**3GPP TSG-RAN WG2 Meeting #126 R2- 2405835**

**Fukuoka, Japan, 20th May – 25th May 2024**

**Agenda item: 6.1.3.1**

**Source: ZTE Corporation**

**Title: Report of [AT126][756][Maint] PDCCH order based CFRA and SI request (ZTE)**

**Document for: Discussion and Decision**

# Introduction

This document provides the summary of below offline discussion:

* [AT126][756][Maint] PDCCH order based CFRA and SI request (ZTE)

Scope:

* + - Discuss how to address the issue that this CR is handling. Produce agreeable CRs, for both MAC and RRC (whichever are needed).

      Intended outcome:

* + - Agreed CRs in R2-2405833, R2-2405834, R2-2405835, and R2-2405836 (ZTE)

     Deadline:

* + - Friday

# Issue 1: RRC change for PDCCH-order based CFRA

For clarifying which RACH-ConfigCommon is used for PDCCH order based CFRA, all companies have the same understanding that the RACH resource selection procedure specified in MAC spec is followed. However, companies have different view on the spec change, the proposed RRC change in R2-2405032 is shown below:

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| ***rach-ConfigCommon***  Configuration of cell specific random access parameters which the UE uses for contention based and contention free random access as well as for contention based beam failure recovery in this BWP. The NW configures SSB-based RA (and hence *RACH-ConfigCommon*) only for UL BWPs if the linked DL BWPs (same *bwp-Id* as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial DL BWP or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB* or the RedCap-specific initial downlink BWP. The network configures *rach-ConfigCommon* (without suffix) and/or *rach-ConfigCommon-r17*, whenever it configures contention free random access, the UE then applies the corresponding configuration depending on the RACH resource set selected upon RACH initialization, as specified in TS 38.321 [3]. For RedCap-specific initial uplink BWP, *rach-ConfigCommon* is always configured when *msgA-ConfigCommon* is configured in this BWP. |

During the offline discussion, one company (Huawei) has concern on removing the bracket, and suggest to add PDCCH order to the bracket, in addition, in order to cover other CFRA cases that introduced in future release, it is recommended to add “e.g.” to the bracket.

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| ***rach-ConfigCommon***  Configuration of cell specific random access parameters which the UE uses for contention based and contention free random access as well as for contention based beam failure recovery in this BWP. The NW configures SSB-based RA (and hence *RACH-ConfigCommon*) only for UL BWPs if the linked DL BWPs (same *bwp-Id* as UL-BWP) are the initial DL BWPs or DL BWPs containing the SSB associated to the initial DL BWP or for RedCap UEs DL BWPs associated with *nonCellDefiningSSB* or the RedCap-specific initial downlink BWP. The network configures *rach-ConfigCommon* (without suffix) and/or *rach-ConfigCommon-r17*, whenever it configures contention free random access (e.g. for reconfiguration with sync or for beam failure recovery or PDCCH order), the UE then applies the corresponding configuration depending on the RACH resource set selected upon RACH initialization, as specified in TS 38.321 [3]. For RedCap-specific initial uplink BWP, *rach-ConfigCommon* is always configured when *msgA-ConfigCommon* is configured in this BWP. |

Proposal 1: Update the RRC CRs (R2-2405052 and R2-2405053) to reflect below change:

* “whenever it configures contention free random access (e.g. for reconfiguration with sync or for beam failure recovery or PDCCH order),”

# Issue 2: Which RACH-ConfigCommon is selected for R17 SI-request in RedCap-specific initial BWP

For Issue 2, there are two approaches:

**Approach 1: Keep Rel-17 MAC spec as it is, which means the RACH-ConfigCommon that not associated with any feature will be selected for the SI-request in RedCap-specific initial BWP.**

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| *Extracted from TS 38.321 v17.8.0, clause 5.1.1b*  1> if neither contention-free Random Access Resources nor Random Access Resources for SI request have been provided for this Random Access procedure and one or more of the features including RedCap and/or Slicing and/or SDT and/or MSG3 repetition is applicable for this Random Access procedure:  \*\*\*\*skip non-related part \*\*\*  1> else if contention-free Random Access Resources have been provided for this Random Access procedure and RedCap is applicable for the current Random Access procedure and there is one set of Random Access resources available that is only configured with RedCap indication:  2> select this set of Random Access resources for this Random Access procedure.  1> else:  2> select the set of Random Access resources that are not associated with any feature indication (as specified in clause 5.1.1c) for the current Random Access procedure. |

**Approach 2: Update Rel-17 MAC spec, the RACH-ConfigCommon that associated with RedCap only will be selected for the SI-request in RedCap-specific initial BWP.**

