3GPP TSG-RAN WG1 Meeting #116 Draft R1-2401518

Athens, Greece, 26th February – 1st March 2024

**Agenda Item: 8.11**

**Title: FL summary #1 for Rel-18 NR eRedCap maintenance**

**Source: Moderator (Ericsson)**

**Document for: Discussion, Decision**

# Introduction

This feature lead (FL) summary (FLS) concerns the Rel-18 work item (WI) on enhanced support of reduced capability (RedCap) NR devices [1]. The final FLS from the previous RAN1 meeting can be found in [2]. The RAN1 agreement summary from the previous RAN1 meeting is available in [3].

This document summarizes contributions [4] – [12] submitted to agenda item 8.11 and the following email discussion:

|  |
| --- |
| [116-R18-Other\_WIs] Email discussion on other Rel-18 WIs – Xiaodong (Vice Chair)   * To be used for sharing updates on online/offline schedule, details on what is to be discussed in online/offline sessions, Tdoc number of the moderator summary for online session, etc.   **RedCap**  R1-2400041 Draft CR for timing relaxation related spec for eRedCap in TS38213 Spreadtrum Communications  R1-2400043 Clarification on remaining issues for eRedCap Spreadtrum Communications  R1-2400225 Maintenance on enhanced reduced capability NR devices Vivo  R1-2400533 Discussion on remaining issues for eRedCap UEs Xiaomi  R1-2400870 Alignment for Rel-18 RedCap NEC  R1-2401097 Maintenance on further UE complexity reduction for eRedCap NTT DOCOMO, INC.  R1-2401199 Correction for SPS PDSCH regarding eRedCap ASUSTeK  R1-2401385 Maintenance on Rel-18 RedCap Huawei, HiSilicon  To be moderated by Johan (Ericsson) |

Issues in this document are tagged and color coded with High Priority, Medium Priority, and Low Priority, and the issues that are in the focus of this discussion round are furthermore tagged FL2.

Follow the naming convention in this example:

* eRedCapFLS1-v000.docx
* eRedCapFLS1-v001-CompanyA.docx
* eRedCapFLS1-v002-CompanyA-CompanyB.docx
* eRedCapFLS1-v003-CompanyB-CompanyC.docx

If needed, you may “lock” a discussion document for 30 minutes by creating a checkout file, as in this example:

* Assume CompanyC wants to update eRedCapFLS1-v002-CompanyA-CompanyB.docx.
* CompanyC uploads an empty file named eRedCapFLS1-v003-CompanyB-CompanyC.checkout.
* CompanyC checks that no one else has created a checkout file simultaneously, and if there is a collision, CompanyC tries to coordinate with the company who made the other checkout (see, e.g., contact list below).
* CompanyC then has 30 minutes to upload eRedCapFLS1-v003-CompanyB-CompanyC.docx.
* If no update is uploaded in 30 minutes, other companies can ignore the checkout file.
* Note that the file timestamps on the server are in UTC time.

In file names, please use the hyphen character (not the underline character) and include ‘v’ in front of the version number, as in the examples above and in line with the general recommendation (see slide 12 in [R1-2400003](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116/Docs/R1-2400003.zip)), otherwise the sorting of the files will be messed up (which can only be fixed by the RAN1 secretary).

To avoid excessive email load on the RAN1 email reflector, please note that there is NO need to send an info email to the reflector just to inform that you have uploaded a new version of this document. Companies are invited to enter the contact info in the table below.

**FL2 Question 0-1a: Please consider entering contact info below for the points of contact for this email discussion.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Point(s) of contact** | **Email address(es)** |
| Spreadtrum | Sicong Zhao | sicong.zhao@unisoc.com |
| vivo | Lihui WANG | wanglihui@vivo.com |
| FUTUREWEI | Vip Desai | vipul.desai@futurewei.com |
| ASUSTeK | Denny Huang | denny\_huang@asus.com |
| NEC | Takahiro Sasaki | takahiro.sasaki@nec.com |
| Nokia | David Bhatoolaul | david.bhatoolaul@nokia.com |
| ZTE, Sanechips | Youjun Hu | hu.youjun1@zte.com.cn |
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| Ericsson | Sandeep Veedu | sandeep.narayanan.kadan.veedu@ericsson.com |

