**3GPP TSG-RAN WG2 Meeting #118-e (draft) R2-220xxxx**

**Online, 09 – 20 May 2022**

**Agenda Item: 8.19.2**

**Source: ZTE Corporation**

**Title: [AT117-e][118][CovEnh] MAC CR (ZTE)**

**Document for: Discussion and decision**

# Introduction

This document summarizes the following offline discussion.

* [AT118-e][118][CovEnh] MAC CR (ZTE)

Scope: Update MAC CR considering the submitted contributions

Intended outcome: Agreeable MAC CR

Deadline (for companies' feedback): Thursday 2022-05-19 12:00 UTC

Deadline (for final CR in R2-2206412): Friday 2022-05-20 08:00 UTC

In this offline document, we discuss the following contributions:

38.321 CRs

[R2-2204739](file:///C:\Data\3GPP\Extracts\R2-2204739%20-%20Correction%20to%2038.321%20on%20redundancy%20version%20for%20Msg3%20repetition.doc) Correction to 38.321 on redundancy version for Msg3 repetition OPPO CR Rel-17 38.321 17.0.0 1227 - F NR\_cov\_enh-Core

* Continue in offline 118

[R2-2205067](file:///C:\Data\3GPP\Extracts\R2-2205067%20Clarification%20on%20Msg3%20repetition%20RV%20determination%20to%20MAC%20spec.doc) Clarification on Msg3 repetition RV determination to MAC spec Huawei, HiSilicon CR Rel-17 38.321 17.0.0 1251 - F NR\_cov\_enh-Core

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In addition, we will also discuss the potential MAC spec impact for supporting CE only BWP.

# Contact from companies

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| --- | --- |
| Company | Email |
| Samsung | Anil Agiwal (anilag@samsung.com) |
| Qualcomm | Linhai He (linhaihe@qti.qualcomm.com) |
| LG Electronics | Gyeong-Cheol LEE (gyeongcheol.lee@lge.com) |
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| Huawei, HiSilicon | Chong Lou (louchong@huawei.com) |

# Discussion

## Redundancy version for Msg3 repetition

In current MAC spec, the redundancy version (RV) is applied on the nth transmission occasion within a bundle of dynamic grant or configure grant. In R2-2204739[1] and R2-2205067[2], companies pointed out the redundancy version for Msg3 repetition is agreed, and it is specified in RAN1 spec as follows, So [1][2] propose to update the MAC CR to also capture this scenario.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| ***from TS 38.214 clause 6.1.2.1***  For a PUSCH transmission scheduled by DCI format 0\_1, or 0\_2, or 0\_0 with CRC scrambled by TC-RNTI, the redundancy version to be applied on the *n*th transmission occasion of the TB, where n = 0, 1, …-1, is determined according to table 6.1.2.1-2.  For a PUSCH transmission of a PUSCH repetition Type A scheduled by RAR UL grant, the redundancy version to be applied on the *n*th transmission occasion of the TB, where n = 0, 1, …-1, is determined according to the first row of Table 6.1.2.1-2.  Table 6.1.2.1-2: Redundancy version for PUSCH transmission   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *rvid* indicated by the DCI scheduling the PUSCH | *rvid* to be applied to *n*th transmission occasion (repetition Type A) or TB processing over multiple slots) or *n*th actual repetition (repetition Type B) | | | | | *((n-(n mod N))/N)* mod 4 = 0 | *((n-(n mod N))/N)* mod 4 = 0 | *((n-(n mod N))/N)* mod 4 = 0 | *((n-(n mod N))/N)* mod 4 = 0 | | 0 | 0 | 2 | 3 | 1 | | 2 | 2 | 3 | 1 | 0 | | 3 | 3 | 1 | 0 | 2 | | 1 | 1 | 0 | 2 | 3 | |

**Q1. Do company agree with the intention of CRs in [1][2]?**

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| --- | --- | --- |
| **Company** | **Yes or No** | **Comments** |
| Samsung | Yes |  |
| Qualcomm | Yes |  |
| LGE | Yes |  |
| Nokia | Yes |  |
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If answer “Yes” to Q1, regarding the MAC TP, the content of [1][2] are given as below:

