3GPP TSG-RAN WG1 Meeting #107-e R1-2112504

e-Meeting, 11th – 19th November 2021

Agenda Item: 8.6

Title: FL summary on RAN1 RRC parameter list for Rel-17 NR RedCap

Source: Moderator (Ericsson)

Document for: Discussion, Decision

# 1 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].

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| [107-e-R17-RRC-REDCAP] Email discussion on Rel-17 RRC parameters for REDCAP – Johan (Ericsson)* Email discussion to start on November 15
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The FLS for the RAN1#106bis-e discussion on the RRC parameter list can be found in [2] and the resulting draft RRC parameter list is available in [3] and [4]. For recommendations on RRC parameter list preparation, see [5]. The issues that are in the focus of this discussion are tagged FL1 through FL5.

After the meeting, a version without change tracking was provided in ***RedCapParamList-v005***. Furthermore, an attempt was done by the FL to further update the parameter list in accordance with the latest RAN1 agreements [6]. The outcome of this exercise is provided in a version with change tracking in ***RedCapParamList-v006*** and in a version without change tracking in ***RedCapParamList-v007*** that was submitted in [7], which will be treated further in the RAN1 post-meeting email discussion [107-e-R17-RRC].

# References

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

1. [R1-2110383](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_106b-e/Docs/R1-2110383.zip), “FL summary on RAN1 RRC parameter list for Rel-17 NR RedCap”, Moderator (Ericsson)

1. [R1-2110384](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_106b-e/Docs/R1-2110384.zip), “Draft RAN1 RRC parameter list for Rel-17 NR RedCap”, Moderator (Ericsson)

1. [R1-2110680](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_106b-e/Docs/R1-2110680.zip), “Collection of higher layers parameter list for Rel-17 LTE and NR”, Moderator (Ericsson)

1. [R1-2111193](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_107-e/Docs/R1-2111193.zip), “Recommendations for RAN1 RRC Parameter Preparation”, Moderator (Ericsson)

1. [R1-2112506](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_107-e/Docs/R1-2112506.zip), “RAN1 agreements for Rel-17 NR RedCap”, Rapporteur (Ericsson)

1. [R1-2112505](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_107-e/Docs/R1-2112505.zip), “Draft RAN1 RRC parameter list for Rel-17 NR RedCap”, Moderator (Ericsson)
2.

# 2 PRACH configuration

**FL1 Question 2-1a: Companies are invited to comment on PRACH configuration parameters in *RedCapParamList-v000*.**

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| **Company** | **Comments** |
| FUTUREWEI | Since support of the optional feature 2-step RACH is agreed, the current paragraph that lists both can be listed as two paragraphs or even two RRC parameters (one for 4-step, the other for 2-step).An edit showing two paragraphs is presented. The clause "if no other UEs are also configured to use the resources" is unnecessary since RAN2 is managing the PRACH resources for RedCap.When this configuration is present, it configures a RedCap-specific PRACH configuration ~~[~~using a separate PRACH resource and/or PRACH preamble partitioning ~~at least~~ for 4-step RACH~~, FFS for 2-step RACH]~~, where usage of the RedCap-specific PRACH configuration implicitly serves as an early RedCap UE indication ~~if no other UEs are also configured to use the resources~~. If the parameter is not present, RedCap UEs use the same PRACH configuration as non-RedCap UEs. [Whether RedCap-specific PRACH configuration is applied for RedCap UE in combination with e.g. CE may need to be clarified.]When this configuration is present, it configures a RedCap-specific PRACH configuration ~~[~~using a separate PRACH resource and/or PRACH preamble partitioning ~~at least for 4-step RACH, FFS~~ for 2-step RACH~~]~~, where usage of the RedCap-specific PRACH configuration implicitly serves as an early RedCap UE indication ~~if no other UEs are also configured to use the resources~~. If the parameter is not present, RedCap UEs use the same PRACH configuration as non-RedCap UEs. [Whether RedCap-specific PRACH configuration is applied for RedCap UE in combination with e.g. CE may need to be clarified.] |
| FL2 | An updated draft parameter list has been provided in ***RedCapParamList-v001***, where the received comments on the PRACH configuration parameters have been considered.**Question 2-1b: Companies are invited to comment on PRACH configuration parameters in *RedCapParamList-v001*.** |
| Intel | For 2-step RACH, we can perhaps delete the last sentence related to CE since CE is not supported for 2-step RACH.~~[Whether RedCap-specific PRACH configuration is applied for RedCap UE in combination with e.g. CE may need to be clarified.]~~ |
| Samsung | We share similar view with Intel.For the combination with CE in 4stepRACH, we think it can up to RAN 2 since it is their design.  |
| FL3 | An updated draft parameter list has been provided in ***RedCapParamList-v002***, where the received comments on the PRACH configuration parameters have been considered, and some further cleanup has been done.**Question 2-1c: Companies are invited to comment on PRACH configuration parameters in *RedCapParamList-v002*.** |
| FL4 | An updated draft parameter list has been provided in ***RedCapParamList-v003*** (no changes to the PRACH configuration parameters compared to previous version).**Question 2-1d: Companies are invited to comment on PRACH configuration parameters in *RedCapParamList-v003*.** |
| FL5 | An updated draft parameter list has been provided in ***RedCapParamList-v004***, (no changes to the PRACH configuration parameters compared to previous version). |

