3GPP TSG-RAN WG1 Meeting #116bis Draft R1-2403449

Changsha, China, 15th – 19th April 2024

**Agenda Item: 8.4**

**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, 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 issue in focus in the initial discussion round are furthermore tagged FL1.

Follow the naming convention in this example:

* *eRedCapFLS1-v000-FL.docx*
* *eRedCapFLS1-v001-FL-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 [R1-2401938](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.

**FL1 Question 0-1a: Please consider entering contact info below for the points of contact for this email discussion.**

|  |  |  |
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| **Company** | **Point(s) of contact** | **Email address(es)** |
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# 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** |
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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** |
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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** |
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# 3 Parameter name alignment

The following contribution concerns parameter name alignment:

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| [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]:

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| 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.**

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| **Company** | **Y/N** | **Comments** |
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# 4 Related issues

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

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| [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

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| [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 |