, as DCM pointed out Component 13 (RAR timeline relaxation) was agreed in RAN1#114 to be included for 48-2 UE.We are also OK with the Msg3/MsgA PUSCH scheduling restriction.[Aris]: ACK for the comment. |

# Second Round Discussion

Please provide your comments on the draft CR for TS 38.213 at [draftCR\_38213 eRedCap\_v1](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17%28Other%29/%5B38.213%20draft%20CRs%5D/NR_redcap_enh/R1-230xxxx%20draftCR_38213%20eRedCap_v1.docx).

The second checkpoint is on September 6, UTC 16:00.

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| Company | Comments |
| MediaTek | Thank you, Editor, for your efforts on the draft CR. We are in principle fine with this version. Just a clarification about the following text: with “indicated” (past tense), can it cover the initial access procedure as well? A UE may not indicate UE capabilities until finishing the RACH procedure. In this case, can the following text still cover all scenarios? *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.*Since the above paragraph applies to both FG 48-1 and FG 48-2 UEs, maybe we can consider deleting “that indicated FG 48-2.” In this way, it results in some redundancy for FG 48-1 UEs considering the second paragraph in this sub-clause. However, it would be clear that both UEs expect the same scheduling restriction. [Aris]: No, that is not the intention (to cover initial access or any other point prior to the indication). The “indicated” is just past tense (could not be any other tense). Let’s keep the text as is for now and RAN1 can discuss a proper modification, if any. |
| NTT DOCOMO | Thank Editor for your efforts on CR.We think MTK’s concern can be addressed by updating as “*A UE that* ***supports*** *FG 48-2 does not expect to transmit…*”[Aris]: I don’t think using “supports” works – how would the gNB know if there is no indication?As we commented in the first round, for CFRA, we are not sure the PUSCH scheduling restriction, i.e., no larger bandwidth than 5MHz, is required for a UE indicates FG48-2. In our view, similar to the following agreement, it would be good to clarify that the case for CFRA, e.g., MsgA PUSCH configured by *RACH-ConfigDedicated,* is precluded.**Agreement*** Component 13 in FG 48-1 is supported by FG 48-2 during initial access. Revisit component 13 for FG 48-2 if RAN2 agrees on differentiation of barring for Rel-18 eRedCap UEs
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| vivo | Thanks a lot editor’s efforts.We also share MTK’s views. It would be simpler and clearer to delete “that indicated FG 48-2”.About DCM’s comments, we understand the guidance and restriction is for “during the initial access”. But, different handling for RACH during initial access and after initial access; for CBRA and CFRA also seems not desirable to have different UE behaviors. So, we prefer to keep the current version and if necessary, we can continue discussing in next RAN1 meeting. [Aris]: Not sure if the preference is to keep “that indicated FG 48-2” (“keep the current version”) or delete that part (“share MTK’s views”). I will keep and RAN1 can discuss.[vivo2]: Sorry for the confusion. We share MTK’s views to delete that part.  |
| Xiaomi | **Comment#1**Thank you editor for the great efforts. We share the same view as MTK deleting “that indicated FG 48-2.”**Comment#2**Broadcast MBS can be received in any RRC state. Thus, during RRC\_CONNCTED state, the MCCH-RNTI scrambled DCI should also be monitored, before which the UE capability may have been reported to the gNB. So, we suggest to add “MCCH-RNTI” in this sentence. Furthermore, to make a clearer understanding, “A UE that has not indicated FG 48-2” can be revised to “A UE ~~that has~~ not ~~indicated~~ supporting FG 48-2”, which naturally describes an objective implementation statement of the eRedCap UE. In conclusion, we suggest to revise it as follows:

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| A UE ~~that has~~ not ~~indicated~~ supporting FG 48-2 is not required to process a PDSCH reception in slot $n$ that is scheduled by a DCI format with CRC scrambled by a MCCH-RNTI or 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 $n+1$. |

