3GPP TSG-RAN WG1 Meeting #116bis Draft R1-2403450

Changsha, China, 15th – 19th April 2024

**Agenda Item: 8.4**

**Title: FL summary #2 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, 2]. The final FLS from the previous RAN1 meeting can be found in [3]. The RAN1 agreement summary from the previous RAN1 meeting is available in [4].

This document summarizes contributions [5] – [23] submitted to agenda items 5 and 8.4 and this email discussion:

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| --- |
| **From agenda item 8.4:**  [116bis-R18-Others] Email discussion on other Rel-18 maintenance issues – 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 – To be discussed in ad-hoc session (Xiaodong)**  R1-2402055 Draft CR for Parameter Name Alignment for R18 RedCap UEs in TS 38.214 FUTUREWEI  R1-2402642 Discussion on 2-step RACH for eRedCap Xiaomi  R1-2403177 Remaining issues for UE complexity reduction for eRedCap Qualcomm Incorporated  R1-2403221 Maintenance on further UE complexity reduction for eRedCap NTT DOCOMO, INC.  R1-2403328 Maintenance on Rel-18 eRedCap Ericsson  R1-2403346 Draft CR on multicast transmissions for Rel-18 RedCap in inactive mode Huawei, HiSilicon  **From agenda item 5:**  **Rel-18 eRedCap**  R1-2401948 LS on 2-step for eRedCap RAN2, Ericsson  RAN1 response necessary. To be discussed under agenda item 8.4 as part of eRedCap maintenance. To be moderated by Johan (Ericsson).  **Relevant Tdoc(s):**  R1-2402182 Discussion on LS on 2-step for eRedCap ZTE, Sanechips  R1-2402183 Draft LS reply on 2-step for eRedCap ZTE, Sanechips  R1-2402200 Draft reply LS on 2-step RACH for eRedCap vivo  R1-2402297 Discussion on reply LS for 2-step RACH of RedCap UE OPPO  R1-2402348 Discussion on reply LS on 2-step RACH for eRedCap CATT  R1-2402413 Draft Reply LS on 2-step for eRedCap Samsung  R1-2402488 Discussion on 2-step RACH for eRedCap vivo  R1-2402802 Discussion on RAN2 LS on 2-step RA for eRedCap CMCC  R1-2402933 Discussion on RAN2 LS on 2-step for eRedCap NEC  R1-2403164 Discussion on LS on 2-step RACH for eRedCap Qualcomm Incorporated  R1-2403324 On LS on 2-step for eRedCap Ericsson  R1-2403362 Draft reply LS on 2-step for eRedCap Huawei, HiSilicon |

Issues in the following sections in this document are tagged and color coded with High Priority and Medium Priority, and the issues in focus of this discussion round are furthermore tagged FL3.

Follow the naming convention in this example:

* *eRedCapFLS2-v000-FL.docx*
* *eRedCapFLS2-v001-FL-CompanyA.docx*
* *eRedCapFLS2-v002-CompanyA-CompanyB.docx*
* *eRedCapFLS2-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 *eRedCapFLS2-v002-CompanyA-CompanyB.docx*.
* CompanyC uploads an empty file named *eRedCapFLS2-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 *eRedCapFLS2-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 [R1-2401938](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116b/Docs/R1-2401938.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.

**FL3 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)** |
| vivo | Lihui Wang | wanglihui@vivo.com |
| Spreadtrum | Sicong Zhao | sicong.zhao@unisoc.com |
| CMCC | Lijie Hu | hulijie@chinamobile.com |
| ZTE, Sanechips | Youjun Hu | hu.youjun1@zte.com.cn |
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| NEC | Takahiro Sasaki | takahiro.sasaki@nec.com |
| Ericsson | Sandeep Veedu | sandeep.narayanan.kadan.veedu@ericsson.com |
| LG Electronics | Seungjin Ahn | seungjin.ahn@lge.com |
| Nokia | David Bhatoolaul | david.bhatoolaul@nokia.com |
| OPPO | Zhisong Zuo | zuozhisong@oppo.com |

