3GPP TSG-RAN WG1 Meeting #106-e R1-21xxxxx

e-Meeting, 16th – 27th August 2021

**Agenda Item: 8.6**

**Title: FL summary on RAN1 RRC parameter list for RedCap**

**Source: Moderator (Ericsson)**

**Document for: Discussion**

# Introduction

This feature lead (FL) summary (FLS) concerns the following email discussion for the Rel-17 work item (WI) for support of reduced capability (RedCap) NR devices [1]. RAN1 agreements for this WI are summarized in [2].

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| As announced during RAN1#106-e, there will be a number of email threads on Rel-17 RRC parameters. For each Rel-17 work item, the work item rapporteur will kick off the email thread. The email discussions on RRC parameters will start from September 1 until September 10 (of course excluding the weekend). The purpose of these email discussions is to initiate our preparations to send the first LS to RAN2 on Rel-17 RRC parameters in October (e.g. tabulate agreed RRC parameters so far and identify ones that RAN1 should discuss whether or not to define).Please note that RAN1 will NOT be making any decision with regards to the Rel-17 RRC parameters during the email discussions. Intention is to have the work item rapporteurs provide their initial assessment and collect company views if there are any. I am hoping that this discussion will help companies better prepare for RAN1#106bis-e. For each email thread, the rapporteur is to provide a tdoc collecting company views along with a draft list of RRC parameter at the end of the email discussion.The email threads and moderators are as follows:* […]
* [Post-106-e-Rel17-RRC-06] REDCAP – to be moderated by Johan (Ericsson)
* […]
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# Discussion

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| **Company** | **Comments** |
| FL1 | **Question: Please provide any comments on the draft RRC parameter list *RedCapParamList-v000.xlsx*.** |
| Huawei, HiSilicon | 1. The meaning of square bracket for ‘Parameter name in the text’ may need to be clarified, i.e. whether it is because the name is up to RAN2 such that we are not sure about those, or it is because we have not confirmed it even in RAN1 (sometimes as working assumption, e.g. the PUCCH hopping, thus preferrably not needed in the spreadsheet or needs to be calrified when sent to RAN2).
2. We suggest to focus on those requiring new RRC parameters and obvious changes to an existing RRC parameters (mainly on their candidate values, or possibly applicability with new restrictions, if agreed) for now. Given many of the optional UE features for non-RedCap UEs would remain applicable for RedCap UEs, accordingly most of the existing RRC configuraions/parameters would remain applicable as well.
	1. One example is the ’*cqi-Table*’, which in our veiw does not need to be specifically provided and the existing parameter may be reused. Although the agreements indicate that ” *... “CQI table 2” (Table 5.2.2.1-3 in TS 38.214) are supported by a RedCap UE indicating support of 256QAM for PDSCH*”, it is natually the case as existing specification.
	2. Another example is DCI format 0\_0 and 0\_1 is agreed as mandatory, and there is exisiting RRC parameter that can be reused. We may not need to specifically mention this in the spreadsheet, as FL currently does.
	3. How to handle those parameters than can be reused from existing parameters may need further discussion in a comprehensive manner.
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| ZTE, Sanechips | In row 4 and column J, if the parameter is not present, we believe it is RedCap UEs use the same initial **UL** BWP as non-RedCap UEs.Additionally, if RedCap-specific initial UL BWP is configured, we can assume that the separate PRACH is configured. Otherwise, it is meaningless to configure the separate initial UL BWP. So it is suggested that the [RedCap-specific PRACH configuration] is the precondition for [RedCap-specific initial UL BWP configuration]For the row 1, it is worth to mention that [RedCap-specific PRACH configuration] should be separate for 4-step RACH and 2-step RACH. |
| Intel | Thanks for the initial draft!Some comments listed below:* On the couple of ”Existing parameters” related to 256QAM (rows # 6 and 7), we understand that the reason they are listed here is to convey the message about being subject to UE capability (e.g., can be captured in 331 in the corresponding field description).
* We also agree with the assumption that if separate initial UL BWP is configured for RedCap UEs, RACH configuration should be provided for the separate initial UL BWP. Similarly, we need to add a PUCCH resource configuration as well for the separate initial UL BWP. In the general case, the enabling/disabling of FH for PUCCH should apply to the PUCCH resources (via a ”pucch-ConfigCommon”)that need to be configured for the separate UL BWP.