# 1 Random access timeline relaxation

The following contributions discuss random access timeline relaxation:

|  |  |  |  |
| --- | --- | --- | --- |
| [4] | [R1-2400041](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400041.zip) (38.213 CR) | Draft CR for timing relaxation related spec for eRedCap in TS38213 | Spreadtrum Communications |
| [7] | [R1-2400533](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400533.zip) (Proposal 1) | Discussion on remaining issues for eRedCap UEs | Xiaomi |

Contribution [4] expresses that when the UE needs to transmit PRACH after RAR PDSCH reception, the timing of the PRACH transmission should be based on the last RAR PDSCH symbol rather than the end of the RAR window and proposes the following change in 38.213 clause 17.1A:

|  |
| --- |
| 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~~. |

**FL1 High Priority Question 1-1a: Do you agree with the above proposed change in 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | Y | Agree with the CR to clean up the spec. |
| CATT | Y | Seems correct that we did not have agreement on the case of ‘UE does not receive any RA-RNTI or MsgB-RNTI scrambled DCI’. With this understanding we are OK. |
| Spreadtrum | Y |  |
| Nordic | N | We think spec is clear, not need to change |
| vivo |  | We suggest following change that keeping “as described in Clauses 8.2 and 8.2A.”  “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.” |
| NEC | Y |  |
| Nokia, NSB | Y |  |
| ZTE, Sanechips |  | It is a little bit redundant but not critical. We do not have strong view. |
| LG | N | We think this is not a critical issue. |
| DOCOMO | Y |  |
| Samsung | N | We don’t think it is a critical issue. |
| OPPO | Y |  |
| Spreadtrum2 |  | @Nordic, @LG, @Samsung, thanks for the views, further clarification is as follows.  For legacy UE (38.213), there are two cases for determination of the PRACH transmission time:   * If the UE does not detect the DCI format 1\_0 … within the window, …, the UE shall be ready to transmit a PRACH no later than msec after the last symbol of the window, * if the UE detects the DCI format 1\_0 … within the window, the UE shall be ready to transmit a PRACH no later than msec after the last symbol of the PDSCH reception.   While for eRedCap, only the case of UE receives a PDSCH scheduled by a DCI is mentioned. Then the eRedCap here will not determine the PRACH time based on the window. Therefore, the wording “or after the last symbol of the window as described in Clauses 8.2 and 8.2A.” should be removed.  One possible interpretation for “or after the last symbol of the window as described in Clauses 8.2 and 8.2A” is that for other case (e.g., UE does not detect the DCI within the window), the time should be after the window. However, we need to notice that there is also a “,” before “after the last symbol of the PDSCH reception”, that means it can be interpreted as: even the UE does not receives DCI within the window, the UE can also relax the timeline for PRACH transmission.   |  | | --- | | 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. |   But the fact is, if the UE does not receives DCI within the window, the UE should follow the legacy for PRACH transmission timeline determination, as we don’t have the agreements to relax timeline for this case.  In addition, in the sentence of “or after the last symbol of the window as described in Clauses 8.2 and 8.2A.”, the red part can be interpreted as an explanation only for the window (what the window is,). In this regard, the issue is still exist.  So, remove the “~~, or after the last symbol of the window as described in Clauses 8.2 and 8.2A~~.” is reasonable and necessary. |
| Ericsson | Y |  |
| FL2 | Based on the received responses, including the explanation in Spreadtrum’s last comment above, the following proposal can be considered.  **High Priority Proposal 1-1b: Agree the draft CR for 38.213 clause 17.1A in** [**R1-2400041**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400041.zip)**.**   * **If there are concerns with this proposal, please elaborate in the comment field.** | |
|  |  |  |

Contribution [7] proposes the following change in 38.213 clause 17.1A to capture the RAN1#114bis agreement that the RAR PDSCH timeline relaxation does not apply to CFRA for FG 48-2 UEs [3]:

|  |
| --- |
| For a UE not supporting FG 48-2 performing random access procedure, and for a UE supporting FG 48-2 performing contention-based random access procedure, w~~W~~hen  - 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. |