# 1 Reply to RAN2 LS on 2-step RACH

The following contributions discuss the incoming RAN2 LS on 2-step RACH for eRedCap [5]:

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| --- | --- | --- | --- |
| [5] | [R1-2401948](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2401948.zip) | LS on 2-step for eRedCap | RAN2, Ericsson |
| [7] | [R1-2402182](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402182.zip) | Discussion on LS on 2-step for eRedCap | ZTE, Sanechips |
| [8] | [R1-2402183](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402183.zip) | Draft LS reply on 2-step for eRedCap | ZTE, Sanechips |
| [9] | [R1-2402200](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402200.zip) | Draft reply LS on 2-step RACH for eRedCap | vivo |
| [10] | [R1-2402297](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402297.zip) | Discussion on reply LS for 2-step RACH of RedCap UE | OPPO |
| [11] | [R1-2402348](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402348.zip) | Discussion on reply LS on 2-step RACH for eRedCap | CATT |
| [12] | [R1-2402413](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402413.zip) | Draft Reply LS on 2-step for eRedCap | Samsung |
| [13] | [R1-2402488](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402488.zip) | Discussion on 2-step RACH for eRedCap | vivo |
| [14] | [R1-2402642](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402642.zip) | Discussion on 2-step RACH for eRedCap | Xiaomi |
| [15] | [R1-2402802](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402802.zip) | Discussion on RAN2 LS on 2-step RA for eRedCap | CMCC |
| [16] | [R1-2402933](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402933.zip) | Discussion on RAN2 LS on 2-step for eRedCap | NEC |
| [17] | [R1-2403164](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403164.zip) | Discussion on LS on 2-step RACH for eRedCap | Qualcomm Incorporated |
| [18] | [R1-2403177](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403177.zip) (Section 2) | Remaining issues for UE complexity reduction for eRedCap | Qualcomm Incorporated |
| [20] | [R1-2403324](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403324.zip) | On LS on 2-step for eRedCap | Ericsson |
| [23] | [R1-2403362](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403362.zip) | Draft reply LS on 2-step for eRedCap | Huawei, HiSilicon |

The LS [5] has the following content:

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| **1. Overall Description:**  RAN2 had a discussion on how to configure 2-step RA resources for eRedCap UEs. RAN2 decided to recommend RAN1 to support 2-step RA for eRedCap UEs on 2-step eRedCap resources. If this is not agreeable RAN2 will assume that 2-step RA for eRedCap is not supported at all.  It was also agreed that the following is not specified from RAN2 standpoint: the case where an eRedCap UE uses 2-step RedCap RA resources when 2-step eRedCap RA resources are not configured. If this is agreeable to RAN1, RAN2 will specify that an eRedCap UE that falls back from 2-step random access (using the 2-step eRedCap RA resources) shall use the 4-step eRedCap RA resources.  **2. Actions:**  **To RAN1**  **ACTION:** RAN2 kindly asks RAN1 to take the information above into consideration and recommends RAN1 to respond before the RAN2#126 meeting **at the latest**. |

RAN1 has made the following earlier agreements [4] related to 2-step RA resources for eRedCap UEs:

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| --- |
| Agreement:   * Additional early indication in MsgA PRACH is not supported.   Agreement:   * If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH.   + Send LS to RAN2 to inform about this agreement. * Draft LS in [R1-2312617](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312617.zip) is endorsed. Final LS is agreed in [R1-2312618](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312618.zip). |

The contributions submitted to this meeting express mixed views regarding the LS from RAN2. Companies are invited to provide their input on the two following questions, which concern the first and second paragraph in the LS, respectively.

