**3GPP TSG-RAN WG1 Meeting #104b-e R1-210xxxx**

**e-Meeting, April 12th – 20th, 2021**

**Agenda Item: 7.2.1**

**Source: Moderator (ZTE)**

**Title: FL summary on the maintenance of 2-step RACH**

**Document for: Discussion**

# Introduction

This document contains the summary of issues related to the maintenance of Rel-16 2-step RACH WI in RAN1#104b-e meeting.

# Maintenance issues

The following 3 issues are identified based on the submitted contributions in RAN1#104b-e.

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| Issue # | Description | Related TDoc # |
| 1 | Correction on the configuration of RACH-related power control parameters | R1-2103403 |
| 2 | Editorial corrections on the DMRS description for MsgA | R1-2103495 |
| 3 | Determination of power control parameter in case of 2-step RACH only operation | R1-2103680, TP#1 |
| 4 | Determination of PUSCH waveform in case of 2-step RACH only operation | R1-2103680, TP#2 |

# Summary

It seems be rather straightforward to include all the above issues in a single email thread. Therefore the following email discussion is proposed (will be updated based on companies’ feedback, if any).

Proposed Email thread #1:

Corrections of 2-step RACH related issues

* CR in R1-2103403, CR in R1-2103495 and two TPs in R1-2103680

Any comments?

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| Company | Comment |
| Samsung | We think in general it may be no harmful to discuss the raised issues. But we still want ask few questions regarding on following two Tdocs. CR in R1-2103403 –>in the early part of section 7.1.1, there is already conditions for setting , and the change of order of *msg3-alpha* did not change the behavior comparing with old version. The “elseif” part was saying when *msgA-alpha* is not configured, and *msg3-alpha*, we will use *msg3-alpha*. It seems no difference comparing what we have now.TP in R1-2103680 -> For proposal 1, 38.213 clearly specifies the j=0 for “for a PUSCH transmission for Type-2 random access procedure as described in Clause 8.1A”, how will it be j=1 or other value?For proposal 2, if a BWP has no configuration of 2stepRACH and 4step RACH, what will be the waveform? This issue is handled regardless of 2step RACH, e.g., a BWP may or may not have 4step RACH, so how UE decides the waveform of CG-PUSCH, because 4step RACH in initial BWP will be always there. The TP here seems introducing new functions/behaviours with msgA-transformPrecoder. |
| CATT | We are fine with FL proposal on discussing about 3 submitted TDocs by a single email thread. |
| Huawei | OK with FL proposal.A quick response to Samsung: the interpretation of “=” in the equation of concerned texts may be misleading, in the sense that “=” only cares about the final results so that when the two delta values are the same then there could be the case that the “if” and “elseif” condition does not differentiate. So the intention is just to make it clear that the behavior is to check how is determined by, rather than what value is. |
| Ericsson | Fine with FL proposal.Some response to Samsung from our side as well: The proposal 1 and proposal 2 are for the configuration for a normal PUSCH when only 2-step RACH is configured, i.e. for configuration .For proposal 2, for 2-step RACH only case, there will be no 4-step RACH configured. You can find that both 4-step RACH and 2-step RACH are optional in the RRC spec. BWP-UplinkCommon ::= SEQUENCE { genericParameters BWP, rach-ConfigCommon SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M pusch-ConfigCommon SetupRelease { PUSCH-ConfigCommon } OPTIONAL, -- Need M pucch-ConfigCommon SetupRelease { PUCCH-ConfigCommon } OPTIONAL, -- Need M ..., [[ rach-ConfigCommonIAB-r16 SetupRelease { RACH-ConfigCommon } OPTIONAL, -- Need M useInterlacePUCCH-PUSCH-r16 ENUMERATED {enabled} OPTIONAL, -- Need R msgA-ConfigCommon-r16 SetupRelease { MsgA-ConfigCommon-r16 } OPTIONAL -- Cond SpCellOnly2 ]]} |
| Qualcomm | Agree with the proposal of FL. |
| Apple | Agree with FL’s proposal. |

# References

1. R1-2103403 Correction on the configuration of RACH-related power control parameters Huawei, HiSilicon
2. R1-2103495 Editorial corrections on the DMRS description for MsgA ZTE, Sanechips
3. R1-2103680 Discussion on corrections for 2-step RACH Ericsson

# Appendix

List of proposals in the submitted contributions.