# 3 Initial DL BWP configuration

**FL1 Question 3-1a: Companies are invited to comment on initial DL BWP configuration parameters in *RedCapParamList-v000*.**

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| **Company** | **Comments** |
| FUTUREWEI | It is unclear how option 2 is captured for a separate initial DL BWP is used for random access as per* + For a separate initial DL BWP (if it does not include CD-SSB and the entire CORESET#0) from RAN1 perspective,
		- If it is configured for random access while not for paging in idle/inactive mode, RedCap UE does NOT expect it to contain SSB/CORESET#0/SIB.
		- Note: RAN1 assumes REDCAP UE performing Random access in the separate DL BWP does not need to monitor paging in a BWP containing CORESET#0

If High Priority Proposal 3-2d (or a modified version) is agreed, then the square brackets need to be removed |
| FL2 | An updated draft parameter list has been provided in ***RedCapParamList-v001***, but the initial DL BWP configuration parameters have not been updated, since further RAN1 agreements are needed.**Question 3-1b: Companies are invited to comment on initial DL BWP configuration parameters in *RedCapParamList-v001*.** |
| Samsung | For the following highligh text, . [When the parameter is not present, RedCap UEs use the same SIB-configured initial DL BWP as non-RedCap UEs if it does not exceed the RedCap UE maximum bandwidth, otherwise the RedCap UEs will continue using the MIB-configured initial DL BWP.]We don’t think MIB will configure a initial DL BWP. Therefore, we suggest to change it to the following. Because, initial not only frequency but also other parameter, which is not configure by MIB. While in our understanding, if the proposal can be agreed in AI 8.6.1.1, RedCap will use the same parameter as SIB-configured initial DL BWP, except *locationAndBandwidth.* [When the parameter is not present, RedCap UEs use the same SIB-configured initial DL BWP as non-RedCap Ues. if the bandwith of SIB-configured iniital DL BWP does not exceed the RedCap UE maximum bandwidth, the UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*, otherwise the RedCap UEs will continue to keep CORESET #0 as the frequeny position for initial DL BWP.]Reference from 331***initialDownlinkBWP***The initial downlink BWP configuration for a PCell. The network configures the *locationAndBandwidth* so that the initial downlink BWP contains the entire CORESET#0 of this serving cell in the frequency domain. The UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment*. |
| FL3 | An updated draft parameter list has been provided in ***RedCapParamList-v002***, but the initial DL BWP configuration parameters have not been updated since further RAN1 agreements are needed, but some cleanup has been done.**Question 3-1c: Companies are invited to comment on initial DL BWP configuration parameters in *RedCapParamList-v002*.** |
| FL4 | An updated draft parameter list has been provided in ***RedCapParamList-v003*** (no changes to the initial DL BWP configuration parameters compared to previous version).**Question 3-1d: Companies are invited to comment on initial DL BWP configuration parameters in *RedCapParamList-v003*.** |