[Aris]: I tend to agree but would prefer to not add it now. It can be considered in ~6 weeks and after possible consideration in RAN1#114bis. |
| Ericsson | **Comment #1**Since RAN#99 conclusion concerns only initial access, we think that following update is needed for PUSCH paragraph:----------------------------------------start of text-------------------------------------------A UE in RRC\_IDLE or RRC\_INACTIVE, or a UE in RRC\_CONNECTED not indicating FG 48-2, ~~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.--------------------------------------end of text---------------------------------------------We think similar update is needed for all other paragraphs that concern random access channels.[Aris]: I would suggest to keep the current text and RAN1 can discuss it. For example, it is not clear why a UE that is in RRC\_INACTIVE, after previously being in RRC\_CONNECTED and declaring FG 48-2, has to “does not expect …”. As a side note, a simpler way to say the above may be the following.A UE that is not in RRC\_CONNECTED state or has not indicated FG 48-2 does not expect …**Comment #2**For the MBS paragraph, we agree with others that “that has not indicated FG 48-2” can be removed. [Aris]: I’m not sure whether there were comments for this aspect in the MBS paragraph, but “that has not indicated FG 48-2” can stay for now and RAN1 can discuss in ~6 weeks. I don’t think there is a fundamental difference with the UE behavior in Comment#1 above. |
| QC | Just listing comments to share our view as below. No action needs to take on the CR.Regarding the MBS paragraph, our view is “that has not indicated FG 48-2” should be kept, as the restriction on broadcast MBS BW is for PR3 UE.For the random access timeline relaxation, we are still not fully convinced that all the timeline relaxations should be extended to PR1 UE. But like editor suggested, we can further discuss this in next meeting.  |
| vivo2 | Sorry for the confusion. We share MTK’s views to delete that part. |
| Huawei, HiSilicon | **//Comment#1**Regarding Ericsson’s comment#1, its proposed text is not in line with agreements because initial access procedure is also applied in cell handover which is in connected mode. Regarding “that indicated FG 48-2”, we share similar view as MediaTek and vivo and prefer to delete it because the text is also applicable to UEs capable of FG 48-1 only. |
| MediaTek2 | Thank you Editor for the clarification. Since the intention of using “indicated” is not to cover initial access, then “that indicated FG 48-2” should be deleted in the following paragraph to avoid confusion. Otherwise, it is for sure not inline with RAN#99 agreements. *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.* |
| Ericsson2 | **Comment #1**Regarding the PUSCH paragraph, we agree with the MediaTek2 comment above that “that indicated FG 48-2” needs to be removed, since the bandwidth reduction also applies to FG 48-1. We can revisit the other aspects of our previous comment in the next meeting, but it would be good to remove “that indicated FG 48-2” since it seems to be clearly wrong.**Comment #2**Regarding the MBS paragraph, there was a mix-up in our previous comment, sorry about that. What we meant to say is that we agree with others that “that has not indicated FG 48-2” should be replaced with “not supporting FG 48-2” to make the next less ambiguous. We would also be fine with discussing it in the next meeting instead. |
| Ericsson3 | On second thought, we now realized that there is already an old PUSCH paragraph for the FG 48-1 case, so the new PUSCH paragraph for the FG 48-2 case is not necessarily as wrong as we thought (sorry again for the confusion).Therefore, we prefer to stick to the latest (v1) version and revisit any remaining issues in the next meeting. |
| Editor | I think a possible middle ground for moving forward is to keep the (v1) version for the draft CR but with a note that the “that indicated FG 48-2” in the following will be removed if RAN1 does not reach consensus on its validity. Every other aspect discussed (e.g. MBS) is also for RAN1 discussion (probably that doesn’t even need to be stated – always the case). Technical, RAN1-like, discussion should not have been a main point for the draft CR review but it had to be given absence of some agreements. The option to completely delete the statement below does exist (given no agreement or consensus) and I don’t think it would affect the declaration of WI completeness – it can then be treated in ~5 weeks. I will go with the approach in the above paragraph and, if any concern, just deleting the below paragraph should be OK. 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. |