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| *from R2-2204739[1]*  5.4.2.1 HARQ Entity  \*\*\*omit non-related part\*\*\*  For each transmission within a bundle of the dynamic grant or uplink grant received in a MAC RAR, the sequence of redundancy versions is determined according to clause 6.1.2.1 of TS 38.214 [7]. For each transmission within a bundle of the configured uplink grant, the sequence of redundancy versions is determined according to clause 6.1.2.3 of TS 38.214 [7].  *from R2-2205067[2]*  5.4.2.1 HARQ Entity  \*\*\*omit non-related part\*\*\*  For each transmission within a bundle of the dynamic grant, the sequence of redundancy versions is determined according to clause 6.1.2.1 of TS 38.214 [7]. For each transmission within a bundle of the configured uplink grant, the sequence of redundancy versions is determined according to clause 6.1.2.3 of TS 38.214 [7]. For each transmission within a bundle of the uplink grant received in a MAC RAR, the sequence of redundancy versions is determined according to clause 6.1.2.1 of TS 38.214 [7]. |

**Q2. Which TP do you prefer, [1] or [2]? (Please elaborate your comment if you prefer other wording)**

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| --- | --- | --- |
| **Company** | **[1] or [2]** | **Comments** |
| Samsung | [2] |  |
| Qualcomm | [1] | We think two TPs are technically correct but the TP in [1] is simpler |
| LGE | [2] |  |
| Nokia | [2] | Better to refer to RAN1 specification. |
| Huawei, HiSilicon | [2] | We prefer not to touch the legacy text, so additive sentence for new case is better. |

## CE only BWP

Based on RAN1 feedback, RAN2 confirms the feasibility of supporting CE only BWP in R17, regarding how to specify CE only BWP and corresponding UE behaviour, it is now discussed under offline-103, and the following 3 options are provided.

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| Option 1: If the BWP selected for the Random Access procedure is only configured with CE RACH resources, the UE shall assume Msg3 repetition is applicable for the current Random Access resources as in R2-2205841 and R2-2205068;  Option 2: If the BWP selected for the Random Access procedure is NOT configured with rsrp-ThresholdMsg3, the UE shall assume Msg3 repetition is applicable for the current Random Access resources as in R2-2205851;  Option 3: If the BWP selected for the Random Access procedure is only configured with CE RACH resources, the network shall set the value of rsrp-ThresholdMsg3 to infinity as commented online. |

Regarding above 3 options, Option 1 has MAC spec impact as pointed out in [3][4]. For Option 2, it also affect MAC spec, because the UE is not required to evaluate rsrpThresholdMsg3, but Option 3 has no MAC impact, because there is no special handling at UE side, just the rsrp-ThresholdMsg3 will be set to a very large value so the UE always meets the criterion.

However, besides offline-103, rapporteur noticed the similar issue is also discussed under offline-507 and offline-508 in RACH common session. So rapporteur suggests to wait for the progress in other offline discussion. No question on MAC TP regarding CE only BWP is provided in this version of document.

## Other

Except redundancy version and CE-only BWP, any other changes to MAC spec?

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| **Company** | **Comments** |
| Qualcomm | R2-2206034  Proposal. Downselect the following two options:  Option 1. In a UL BWP with RACH resources only for Msg3 repetition, if repetition factor K=1 is not one of the candidate repetition factors, it is up to UE implementation whether to perform RACH in this UL BWP or in initial UL BWP (after BWP switch);  Option 2. Repetition factor K=1 is always configured for a UL BWP with RACH resources only for Msg3 repetition. |
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# Conclusions

*TBD*

# Reference

1. R2-2204739 Correction to 38.321 on redundancy version for Msg3 repetition OPPO CR Rel-17 38.321 17.0.0 1227 - F NR\_cov\_enh-Core
2. R2-2205067 Clarification on Msg3 repetition RV determination to MAC spec Huawei, HiSilicon CR Rel-17 38.321 17.0.0 1251 - F NR\_cov\_enh-Core
3. R2-2205841 CE RACH only BWP handling Nokia, Nokia Shanghai Bell CR Rel-17 38.321 17.0.0 1289 - F NR\_cov\_enh-Core
4. R2-2205068 Discussion on the leftover issues for CE-specific RACH Huawei, HiSilicon discussion Rel-17 NR\_cov\_enh-Core