**FL1 High Priority Question 1-2a: Do you agree with the above proposed change in 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | Y |  |
| CATT | Y |  |
| Nordic | OK |  |
| vivo | Y |  |
| ASUSTeK | Y |  |
| NEC | Y |  |
| Nokia, NSB | N | We don't see the need to change the spec as the PRACH can always be transmitted earlier. Note that this proposal has been discussed in the past and not agreed. |
| ZTE, Sanechips |  | Whether the two following paragraphs are needed to be adapted?   |  | | --- | | For a UE not supporting FG 48-2 performing random access procedure, and for a UE supporting FG 48-2 performing contention-based random access procedure, w~~W~~hen  - 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.  For a UE not supporting FG 48-2 performing random access procedure, and for a UE supporting FG 48-2 performing contention-based random access procedure, w~~W~~hen  - 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. | |
| LG | Y | We don’t have strong preference. |
| DOCOMO | Y |  |
| Samsung | Y |  |
| OPPO | N | We agree the comments by Nokia. |
| Ericsson | Y |  |
| FL2 | Based on the received responses, the following proposal can be considered.  **High Priority Proposal 1-2b: Agree the following TP for 38.213 clause 17.1A.**   * **If there are concerns with this proposal, please elaborate in the comment field.** * **Also, the comment field can be used for providing comments on ZTE’s proposal to consider similar changes in other paragraphs in 38.213 clause 17.1A.**  |  | | --- | | For a UE not supporting FG 48-2 performing random access procedure, and for a UE supporting FG 48-2 performing contention-based random access procedure, w~~W~~hen  - 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. | | |
|  |  |  |

# 2 SPS PDSCH bandwidth

The following contribution discusses SPS PDSCH bandwidth:

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| --- | --- | --- | --- |
| [10] | [R1-2401199](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401199.zip) (38.213 CR) | Correction for SPS PDSCH regarding eRedCap | ASUSTeK |

The above contribution proposes the following change in 38.213 clause 17.1A:

|  |
| --- |
| 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, MCS-C-RNTI, G-RNTI~~,~~ for multicast or G-CS-RNTI, or is associated with a SPS PDSCH configuration activated by a DCI format with CRC scrambled by CS-RNTI or G-CS-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. |

**FL1 High Priority Question 2-1a: Do you agree with the above proposed change in 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | N | The current specification covers SPS activation DCI already. |
| CATT | N |  |
| Spreadtrum | N |  |
| Nordic | Y | It is necessary to include also transmissions without a DCI |
| vivo | Y |  |
| ASUSTeK | Y | Same view as Nordic. |
| NEC | Y |  |
| Nokia, NSB | N | Agree with QC |
| ZTE, Sanechips | N | We think current spec is fine. |
| LG | N | We have the same view as QC. |
| DOCOMO | N | Agree with QC. |
| ASUSTeK2 | comments | Even as commented by QC (i.e., current spec covers SPS activation DCI), current spec still miss the case of SPS PDSCH without a DCI (i.e., 2-nd SPS PDSCH, … n-th SPS PDSCH).  According to current spec, UE does not expect to process PDSCH that is scheduled by DCI over 25/12 PRBs. When it comes to SPS activation DCI scheduling 1-st SPS PDSCH over 25/12 PRBs, the UE does not expect to process 1-st SPS PDSCH according to current spec. However, as the validation of the SPS activation DCI will pass, it remains unclear whether the UE can process the 2-nd SPS PDSCH, …, n-th SPS PDSCH (which is without a DCI) since the current specification merely specifies PDSCH that is scheduled by a DCI format. Thus, we believe it’s necessary to have this TP for clarification. |
| Samsung | N | The current spec is already clear. |
| OPPO | N |  |
| Ericsson | Y | However, now the sentence becomes rather difficult to read. At least, a comma sign needs to be added after the inserted text to clarify that “over a number of PRBs that is larger than 25 PRBs for 15 kHz SCS, or larger than 12 PRBs for 30 kHz SCS” applies not only to the new text. |
| FL2 | Based on the received responses, including the explanation in Asustek’s last comment above, the following proposal can be considered.  **High Priority Proposal 2-1b: Agree the draft CR for 38.213 clause 17.1A in** [**R1-2401199**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401199.zip)**.**   * **If there are concerns with this proposal, please elaborate in the comment field.** | |
| Nokia, NSB2 | N | The current spec is already clear. |