For the present, we suggest to at least add a comment to the following effect:- *Note: This parameter may be provided as part of the [pucch-ConfigCommon] configuration for the separate initial UL BWP.* |
| Spreadtrum | For “RedCap-specific PRACH configuration”, we agree with ZTE that it should be separate for 4-step RACH and 2-step RACH. Since RAN1 has only reached the agreement for 4-step RACH but not 2-step RACH yet, we suggest including RedCap-specific PRACH configuration for 4-step RACH only at this stage.For “RedCap-specific initial DL BWP configuration” and “RedCap-specific initial UL BWP configuration”, we are fine for the wording.For “Intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP enabled/disabled”, we are fine for the wording. |
| LGE | We are fine with the draft version.Regarding the dependency of the RedCap-specific initial UL BWP configuration on the RedCap-specific PRACH configuration, in our view, even if the RedCap-specific initial UL BWP configuration is present, the RedCap-specific PRACH configuration may not be present in which case RedCap UEs use the same PRACH configuration as non-RedCap UEs.On the PUCCH resource configuration for RedCap UEs within the separate initial UL BWP, as some of the details are subject to further discussion in RAN1 (e.g., enabling/disabling PUCCH frequency hopping via SIB is currently a working assumption), we prefer the RRC parameters related to PUCCH resource configuration for RedCap UEs to be added after the next RAN1 meeting. |
| Sharp | 1. We think parameter [RedCap-specific PRACH configuration] is present in [RedCap-specific initial UL BWP configuration] for scenario of seperate initial UL BWP or can also be present in BWP-Uplinkcommon for scenario of shared initial UL BWP. A part of RACH parameters included in the [RedCap-specific PRACH configuration] can be absent, which means the part of parameters configured for non-RedCap UEs can be reused. In addition, [RedCap-specific PRACH configuration] itself and its details would also be impacted by current RAN2 discussion on AI 8.18 common PRACH configuration where a Rel-17 feature and/or feature combination basis configuration are under discussion. 2. For [Intra-slot PUCCH frequency hopping within RedCap-specific initial UL BWP enabled/disabled], we agree the Note proposed from Intel is necessary and helpful. Besides, we think 38.213 should be added in the row 5 and column C because cell specific PUCCH transmission is mainly described in clause 9.2.1 of TS 38.213. |
| FL2 | The meaning of the square brackets in the spreadsheet is that something needs to be confirmed in RAN1. In the end, the final version of the spreadsheet sent to RAN2 should not contain any square brackets.**Question: Please provide any comments on the updated draft RRC parameter list *RedCapParamList-v001.xlsx*.** |
| FUTUREWEI | Thank you for leading the discussion.1. For row 2, many companies view the PRACH parameters for RedCap UE is a combination of RO / preambles. A modification is suggested: “using a separate PRACH resource and/or PRACH preamble partitioning”. The RedCap-specific PRACH configuration should also support identifying RedCap UEs needing possible improvement for DL performance.Secondly, since Msg3 early indication is under consideration in RAN2 and to avoid confusion with the term “serve”, a rephrase of the clause “where usage …” is provided belowWhen this configuration is present, it configures a RedCap-specific PRACH configuration [using a separate PRACH resource or PRACH preamble partitioning at least for 4-step RACH, FFS for 2-step RACH], where usage of the RedCap-specific PRACH configuration also provides ~~serves as~~ an early ~~RedCap UE~~ indication that the UE is a RedCap UE. If the parameter is not present, RedCap UEs use the same PRACH configuration as non-RedCap UEs. 2. For row 3, one condition may be needed. When the initial DL BWP for non-RedCap UEs has BW > maximum BW for RedCap UEs and a separate initial DL BWP for RedCap UEs is not provided, the MIB-based initial DL BWP is used for RedCap UEs.Secondly, as part of the FFS, configurations for CORESET / search spaces for RedCap UEs may be included. 3. How shared ROs are managed require further discussion in light of the discussions regards separate initial DL BWP.4. For row 5, the possibility of disabling intra-slot PUCCH frequency hopping when needed should also be listed. There should be mentioned as an FFS that some parameters may be defined within RAN1 or derived from existing RRC parameters. |
| CATT | 1. Fine with the latest modification that separating 4-step RACH and 2-step RACH.2. Regarding to the relationship between [*RedCap-specific PRACH configuration*] and [*RedCap-specific initial UL BWP configuration*], we agree with LGE and Sharp that [*RedCap-specific PRACH configuration*] may not present even if [*RedCap-specific initial UL BWP configuration*] is configured. If not present, the RedCap shares ROs with non-RedCap UE (as agreed in previous RAN1 meetings), and no need to broadcast RedCap-specific PRACH configuration. Configuring [RedCap-specific initial UL BWP configuration] at least tackles the issue when initial UL BWP for non-RedCap UE is larger than the maximum RedCap UE BW. It does not have to couple with [*RedCap-specific PRACH configuration*].3. Regarding to early indication, although RAN2 agreed to support early indication by Msg3 using LCID, there is no more details so far. We do not see any parameter to capture for now. We can leave this open and comeback later, if necessary.4. Regarding to the PUCCH hopping, although the WA only mentions disabling hopping by SIB, we believe it is the right place to include it in *PUCCH-ConfigCommon* in SIB1, as also mentioned by Intel. |
| Lenovo, Motorola Mobility | Version 001 is in general good with us. One comment is that in the agreements attained so far, the wording “configured/defined” is used for the determination of separate initial DL BWP and separate initial UL BWP for RedCap UEs (instead of clearly say “configured”). It is not clear if there is possibility to determine the position/bandwidth of an initial DL BWP and/or an initial UL BWP without explicit configuration. If majority companies think explicit configuration should be used, we can also accept it.  |
| Qualcomm | We are fine with the RRC parameters listed in Version 001.Since UL coverage enhancement and power saving solutions specified in NR R17 shall be assumed to be available to RedCap UEs by default, the corresponding RRC parameters specified for UL coverage enhancement and power saving solutions are applicable to RedCap UE by default. Because of the benefits in UE power saving and signalling overhead reduction, R17 Small Data Transfer (SDT) can be supported by RedCap UE as well in RRC INACTIVE state. The RRC parameters specified for R17 SDT can be re-used by RedCap UE. |
| FL3 | A further updated draft RRC parameter list is provided in ***RedCapParamList-v002.xlsx***. |

# References

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| [1] | [RP-211574](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_92e/Docs/RP-211574.zip) | Revised WID on support of reduced capability NR devices | Ericsson |
| [2] | [R1-2108271](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_106-e/Docs/R1-2108271.zip) | RAN1 agreements for Rel-17 NR RedCap | Rapporteur (Ericsson) |