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

* **Option 1: Support 2-step RA for eRedCap UEs on 2-step eRedCap RA resources.**
* **Option 2: Do not support 2-step RA for eRedCap UEs.**
* **Option 3: Other option (please describe in the comment field).**

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| --- | --- | --- |
| **Company** | **Option** | **Comments** |
| vivo | Option 3 | RAN1 agreements was “If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH.” **Which means RAN1 agreed that 2-step RA for eRedCap UE is supported by only sharing the Rel-17 RedCap 2-step RA resource**.  Previous RAN1 agreement shall be respected unless there is feasibility issue to proceed with the agreement. However, we failed to see any infeasibility for RAN2 to implement RAN1 agreement. (also we do not understand why RAN2 assume 2-STEP RACH will not be supported by eRedCap is RAN1 agreement is respected). Therefore, our proposal is to Reply to RAN2 that  **RAN1 cannot agree to revert RAN1 agreements that**   * **Additional early indication in MsgA PRACH is not supported.** * **If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH.** |
| Spreadtrum | Option 3 | LS in R1-2312618 is clearly stated RAN1 agreements on 2-step RA for R18 eRedCap. No new agreement is needed in RAN1, as RAN1 R18 function had been frozen for half year.  If it is not feasible or not enough for RAN2 to define 2-step eRedCap procedure, by default, option 2 will be adopted. |
| CMCC | Option 3 | We also think there is no technical reason to revert RAN1 agreements.  For the question of whether the eRedCap UEs can support 2-step RA without dedicated eRedCap 2-step RA resources, we think for this case,   * The direct way is to support eRedCap UE using 2-step RedCap RA resources as agreed in RAN1. And for the fallback behavior, supporting fallback from R17 2-step RA to R18 4-step RA for eRedCap UE. * If RAN2 does not want to specify the fallback from R17 2-step RA to R18 4-step RA for eRedCap UE , 2-step RA can still be supported by eRedCap UEs. Since RAN1 has agreed R18 eRedCap can share R17 PRACH resources according to agreements copied below. gNB can configure R18 eRedCap UEs to share the same 4-step and 2-step RACH resources as R17 RedCap. For this case, the fallback behavior is clear, from R17 2-step RA to R17 4-step RA, and eRedCap UE can be identified by gNB from Msg.3 or MsgA PUSCH, then the it can be treated correctly after the random access. This means it can still support 2-step RACH.   Sharing R17 Msg1 resource is already supported according to RAN1 agreements in RAN1#113 as the following,   * When Msg1 indication for Rel-18 eRedCap UEs is not configured while Msg1 indication for Rel-17 RedCap UEs is configured, Rel-18 eRedCap UEs shall share the PRACH that is configured for Rel-17 RedCap UEs.   + Note: Rel-18 eRedCap UEs will be differentiated from Rel-17 RedCap UEs based on Msg3 of Rel-18 eRedCap UEs. |
| ZTE, Sanechips | Option 1 | Option1 should be adopted.   * If 2 step RACH is not supported, there would be RAN1 impacts and we also need to revert some agreements which indicates the support of 2 step RACH. * If separate 2 step RACH msgA-PRACH is supported, there is no RAN1 impacts. Also, this is NW configurable.   Keeping the current RAN1 situation does not help the progress any. It is hoped it could be solved in this meeting. |
| CATT | Option 3 | RAN1’s position is supporting 2-step RACH for Rel-18 eRedCap UE with shared MsgA PRACH resource with Rel-17 RedCap UE.  We would like to ask RAN2 to rethink about the decision. Whether there is really un-addressable issue from RAN2 perspective for RAN1 agreement, or just RAN2 failed to make down-selection with too many alternatives (which may be complicated but feasible)? If the situation is the latter one, it is in fact RAN2’s decision not to support 2-step RACH for Rel-18 eRedCap (go with Option 2).  Anyway we do not want to repeat the RAN1 debate in Rel-18. |