# 3 MBS PDSCH bandwidth

The following contributions discuss broadcast/multicast MBS PDSCH bandwidth:

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| --- | --- | --- | --- |
| [5] | [R1-2400043](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400043.zip) | Clarification on remaining issues for eRedCap | Spreadtrum Communications |
| [7] | [R1-2400533](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400533.zip) (Proposal 2&3) | Discussion on remaining issues for eRedCap UEs | Xiaomi |
| [11] | [R1-2401385](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401385.zip) (38.213 CR) | Maintenance on Rel-18 RedCap | Huawei, HiSilicon |
| [12] | [R1-2401423](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401423.zip) (Section 2.1) | Maintenance on other Rel-18 work items | Qualcomm Incorporated |

Contribution [5] proposes to discuss TDM of unicast PDSCH and broadcast/multicast PDSCH reception and consider potential clarification of the UE behavior.

**FL1 High Priority Question 3-1a: Given the background information provided in contribution [5], is some clarification of the UE behavior for TDM of unicast PDSCH and broadcast/multicast MBS PDSCH needed? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| Spreadtrum | Yes | For eRedCap, the TDMed unicast and multicast/broadcast PDSCH reception in one slot is unclear. From UE implementation point of view, the UE behaviour is not clear when facing the TDMed cases.  RAN1 should discuss the cases and make conclusions, e.g., clear UE behaviours or up to UE implementation. |
| Nordic | N | For the TDM, each PDSCH is handled separately, e.g. multi-cast should not span over 25/12PRB |
| vivo | N | We share with Nordic’s view. |
| Nokia, NSB | N | Similar view as Nordic |
| ZTE, Sanechips |  | In current stage, we prefer to discuss a CR issue. |
| LG | N | We have the same view as Nordic |
| DOCOMO |  | While we don’t see the strong need, we are fine to discuss. |
| Samsung | N | Same view with Nordic. |
| OPPO | N |  |
| Ericsson |  | It would be good to see a more concrete proposal. |
| FL2 | Based on received responses, it is not clear that there is a need for a clarification of the UE behavior for TDM of unicast PDSCH and broadcast/multicast MBS PDSCH. Additional comments, if any, can be provided below. | |
| Spreadtrum | Thanks for the discussion and thanks @Nordic for the views. we just doubt “For the TDM, each PDSCH is handled separately, e.g. multi-cast should not span over 25/12PRB” mentioned by Nordic is the common understanding or is already explicit descripted in the spec.  For TDMed case 1 (following figure): if eRedCap UE is capable of receiving TDMed unicast and multicast/broadcast PDSCH per slot (i.e., Corresponding to the capability/feature *intraSlotTDM-UnicastGroupCommonPDSCH-r17*), we understand that the UE can decode the two PDSCHs.    For TDMed case 2(following figure): according to eRedCap’s capability and the handling method for FDMed cases, it is not reasonable to process both PDSCH here. Similar method can be adopted, i.e., the UE may skip decoding one of the two PDSCHs. Or we can also accept Nordic’s suggestion., multi-cast should not span over 25/12PRB.    In general, RAN1 can consider the following conclusion based on the responses.  **Conclusion:**  **For eRedCap UE capable of receiving TDMed unicast and multicast/broadcast PDSCH per slot, multicast/broadcast PDSCH should not span over 25/12PRB.** | |

Contribution [7] proposes that for broadcast MBS PDSCH repetitions, or for consecutive scheduling between broadcast MBS PDSCH and any PDSCH, it is up to UE implementation to prioritize the reception in the first slot or the reception in the second slot, when the number of PRBs for broadcast MBS PDSCH is larger than 25/12 PRBs for 15/30 kHz SCS and proposes the following change in 38.213 clause 17.1A:

|  |
| --- |
| 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, MCS-C-RNTI, G-RNTI for multicast, or G-CS-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. |