| HW, HiSi | We are OK to send RAN2 with LS including this parameter of *RedCap-specific initial DL BWP configuration*, although we unfortunately do not feel the parameter including its useage could be claimed as stable. When it is present, it is not clear whether it is actually only agreed for the scenario that CORESET#0 is contained; it is not clear its application is valid in case of not containing CORESET#0 and it is still WA for paging; when incuding COREET#0, it is not clear whether it subjects to restriction due to e.g. centre frequency location; when it is not present, the whole details are currently in [ ] however the agreements actually said network can (thus can also not-)configure this parameter. The current ‘description‘ can be misleading, which reads like the function is relatively complete for the case “when this configuration is present“. We may suggest rapporteur to add some high level notes for these unstable asepcts in Comment column. |
| Nordic  | There is no agreement for the following, and should be removed for now. Thanks.[When the parameter is not present, RedCap UEs use the same SIB-configured initial DL BWP as non-RedCap UEs if it does not exceed the RedCap UE maximum bandwidth. ~~otherwise the RedCap UEs will continue using the MIB-configured initial DL BWP.]~~Also this wording from Samsung is more precise.[When the parameter is not present, RedCap UEs use the same SIB-configured initial DL BWP as non-RedCap Ues. if the bandwith of SIB-configured iniital DL BWP does not exceed the RedCap UE maximum bandwidth, the UE applies the *locationAndBandwidth* upon reception of this field (e.g. to determine the frequency position of signals described in relation to this *locationAndBandwidth*) but it keeps CORESET#0 until after reception of *RRCSetup*/*RRCResume/RRCReestablishment]* |
| FL5 | An updated draft parameter list has been provided in ***RedCapParamList-v004***, where the received comments on the initial DL BWP configuration parameters have been considered, and the row is marked as Unstable in column R. |

# 4 Initial UL BWP configuration

**FL1 Question 4-1a: Companies are invited to comment on initial UL BWP configuration parameters in *RedCapParamList-v000*.**

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| **Company** | **Comments** |
| FUTUREWEI | The paragraph for the separate initial UL BWP is a good starting point for the RRC parameter. |
| FL2 | An updated draft parameter list has been provided in ***RedCapParamList-v001***, without any updates to the UL BWP configuration parameters.**Question 4-1b: Companies are invited to comment on initial UL BWP configuration parameters in *RedCapParamList-v001*.** |
| Samsung | For intial UL BWP, we think the value can be up to RAN 2. |
| FL3 | An updated draft parameter list has been provided in ***RedCapParamList-v002***, where the received comments on the initial UL BWP configuration parameters have been considered, and some further cleanup has been done.**Question 4-1c: Companies are invited to comment on initial UL BWP configuration parameters in *RedCapParamList-v002*.** |
| FL4 | An updated draft parameter list has been provided in ***RedCapParamList-v003*** (no changes to the initial UL BWP configuration parameters compared to previous version).**Question 4-1d: Companies are invited to comment on initial UL BWP configuration parameters in *RedCapParamList-v003*.** |
| FL5 | An updated draft parameter list has been provided in ***RedCapParamList-v004***, (no changes to the initial UL BWP configuration parameters compared to previous version). |