| Xiaomi | Option 3 | Agreement:   * Additional early indication in MsgA PRACH is not supported.   Agreement:   * If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH.   + Send LS to RAN2 to inform about this agreement. * Draft LS in [R1-2312617](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312617.zip) is endorsed. Final LS is agreed in [R1-2312618](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_115/Docs/R1-2312618.zip).   For about agreements as the related LS sent to RAN2, there are many issues to be discussed, including: how to select the PRACH resources for eRedCap, how to manage the fallback from 4-step RACH to 2-step RACH and so on…  However, we have checked with our RAN2 colleagues that the intention of sending this LS to us is just to solve the **fallback** issue. From RAN2 specification point of view, it is too complicated to capture the **fallback** case for eRedCap from 4-step RACH **(which is based on eRedCap-specific 4-step RACH resources)** to 2-step RACH **(which is based on RedCap-specific 2-step RACH resources**) into the RAN2 specification. Meanwhile, In Rel-17 PRACH partition WI, it has been forbidden to fallback from one feature to another feature between 4-step RACH and 2-step RACH.  So, in our view, the LS from RAN2 is just want to ask us: **whether 2-step RACH must be supported for eRedCap when eRedCap-specific 4-step RACH resources is configured** (Actually, the pre-condition is missed in this LS if our understanding is correct). For this issue, our answer is “it is not necessary to support 2-step RACH in this case.” Companies can also check with their RAN2 colleagues about the intention of this LS.  For another case, i.e., for the case that eRedCap-specific 4-step RACH resources are not configured, it has already been captured in the current RAN2 specification that, in this case, the eRedCap UE will select the PRACH resources just like a “RedCap UE”. In this case, 2-step RACH based on RedCap-specific is already supported for eRedCap in RAN2 specification.  So, our proposed **option 3** is as follows:   * **Option 3: Do not support 2-step RACH for eRedCap UEs when eRedcap-specific 4-step RACH is configured.**   Also, the following option is ok for us. It means that how to deal with the fallback case is up to RAN2, but the original RAN1 agreement shouldn’t been reverted:   * **Option 3’: Additional early indication in MsgA PRACH is not supported.** |
| NEC | Option 1 | We would like avoid a situation RAN2 will not specify higher layers for Rel-18 RedCap UE to support 2-step RACH at all on any RA resources. We disagree option 2. |
| Ericsson | Option 1 | To our understanding, the reason that RAN2 recommends supporting 2-step RACH for eRedCap UEs using eRedCap RACH resources is that it turned out to be too complicated to support 2-step RACH for eRedCap UEs using RedCap RACH resources with fallback to 4-step eRedCap RACH resources.  To our understanding, whether we follow the earlier RAN1 agreements or the new RAN2 recommendation will have little to no RAN1 specification impacts, whereas it has significant RAN2 specification impact.  We think it would be unfortunate to not support 2-step RACH for eRedCap UEs at all, and therefore we suggest going for Option 1. |
| LGE | Option 1 | I don’t yet know why 2-step RACH and 4-step RACH for early indication should be different. Early indication for Rel-18 eRedCap is the only case that early indication in 4-step RACH is supported and early indication in 2-step RACH is not supported, compared to the rest of features supporting early indication. As the configuration for early indication on each feature depends on RAN2 and there no impact in RAN1 specification, we prefer to reconsider RAN2 recommendation. |
| Nokia | Option 1 | Given the latest clarification of the intention of the RAN2 LS from Ericsson and Xiaomi, we have a slight preference to go with Option 1 to ensure eRedCap support of 2-step RACH. |
| DOCOMO | Option 1 | We prefer to clarify the exact technical concern to support option 1 from RAN1 perspective. |
| OPPO | Option 3 | RAN1 decision has been sent to RAN2 in LS, meetings ago.  As we also believe there is no reason to overturn RAN1 decision, we would like to ask RAN2 to re-discuss how to support 2-step RACH, assuming there is not dedicated RA Resource for 2-step RACH procedure for Rel-18 RedCap UE. |
| Nordic | Option 1 | We agree with Ericsson.  Moreover, when we precluded use of separate MSG-A RACH resources for eRedCap intention was to avoid complexity in RAN2. It turned out to be other way around. And therefore, we should follow RAN2 recommendation. |