**FL1 High Priority Question 3-2a: Do you agree with the above proposed change in 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | N | The CR is against previous agreement. |
| CATT | N | The previous agreement is close to ‘UE is not required to…’ |
| Nordic | N |  |
| vivo | N |  |
| ASUSTeK | N |  |
| Nokia, NSB | N |  |
| ZTE, Sanechips | N |  |
| LG | N | We have the same view as QC. |
| DOCOMO | N |  |
| Samsung | N |  |
| OPPO | N |  |
| Ericsson | N |  |
| FL2 | Based on received responses, there does not seem to be much support for the proposed change. Additional comments, if any, can be provided below. | |
|  |  | |

Contribution [11] expresses that the currently specified UE behavior implies that the UE must check the scheduling information for the next slot before it determines to skip the PDSCH in current slot and proposes the following change to 38.213 clause 17.1A to specify that the UE checks the previous slot instead:

|  |
| --- |
| A UE that has not indicated FG 48-2 is not required to process a PDSCH reception in slot when the UE received a PDSCH 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~~ . The UE is not required to process PDSCH reception with repetitions that is scheduled by a DCI format with CRC scrambled by a G-RNTI for broadcast or 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. |

**FL1 High Priority Question 3-3a: Do you agree with the above proposed change in 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | N | The CR is against previous agreement |
| CATT | N | We think the proposed version means ‘priority of slot n-1 is higher than that of n’, while the original version means ‘priority of slot n+1 is higher than that of n’. They are not just in the other way around. |
| Spreadtrum | N |  |
| Nordic | N | It is changing what is being drop, broadcast or unicast. |
| vivo | Y | We are fine with the proposal to facilitate UE implementation. |
| NEC | N | The CR does not seem in line with the agreements. |
| Nokia, NSB | N |  |
| ZTE, Sanechips | N |  |
| LG | N | The proposal seems to be different from the previous agreement |
| DOCOMO | N |  |
| Samsung | N |  |
| OPPO | N |  |
| Ericsson |  | We may be ok with changing the specification text to avoid that the UE needs to check the scheduling information for the next slot before it determines whether to skip the PDSCH in the current slot, but the current proposal also seems to prioritize MBS PDSCH over other PDSCH, which may be contrary to earlier agreement. |
| FL2 | Based on received responses, there does not seem to be much support for the proposed change. Additional comments, if any, can be provided below. | |
|  |  | |

Contribution [12] has the following proposal:

* 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 if both following conditions are satisfied:
  + Multicast MCCH/MTCH in RRC\_INACTIVE without any PDSCH in next slot.
  + Multicast MCCH/MTCH in RRC\_INACTIVE without MBS PDSCH repetition.

**FL1 High Priority Question 3-4a: Do you agree with the above proposal? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC | Y | This proposal just follow the agreement made on MBS broadcast. |
| CATT |  | Propose to discuss in **High Priority Question 4-1a** together. |
| Nordic | Y,but | should this be discussed in section 4? |
| vivo |  | Same views as CATT and Nordic. |
| Nokia, NSB |  | See 4-1a response. |
| ZTE, Sanechips |  | the number of PRBs scheduled in which DCI? |
| LG | Y | It can be discussed in **FL1 High Priority Question 4-1a** |
| DOCOMO |  | This question should be discussed in 4-1a. |
| Ericsson |  | As other companies have pointed out, perhaps this issue should be treated together with the proposals in Section 4. |
| FL2 | The proposed change can be treated together with the proposals in Section 4. | |

# 4 Multicast MBS in RRC\_INACTIVE

The following contributions discuss eRedCap UE support for the Rel-18 feature for Multicast MBS in RRC\_INACTIVE:

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| [7] | [R1-2400533](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400533.zip) (Proposal 4) | Discussion on remaining issues for eRedCap UEs | Xiaomi |
| [9] | [R1-2401097](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401097.zip) (Proposal 1) | Maintenance on further UE complexity reduction for eRedCap | NTT DOCOMO, INC. |

RAN1#115 discussed this topic and considered the following proposal [2]:

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| --- |
| RAN1#115 Medium Priority Proposal 4-2b: Down-select between the following options:   * Option 1: For UE BB bandwidth reduction, the number of PRBs scheduled in DCI is not larger than 25/12 PRBs for 15/30 kHz SCS for Rel-18 multicast MBS feature for inactive state. * Option 2: For UE BB bandwidth reduction, the number of PRBs scheduled in DCI can be larger than 25/12 PRBs for 15/30 kHz SCS for Rel-18 multicast MBS feature for inactive state. |

Contribution [9] supports Option 1, whereas contribution [7] supports Option 2.