The possible MAC change is shown below:

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| *Update based on Xiaomi’s CR in R2-2405554*  1> else if contention-free Random Access Resources have been provided for this Random Access procedure and RedCap is applicable for the current Random Access procedure and there is one set of Random Access resources available that is only configured with RedCap indication:  2> select this set of Random Access resources for this Random Access procedure.  1> else if Random Access Resources for SI request have been provided for this Random Access procedure on the RedCap-specific initial UL BWP and there is one set of Random Access resources available that is only configured with RedCap indication:  2> select this set of Random Access resources for this Random Access procedure.  1> else:  2> select the set of Random Access resources that are not associated with any feature indication (as specified in clause 5.1.1c) for the current Random Access procedure. |

During the offline, 4 companies (ZTE, Ericsson, LG and Xiaomi) are OK with approach 2, because for approach 1, in RedCap-specific initial BWP, when the network configures a feature other than RedCap, all the RACH partitions that associated with RedCap indication, but in order to enable Msg1-based SI-request in RedCap-specific initial BWP, the network needs to configure a RACH partition that not associated with any feature, and this partition will never be used by RedCap UEs.

However, 2 companies (Samsung and Huawei) have strong concern on Approach 2 because they think Approach 2 is NBC for UE implementation. Since there is NBC concern, companies compromise and decide to go for Approach 1.

Proposal 2: Confirm for SI-request without Msg1 repetition in RedCap-specific initial BWP, the UE selects the RACH-ConfigCommon that not associated with any feature (no change to R17 MAC spec).

Regarding the RRC spec change, all companies are OK with the changes proposed in R2-2405052 and R2-2405052 (see below). During offline, one company also suggests to clarify in CR cover page that “initial uplink BWP” covers both legacy initial BWP and RedCap-specific initial BWP.

R17

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| *SI-RequestConfig* field descriptions |
| ***rach-OccasionsSI***  Configuration of dedicated RACH Occasions for SI. If the field is absent, the UE uses the corresponding parameters configured in *rach-ConfigCommon* corresponding to the RACH resource set selected upon RACH initialization (as specified in TS 38.321 [3]), of the initial uplink BWP. |

R18

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| S*I-RequestConfigRepetition* field descriptions |
| ***rach-OccasionsSI***  Configuration of dedicated RACH Occasions for SI. If the field is absent, the UE uses the corresponding parameters configured in *rach-ConfigCommon* corresponding to the RACH resource set selected upon RACH initialization (as specified in TS 38.321 [3]), of the initial uplink BWP. |

Proposal 3: Agree the change to FD of rach-OccasionsSI in CR R2-2405052 and R2-2405053, update the CR cover page to clarify that “initial uplink BWP” covers both legacy initial uplink BWP and RedCap-specific initial uplink BWP.

In addition, for approach 1, in RedCap-specific initial BWP, since network needs to configure RACH resources that not associated with any feature for SI-request, the possible RRC configuration can be one of below:



But for either Option 1 or Option 2, to avoid wasting CB preambles (indicated by R15 rach-ConfigCommon IE), it is unclear whether the network can configure preamble starts from 0 for the RA partition that associated with feature. Since no consensus can be reached during offline, it is proposed to capture the FFS in meeting minutes, so companies can discuss it in next meeting.

Please note, the intention is to align the understanding between network and UE, so inter-operability issue can be avoided.

Proposal 4: FFS for the redcap specific initial uplink BWP, whether the CB preambles in “RA partition not associated with any feature can be configured in another RA partition sharing the ROs. (can be discussed in next meeting)

For proposal 1 and 3, rapporteur will provide the updated CRs for further review.

# Conclusion

The proposals for this offline are:

Proposal 1: Update the RRC CRs (R2-2405052 and R2-2405053) to reflect below change:

* “whenever it configures contention free random access (e.g. for reconfiguration with sync or for beam failure recovery or PDCCH order),”

Proposal 2: Confirm for SI-request without Msg1 repetition in RedCap-specific initial BWP, the UE selects the RACH-ConfigCommon that not associated with any feature (no change to R17 MAC spec).

Proposal 3: Agree the change to FD of rach-OccasionsSI in CR R2-2405052 and R2-2405053, update the CR cover page to clarify that “initial uplink BWP” covers both legacy initial uplink BWP and RedCap-specific initial uplink BWP.

Proposal 4: FFS for the redcap specific initial uplink BWP, whether the CB preambles in “RA partition not associated with any feature can be configured in another RA partition sharing the ROs. (can be discussed in next meeting)