Assuming that 2-step RA for eRedCap UEs is supported, the LS informs RAN1 that RAN2 has agreed to not specify the case where an eRedCap UE uses 2-step RedCap RA resources when 2-step eRedCap RA resources are not configured, and that if this is agreeable to RAN1, then RAN2 will specify that an eRedCap UE that falls back from 2-step RA (on 2-step eRedCap RA resources) shall use the 4-step eRedCap RA resources (i.e., no fallback to 4-step RedCap RA resources).

**FL1 High Priority Question 1-2a: Is the above RAN2 agreement agreeable? Please elaborate in the comment field.**

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| **Company** | **Y/N** | **Comments** |
| vivo | N | See our replies to Question 1-1a. |
| Spreadtrum | Y, but | Same comment as Question 1-1a. |
| CMCC | N | See comment for Question 1-1a. If RAN2 does not want to specify R18 eRedCap UE shares R17 eRedCap 2-step RA resources, without dedicated eRedCap 2-step RA resources, eRedCap UE can support 2-step and 4-step RA with shared R17 PRACH resources, the fallback behavior is also clear. |
| ZTE, Sanechips | Y | I think RAN2 has clearly stated their position. We think eRedCap UE also should support 2 step RACH as RedCap UE. |
| CATT |  | Let’s conclude Question1-1a first. |
| Xiaomi |  | Same view as **High Priority Question 1-1a.** |
| NEC |  | The LS looks like only concerning the case 4-step RA resources for Rel-18 is configured. It is unclear from the LS for the case 4-step RA resources for Rel-18 RedCap UE is not configured. Our understanding is 2-step RACH for Rel-18 RedCap UE is supported on shared RA resources in case neither 4-step nor 2-step RA resources for Rel-18 RedCap UE are not configured. |
| Ericsson | Y | See our comment for Question 1-1a. |
| LGE | Y | Same comment as Question 1-1a. |
| Nokia | Y | The above RAN2 agreement/intention, seems acceptable to us assuming RAN1 is prepared to revert it’s agreement. |
| DOCOMO | Y | We share the same view with ZTE. |
| OPPO |  | Up to decision in Q1-1a |

Based on the received responses to Questions 1-1a and 1-2a, perhaps the following proposal can be considered.

**FL2 High Priority Proposal 1-3a:**

* **In the reply to RAN2, ask RAN2 to consider an alternative approach based on the following potential modification of the earlier RAN1 agreements:**
  + **Additional early indication in MsgA PRACH is not supported.**
  + **If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH, with fallback to 4-step Rel-17 RedCap RACH resources.**

The above proposal was discussed in the Tuesday online session, where the following agreement was made:

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| Agreement:   * + On top of earlier RAN1 agreement     - Additional early indication in MsgA PRACH is not supported.     - If MsgA PRACH early indication for Rel-17 RedCap UEs is configured, a Rel-18 eRedCap UE shall share the MsgA PRACH that is configured for Rel-17 RedCap UEs if the Rel-18 eRedCap UE performs 2-step RACH,   from RAN1 point of view, above can be supported with fallback to 4-step Rel-17 RedCap RACH resources by assuming that gNB will apply eRedCap RAR timing relaxation for RedCap UE when needed.   * + Send LS to RAN2 to inform the above agreement. |

Based on the above agreement and discussion during the Tuesday online session, a draft LS reply has been prepared.