**FL1 High Priority Question 4-1a: Companies are invited to express their preference among Options 1 and 2. Please elaborate in the comment field.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Option (1/2)** | **Comments** | |
| QC | Neither Option 1 or 2 | We support option 2 with the following two conditions:   * Multicast MCCH/MTCH in RRC\_INACTIVE without any PDSCH in next slot. * Multicast MCCH/MTCH in RRC\_INACTIVE without MBS PDSCH repetition. | |
| CATT | Option 1 | Slightly prefer Option1 for the sake of simplicity. | |
| Nordic | Same as  Q3-4? |  | |
| vivo | Option 1 | Option 1 is preferred for simplicity. | |
| NEC | Option 1 | Option 1 would be preferable for simplicity in CR phase. | |
| Nokia, NSB | Option 1 | This is the same behavior in INACTIVE mode as CONNECTED mode | |
| ZTE, Sanechips | None | We do not think we should discuss how eRedCap UE supports Rel-18 features in current stage. | |
| LG | Option 2 | But, we can live with QC’s proposal | |
| DOCOMO | Option 1 | Same principle as in RRC CONNECTED should be applied. Our concern is that even though there is no HARQ-ACK feedback for multicast PDSCH in RRC INATIVE, there seems a processing time requirement for process a PDSCH with a given HARQ process number which is indicated by HPN field in DCI format 4\_1. | |
| Samsung | Option 1 | We prefer option 1 for simplicity. | |
| Ericsson |  | No strong view | |
| FL2 | Based on received responses, the following updated proposal can be considered.  **High Priority Proposal 4-1b: Down-select between the following options:**   * **Option 1: For UE BB bandwidth reduction, the number of PRBs scheduled in DCI is not larger than 25/12 PRBs for 15/30 kHz SCS for Rel-18 multicast MBS feature for inactive state.** * **Option 2: For UE BB bandwidth reduction, the number of PRBs scheduled in DCI can be larger than 25/12 PRBs for 15/30 kHz SCS for Rel-18 multicast MBS feature for inactive state if both the following conditions are satisfied:**   + **Multicast MCCH/MTCH in RRC\_INACTIVE without any PDSCH in next slot.**   + **Multicast MCCH/MTCH in RRC\_INACTIVE without MBS PDSCH repetition.** | | |
| **Company** | **Y/N** | **Preferred option (1/2)** | **Comments** |
| Nokia, NSB2 | Y | Option 1 |  |

# 5 Clarification of “UE that has not indicated FG 48-2”

RAN1#115 discussed potential clarification of “A UE that has not indicated FG 48-2” and “A UE that indicated FG 48-2” in the following paragraphs in 38.213 clause 17.1A. The discussion is captured in Section 8 in the FLS in [2].

|  |
| --- |
| 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, MCS-C-RNTI, G-RNTI for multicast, or G-CS-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. |

Following the discussion, RAN1#115 made the following agreement regarding “A UE that indicated FG 48-2” [3]:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Agreement:  Adopt the following TP for TS 38.213 clause 17.1A:   |  | | --- | | 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. | | **Reason for change:** The formulation “A UE that indicated FG 48-2” may have ambiguous interpretation since the UE may not yet have indicated FG 48-2 when it transmits Msg3. | | **Summary of change:** Replace “A UE that indicated FG 48-2” with “A UE”. | | **Consequences if not approved:** Different interpretations of the current text may result in different implementations of the Msg3 PUSCH transmission for FG 48-2 UEs. | |

The potential clarification of “A UE that has not indicated FG 48-2” is discussed in the following contributions:

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| [6] | [R1-2400225](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400225.zip) (38.213 CR) | Maintenance on enhanced reduced capability NR devices | Vivo |

The above contribution proposes to replace “A UE that has not indicated FG 48-2” with “A UE not supporting FG 48-2”.