# 5 PUCCH configuration

**FL1 Question 5-1a: Companies are invited to comment on PUCCH configuration parameters in *RedCapParamList-v000*.**

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| **Company** | **Comments** |
| FUTUREWEI | This parameter description will need to be revised to capture the discussions in 8.6.1.1 (High Priority Proposal 8-1e or later). There may be parameters indicating which resource is used (e.g. which side of the separate initial UL BWP the PUCCH resources are located, any offset)  |
| FL2 | An updated draft parameter list has been provided in ***RedCapParamList-v001***, but the PUCCH configuration parameters have not been updated, since further RAN1 agreements are needed.**Question 5-1b: Companies are invited to comment on PUCCH configuration parameters in *RedCapParamList-v001*.** |
| FL3 | An updated draft parameter list has been provided in ***RedCapParamList-v002***, where some cleanup has been done.**Question 5-1c: Companies are invited to comment on PUCCH configuration parameters in *RedCapParamList-v002*.** |
| FL4 | An updated draft parameter list has been provided in ***RedCapParamList-v003***, with updates to capture the following RAN1#107-e agreements:Agreement:* In Rel-17, up to 1 separate initial UL BWP for RedCap can be configured.

Agreement:* When the frequency hopping for the RedCap PUCCH resources (for HARQ feedback for Msg4/MsgB) is deactivated,
	+ Each PUCCH resource is mapped to a single PRB.
	+ What side[(s)] of the RedCap UL BWP center frequency to which PUCCH resources are mapped is[/are] configurable by the network, including SIB-configurable [additional] offset (with no more than [4] candidate values) ~~from edge~~ using the existing equations for determining the PRB index of the PUCCH transmission as a starting point.
* RedCap and non-RedCap can be configured with the same or different PUCCH resource set indices (see TS 38.213 Table 9.2.1-1).

The information for parameter on row 6 has been updated in columns M and N, and two new parameters have been inserted on rows 7-8 in ***RedCapParamList-v003*** and are indicated as New-Unstable in column R.**Question 5-1d: Companies are invited to comment on PUCCH configuration parameters in *RedCapParamList-v003*.** |
| FL5 | An updated draft parameter list has been provided in ***RedCapParamList-v004***, (no changes to the PUCCH configuration parameters compared to previous version). |

# 6 CQI/MCS table configuration

**FL1 Question 6-1a: Companies are invited to comment on CQI/MCS table configuration parameters in *RedCapParamList-v000*.**

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| **Company** | **Comments** |
| FUTUREWEI | It is unclear why these two rows are needed – the agreements are not even about RRC parameters. With the notes being proposed in the feature discussion and possibly indicated in a LS reply, the feature description will capture the agreements about the tables. Our proposal is to remove these two rows.  |
| FL2 | An updated draft parameter list has been provided in ***RedCapParamList-v001***, but the CQI/MCS table configuration parameters have not been updated. The received comments propose to remove these rows since CQI/MCS table related agreements are bring discussed in the UE capability related discussions (under RAN1#107-e agenda item 8.16.6), but it should be noted that the rows in this draft parameter list concern configuration parameters and their descriptions, not capabilities and their descriptions. **Question 6-1b: Companies are invited to comment on CQI/MCS table configuration parameters in *RedCapParamList-v001*.** |
| FUTUREWEI | Yes, our point is that the agreement is with respect to capability and NO update is needed to the configuration parameters. These can be configured exactly as in legacy. So the rows should be removed. |
| Intel | Agree with the FL that it would be necessary to list the parameters here as the applicability to RedCap is slightly different as captured in the Description column. Note that these are identified as „Existing“ parameter.  |
| FL3 | An updated draft parameter list has been provided in ***RedCapParamList-v002***, but the CQI/MCS table configuration parameters have not been modified.**Question 6-1c: Companies are invited to comment on CQI/MCS table configuration parameters in *RedCapParamList-v002*.** |
| FL4 | An updated draft parameter list has been provided in ***RedCapParamList-v003*** (no changes to the CQI/MCS table configuration parameters compared to previous version).**Question 6-1d: Companies are invited to comment on CQI/MCS configuration parameters in *RedCapParamList-v003*.** |
| FL5 | An updated draft parameter list has been provided in ***RedCapParamList-v004***, (no changes to the CQI/MCS table configuration parameters compared to previous version). |

# 7 Other comments

**FL4 Question 7-1a: Companies are invited to provide any other comments they might have on RRC parameters for RedCap.**

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| **Company** | **Comments** |
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