**FL3 High Priority Question 1-4a:**

* **Since the above agreement might be difficult for the receiver to interpret, FL has provided a suggested draft LS reply in *eRedCapDraftLs2stepRach-v000-FL.docx* (**[**Local inbox**](http://10.10.10.10/ftp/RAN/RAN1/Inbox/drafts/8.4(NR_others)/eRedCap/LS/eRedCapDraftLs2stepRach-v000-FL.docx)**,** [**Sync inbox**](https://www.3gpp.org/ftp/Meetings_3GPP_SYNC/RAN1/Inbox/drafts/8.4(NR_others)/eRedCap/LS/eRedCapDraftLs2stepRach-v000-FL.docx)**,** [**Final inbox**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116b/Inbox/drafts/8.4(NR_others)/eRedCap/LS/eRedCapDraftLs2stepRach-v000-FL.docx)**), and companies are invited to comment on whether they prefer this version (or a variant of it), or if they prefer to just send the above agreement as is to RAN2.**

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| --- | --- |
| **Company** | **Comments** |
| CATT | Fine with briefly providing motivation/reasons from RAN1, and we think the above agreement can also be copied in the LS too.  And don’t forget to correct the location and date (still Chicago and Nov.2023 yet) in the title. |
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# 2 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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| [18] | [R1-2403177](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403177.zip) (Section 3) | Remaining issues for UE complexity reduction for eRedCap | Qualcomm Incorporated |
| [19] | [R1-2403221](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403221.zip) (38.213 TP) | Maintenance on further UE complexity reduction for eRedCap | NTT DOCOMO, INC. |
| [21] | [R1-2403328](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403328.zip) | Maintenance on Rel-18 eRedCap | Ericsson |
| [22] | [R1-2403346](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403346.zip) (38.213 CR) | Draft CR on multicast transmissions for Rel-18 RedCap in inactive mode | Huawei, HiSilicon |

RAN1#116 discussed this topic and considered the following proposal [3]:

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| --- |
| RAN1#116 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. |

The following views are expressed in the contributions to this meeting:

* Contributions [18, 22] support Option 2.
* Contribution [19] supports Option 1 for DCI format 4\_1 scrambled by G-RNTI, and Option 2 for DCI format 4\_0 scrambled by MCCH-RNTI.
* Contribution [21] proposes to discuss and down-select between the two options.

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

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| --- | --- | --- | --- |
| **Company** | **Option for G-RNTI** | **Option for MCCH-RNTI** | **Comments** |
| vivo | Option 1 | Option 1 | For simplicity and same behavior as RRC CONNECTED mode. |
| Spreadtrum | Option 1 | Option 1 | Optimization is unnecessary at this stage. |
| CMCC | Option 1 | Option 1 | Same as RRC connected behavior. |
| ZTE, Sanechips | Option 2 | Option 2 | The current spec text seems unchanged under option 2. we prefer not to introduce other spec impacts and make option as a conclusion. |
| CATT | Option 1 | Option 2 | We think current spec is close to proposal from [19]. |
| Xiaomi |  |  | Both options can work well in our view. If we go with option 1, it doesn’t mean that separate scheduling of MTCH and MCCH for multicast MBS in inactive modes is necessary for eRedCap. It only means that, if the CBW of MTCH and/MCCH for multicast MBS in inactive modes is larger than 25/12 PRBs for FG 48-1 UEs, it can be taken as an error case and UE’s behavior is up to UE implementation. There is no harmful even without any conclusion.  For option 2, considering that it has already been implemented for broadcast MBS, it is also not too complicated for multicast MBS in inactive states from the point of UE implementation view. Besides, in fact, the configuration and scheduling of multicast MBS during inactive states is just following the similar behavior as for broadcast MBS even for eMBB UEs. |
| NEC | Option 2 | Option 2 | The same behavior as broadcast seems simpler. |
| Ericsson |  |  | Fine with either option |
| LGE | Option 2 | Option 2 | It is thought that there is no reason why the behavior in RRC\_INACTIVE does not need to be different with it in RRC\_IDLE. |
| Nokia | Option 1 | Option 1 | Align with CONNECTED mode behavior. |
| DOCOMO | Option 1 | Option 1 or option 2 | Per our understanding, current specification has already captured that option 1 is applied for G-RNTI and option 2 is applied for MCCH-RNTI and we believe this work for RRC INACTIVE state. Given that this is maintenance phase, we think optimization is not necessary unless critical concern is identified.  At least, we see some additional spec impact if option 2 is applied to G-RNTI case. Therefore, we are open for MCCH-RNTI as long as option 1 is applied to G-RNTI. |
| OPPO | Option 1 | Option 1 |  |
| QC | Option 2 | Option 2 |  |
| Nordic | Option 1 | Option 1 |  |