**FL1 High Priority Question 5-1a: Is there a need to modify one or more of the occurrences of the formulation “A UE that has not indicated FG 48-2” 38.213 clause 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| QC |  | We agree with VIVO’s proposal |
| CATT | Y |  |
| Spreadtrum | Y |  |
| Nordic |  | For the first 3 highlighted part, OK. The last highlighted part not acceptable. |
| vivo | Y | @Nordic, our correction in [R1-2400225](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400225.zip) is only for the first 3 highlighted part. :) |
| FUTUREWEI | N | Except for the agreement, there was no consensus to make changes in RAN1#115. We should not reopen this topic. |
| NEC |  | We share similar view as FUTUREWEI but are OK to follow the majority’s view. |
| Nokia, NSB | Y | For CBRA, the gNB does not know until msg5, if the UE has indicated 48.2. |
| ZTE, Sanechips |  | OK to consider. |
| LG | N | We don’t think that there are critical issues without change |
| DOCOMO |  | If we change “A UE that has not indicated FG 48-2” to “A UE not supporting FG 48-2”, it is unclear how the PDSCH/PUSCH before dedicated configuration, such as Msg5 PUSCH, should be scheduled for UE supporting FG48-2.  Per our understanding, with the current description, not only PDSCH/PUSCH for random access but also all the PDSCH/PUSCH before UE capability reporting are scheduled assuming scheduling restriction on UE without FG48-2, which makes sense since NW cannot differentiate UE with and without FG48-2 before UE capability reporting. |
| Samsung |  | Open to discuss |
| OPPO | N | Since this is not essential correction, we don’t agree the CR. |
| Ericsson |  | We are fine with the proposal, but since it has already been discussed in earlier meetings without being agreed and nothing seems to have changed since then, perhaps there is no need to continue the discussion in this meeting. |
| FL2 | Based on received responses, companies are invited to reply to the following follow-up question.  **High Priority Question 5-1b: What are the consequences if the proposal to modify one or more of the occurrences of the formulation “A UE that has not indicated FG 48-2” 38.213 clause 17.1A is not agreed?** | |
| FUTUREWEI | We provided a detailed explanation in R1-2310820.  One clause is critical as the FG48-2 UE follows the same procedure as a FG48-1 UE  “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.”  The highlighted phrase “has not indicated FG 48-2” clarifies that the PUSCH clause is applicable to FG 48-1 UEs and to FG 48-2 UEs during initial access (Msg3 and subsequent PUSCH transmissions) as FG 48-2 UEs follow the same initial access procedures as FG 48-1 UEs until capability exchange.  Two clauses might be changed for the following reasons provided below. Note that the change is not essential.  In both clauses, the phrase “has not indicated FG 48-2” by “has indicated FG 48-1” because the UE has exchanged capabilities to the network. We should avoid using the phrase “support” as the 38.213 standard has limited usage of the phrase.  “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, MCS-C-RNTI, G-RNTI for multicast, or G-CS-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.”  The phrase “has not indicated FG 48-2” clarifies that the PDSCH clause is applicable to FG 48-1 UEs and to FG 48-2 UEs during initial access. However, the remainder of the clause is used to describe FG 48-1 behavior for unicast. While the phrase “has not indicated FG 48-2” is technically correct, it may lead to confusion.  “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 .”  The clause is applicable for an FG 48-1 UE supporting MBS. The network does know about the UE capability, except if it roamed into the cell during the idle state. | |
|  |  | |

# 6 Parameter name alignment

The following contribution discusses parameter name alignment:

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| [8] | [R1-2400870](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400870.zip) (38.213 CR) | Alignment for Rel-18 RedCap | NEC |

The above contribution proposes to replace *supportOfRedCap-r18* with *supportOfERedCap* and to replace FG 48-2 with *eRedCapNotReducedBB-BW* in 38.213 clauses 17.1 and 17.1A.