The received responses are summarized in the table below:

|  |  |  |
| --- | --- | --- |
| **Expressed view** | **For G-RNTI** | **For MCCH-RNTI** |
| Prefers Option 1 | 8 responses | 6 responses |
| Prefers Option 2 | 4 responses | 5 responses |
| Fine with either option | 2 responses | 3 responses |

Based on the received responses, the following proposals can be considered and further down-selected in the Tuesday online session.

**FL2 High Priority Proposal 2-1b:**

* **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.**

**FL2 High Priority Proposal 2-1c:**

* **For G-RNTI, Option 1 is selected.**
* **For MCCH-RNTI, Option [1 or 2] is selected.**

There was no time to treat the above proposals in the Tuesday online session. Companies are invited to comment on Proposal 2-2a and Question 2-3a below.

**FL3 High Priority Proposal 2-2a:**

* **For G-RNTI, Option 1 is selected.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| CATT | Y |  |
|  |  |  |
|  |  |  |

**FL3 High Priority Question 2-3a:**

* **Assuming that Proposal 2-2a is agreed (i.e., Option 1 is selected for G-RNTI), which option should be selected for MCCH-RNTI?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option (1/2)** | **Comments** |
| CATT | 1 | Simplify the mechanism. Not try to over-optimize. |
|  |  |  |
|  |  |  |

# 3 Parameter name alignment

The following contribution concerns parameter name alignment:

|  |  |  |  |
| --- | --- | --- | --- |
| [6] | [R1-2402055](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402055.zip) (38.214 CR) | Draft CR for Parameter Name Alignment for R18 RedCap UEs in TS 38.214 | FUTUREWEI |

This draft CR replaces *supportOfRedCap-r18* with *supportOfERedCap* and FG 48-2 with *eRedCapNotReducedBB-BW* in 38.214 clause 5.1 and removes a return in the middle of a paragraph.

A similar parameter name alignment was made in 38.213 in RAN1#116 [3, 4]:

|  |
| --- |
| Agreement:  Adopt the proposed parameter name for alignment (replacing *supportOfRedCap-r18* with *supportOfERedCap* and replacing FG 48-2 with *eRedCapNotReducedBB-BW*).  For the editor,  Above editorial spec changes are agreeable and recommended to be incorporated into NR R18 alignment CRs for TS 38.213, please consider them in the next specification revision. |

**FL1 Medium Priority Question 3-1a: Do you agree with the proposed change in 38.214 clause 5.1? Please elaborate in the comment field.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Y/N** | **Comments** |
| vivo | Y |  |
| Spreadtrum | Y |  |
| CMCC | Y |  |
| ZTE, Sanechips | Y |  |
| CATT | Y |  |
| Xiaomi | Y |  |
| NEC | Y |  |
| Ericsson | Y |  |
| LGE | Y |  |
| Nokia | Y |  |
| DOCOMO | Y |  |
| OPPO | Y |  |
| Nordic | Y |  |
| FL2/FL3 | Based on the received responses, the following proposal can be considered.  **Medium Priority Proposal 3-1b:**   * **For the editor,**   + **Editorial spec changes in** [**R1-2402055**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402055.zip) **are agreeable and recommended to be incorporated into NR R18 alignment CR for TS 38.214, please consider them in the next specification revision.** | |
| CATT | Y |  |

# 4 Related issues

The following contribution concerns potential new eRedCap UE feature groups for MBS reception:

|  |  |  |  |
| --- | --- | --- | --- |
| [18] | [R1-2403177](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403177.zip) (Sections 4&5) | Remaining issues for UE complexity reduction for eRedCap | Qualcomm Incorporated |

The above topic is expected to be handled in the eRedCap UE feature list discussion.

# References

|  |  |  |  |
| --- | --- | --- | --- |
| [1] | [RP-233637](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_102/Docs/RP-233637.zip) | Revised WID on Enhanced support of reduced capability NR devices | Ericsson |
| [2] | [RP-233638](https://www.3gpp.org/ftp/tsg_ran/TSG_RAN/TSGR_102/Docs/RP-233638.zip) | Summary of WI on enhanced support of reduced capability NR devices | Ericsson |
| [3] | [R1-2401519](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116/Docs/R1-2401519.zip) | FL summary #2 on Rel-18 RedCap UE complexity reduction | Moderator (Ericsson) |
| [4] | [R1-2401521](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_116/Docs/R1-2401521.zip) | RAN1 agreements for Rel-18 NR RedCap | Rapporteur (Ericsson) |
| [5] | [R1-2401948](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2401948.zip) | LS on 2-step for eRedCap | RAN2, Ericsson |
| [6] | [R1-2402055](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402055.zip) | Draft CR for Parameter Name Alignment for R18 RedCap UEs in TS 38.214 | FUTUREWEI |
| [7] | [R1-2402182](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402182.zip) | Discussion on LS on 2-step for eRedCap | ZTE, Sanechips |
| [8] | [R1-2402183](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402183.zip) | Draft LS reply on 2-step for eRedCap | ZTE, Sanechips |
| [9] | [R1-2402200](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402200.zip) | Draft reply LS on 2-step RACH for eRedCap | vivo |
| [10] | [R1-2402297](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402297.zip) | Discussion on reply LS for 2-step RACH of RedCap UE | OPPO |
| [11] | [R1-2402348](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402348.zip) | Discussion on reply LS on 2-step RACH for eRedCap | CATT |
| [12] | [R1-2402413](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402413.zip) | Draft Reply LS on 2-step for eRedCap | Samsung |
| [13] | [R1-2402488](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402488.zip) | Discussion on 2-step RACH for eRedCap | vivo |
| [14] | [R1-2402642](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402642.zip) | Discussion on 2-step RACH for eRedCap | Xiaomi |
| [15] | [R1-2402802](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402802.zip) | Discussion on RAN2 LS on 2-step RA for eRedCap | CMCC |
| [16] | [R1-2402933](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2402933.zip) | Discussion on RAN2 LS on 2-step for eRedCap | NEC |
| [17] | [R1-2403164](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403164.zip) | Discussion on LS on 2-step RACH for eRedCap | Qualcomm Incorporated |
| [18] | [R1-2403177](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403177.zip) | Remaining issues for UE complexity reduction for eRedCap | Qualcomm Incorporated |
| [19] | [R1-2403221](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403221.zip) | Maintenance on further UE complexity reduction for eRedCap | NTT DOCOMO, INC. |
| [20] | [R1-2403324](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403324.zip) | On LS on 2-step for eRedCap | Ericsson |
| [21] | [R1-2403328](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403328.zip) | Maintenance on Rel-18 eRedCap | Ericsson |
| [22] | [R1-2403346](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403346.zip) | Draft CR on multicast transmissions for Rel-18 RedCap in inactive mode | Huawei, HiSilicon |
| [23] | [R1-2403362](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_116b/Docs/R1-2403362.zip) | Draft reply LS on 2-step for eRedCap | Huawei, HiSilicon |