**FL1 Medium Priority Question 6-1a: Do you agree with the above proposed change in 38.213 clauses 17.1 and 17.1A? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| CATT |  | Maybe OK with first change of ‘*supportOfERedCap*’.  But FG 48-2 is still a formal index for UE capability feature. Seems no strong need to change. |
| Nordic |  | Spec editor fixes, no need for CR |
| vivo |  | Agree with Nordic. |
| NEC |  | We are fine with either to provide the information for spec editor or to include it in FL’s CR. |
| Nokia, NSB |  | Agree with Nordic |
| ZTE, Sanechips |  | Shall we need a conclusion like ‘up to editor’ ? |
| LG |  | Proponent can provide the information to the spec editor. |
| Ericsson |  | If some other 38.213 CR is agreed, these updates can be included as part of it. |
| FL2 | Based on received responses, the following proposal can be considered.  **Medium Priority Proposal 6-1b: If RAN1 agrees to a 38.213 CR for eRedCap for one of the other issues (described in Sections 1 through 5 in this FLS), the proposed parameter name alignment (replacing *supportOfRedCap-r18* with *supportOfERedCap* and replacing FG 48-2 with *eRedCapNotReducedBB-BW*) is included as part of that CR.** | |
| Nokia, NSB2 | Y | We support the proposal. |

# 7 Related issues

The following contribution concerns the maximum receive bandwidth of an eRedCap UE during MBS CFR reception:

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| --- | --- | --- | --- |
| [13] | [R1-2400042](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400042.zip) (38.213 CR) | Draft CR for MBS reception related spec for eRedCap in TS38213 | Spreadtrum Communications |

The following contributions concern RedCap/eRedCap UE support for the Rel-18 TEI on RedCap-specific MBS CFR:

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| --- | --- | --- | --- |
| [9] | [R1-2401097](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401097.zip) (Observation 1) | Maintenance on further UE complexity reduction for eRedCap | NTT DOCOMO, INC. |
| [14] | [R1-2400483](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400483.zip) | Discussion on RedCap MBS TEI issues | ZTE, Sanechips |
| [15] | [R1-2400484](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400484.zip) (38.213 CR) | Corrections on MBS for Redcap | ZTE, Sanechips |
| [16] | [R1-2401100](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401100.zip) | Maintenance on MBS for RedCap | NTT DOCOMO, INC. |

The following contributions concern potential new eRedCap UE feature groups for MBS reception:

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| [7] | [R1-2400533](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400533.zip) (Section 2.3) | Discussion on remaining issues for eRedCap UEs | Xiaomi |
| [12] | [R1-2401423](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401423.zip) (Section 2.2 & Section 2.3) | Maintenance on other Rel-18 work items | Qualcomm Incorporated |

The above topics are expected to be handled in other feature lead summaries.

# References

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| --- | --- | --- | --- |
| [1] | [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 |
| [2] | [R1-2312282](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312282.zip) | FL summary #3 on Rel-18 RedCap UE complexity reduction | Moderator (Ericsson) |
| [3] | [R1-2312283](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312283.zip) | RAN1 agreements for Rel-18 NR RedCap | Rapporteur (Ericsson) |
| [4] | [R1-2400041](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400041.zip) | Draft CR for timing relaxation related spec for eRedCap in TS38213 | Spreadtrum Communications |
| [5] | [R1-2400043](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400043.zip) | Clarification on remaining issues for eRedCap | Spreadtrum Communications |
| [6] | [R1-2400225](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400225.zip) | Maintenance on enhanced reduced capability NR devices | Vivo |
| [7] | [R1-2400533](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400533.zip) | Discussion on remaining issues for eRedCap UEs | Xiaomi |
| [8] | [R1-2400870](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400870.zip) | Alignment for Rel-18 RedCap | NEC |
| [9] | [R1-2401097](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401097.zip) | Maintenance on further UE complexity reduction for eRedCap | NTT DOCOMO, INC. |
| [10] | [R1-2401199](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401199.zip) | Correction for SPS PDSCH regarding eRedCap | ASUSTeK |
| [11] | [R1-2401385](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401385.zip) | Maintenance on Rel-18 RedCap | Huawei, HiSilicon |
| [12] | [R1-2401423](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401423.zip) | Maintenance on other Rel-18 work items | Qualcomm Incorporated |
| [13] | [R1-2400042](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400042.zip) | Draft CR for MBS reception related spec for eRedCap in TS38213 | Spreadtrum Communications |
| [14] | [R1-2400483](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400483.zip) | Discussion on RedCap MBS TEI issues | ZTE, Sanechips |
| [15] | [R1-2400484](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2400484.zip) | Corrections on MBS for Redcap | ZTE, Sanechips |
| [16] | [R1-2401100](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116/Docs/R1-2401100.zip) | Maintenance on MBS for RedCap | NTT DOCOMO, INC. |