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| TDoc | Proposals |
| R1-2103403Huawei | **Reason for change:** 1. The *msgA-Alpha* and *msg3-Alpha* should be used for the PUSCH transmission of 2-step RACH and 4-step RACH, respectively. However, according to current TS 38.213, when both 2-step RACH and 4-step RACH are configured, and is equal to , *msgA-Alpha* will be used for both 2-step RACH and 4-step RACH.

----------------------------Uplink Power control7.1 Physical uplink shared channel7.1.1 UE behaviour\*\*\* Unchanged text is omitted \*\*\*- For - For , - if is determined by and , and *msgA-Alpha* is provided, is the value of *msgA-Alpha*- elseif- is determined by and , or *msgA-Alpha* is not provided, and - *msg3-Alpha* is provided, -  is the value of *msg3-Alpha*- else, \*\*\* Unchanged text is omitted \*\*\* |
| R1-2103495ZTE | **Reason for change**: Some typos and copy-paste errors were found in the latest specification for the description of DMRS configurations for MsgA.-----------------------------------------< Unchanged parts are omitted >For PUSCH mapping type A, - the case *dmrs-AdditionalPosition* equals to 'pos3' is only supported when *dmrs-TypeA-Position* is equal to 'pos2';- symbols in Table 6.4.1.1.3-4 is only applicable when *dmrs-TypeA-Position* is equal to 'pos2'.For msgA transmitted using PUSCH mapping type A, - the case *msgA-DMRS-AdditionalPosition* equals to 'pos3' is only supported when *dmrs-TypeA-Position* is equal to 'pos2';- *'dmrs-AdditionalPosition*' in Tables ~~Tables~~ 6.4.1.1.3-3 to 6.4.1.1.3-6 shall be replaced by *msgA-DMRS-AdditionalPosition;*- only PUSCH DM-RS configuration type 1 is supported.For msgA transmitted using PUSCH mapping type B, - '*dmrs-AdditionalPosition*' in Tables 6.4.1.1.3-3 to 6.4.1.1.3-6 shall be replaced by *msgA-DMRS-AdditionalPosition*;- only PUSCH DM-RS configuration type 1 is supported.< Unchanged parts are omitted > |
| R1-2103680Ericsson | 1. In case of 2-step RACH only operation, when p0-AlphaSets is not provided, for power control of normal PUSCH, P0-nominal and alpha for msgA PUSCH are used, according to TP1.

------------------------- TP1 of 38.213 V16.5.0 -----------------------------------------7.1.1 UE behaviour\*\*\* unchanged text omitted\*\*\*- For - For , - if and *msgA-Alpha* is provided, is the value of *msgA-Alpha*- elseif or *msgA-Alpha* is not provided, and *msg3-Alpha* is provided,  is the value of *msg3-Alpha*- else, - For ,  is provided by *alpha* obtained from *p0-PUSCH-Alpha* in *ConfiguredGrantConfig* providing an index *P0-PUSCH-AlphaSetId* to a set of *P0-PUSCH-AlphaSet* for active UL BWP  of carrier  of serving cell - For , a set of  values are provided by a set of *alpha* in *P0-PUSCH-AlphaSet* indicated by a respective set of *p0-PUSCH-AlphaSetId* for active UL BWP  of carrier  of serving cell - If the UE is provided *SRI-PUSCH-PowerControl* and more than one values of *p0-PUSCH-AlphaSetId*, and if a DCI format scheduling the PUSCH transmission includes an SRI field, the UE obtains a mapping from *sri-PUSCH-PowerControlId* in *SRI-PUSCH-PowerControl* between a set of values for the SRI field in the DCI format [5, TS 38.212] and a set of indexes provided by *p0-PUSCH-AlphaSetId* that map to a set of *P0-PUSCH-AlphaSet* values and determines the values of  from the *p0-PUSCH-AlphaSetId* value that is mapped to the SRI field value- If the PUSCH transmission except for the PUSCH retransmission corresponding to a RAR UL grant is scheduled by a DCI format that does not include an SRI field, or if *SRI-PUSCH-PowerControl* is not provided to the UE, , and the UE determines  from the value of the first *P0-PUSCH-AlphaSet* in *p0-AlphaSets*- For or if *P0-PUSCH-AlphaSet* is not configured, the UE uses the *P0-nominal* and *msg3-Alpha* configured for msg3 PUSCH if a Type-1 random access is configured for the BWP or uses the *P0-nominal* and *msgA-Alpha* for msgA PUSCH if a Type-1 random access procedure is not configured for the BWP.\*\*\* unchanged text omitted\*\*\*---------------------------------- TP1 of 38.213 V16.5.0 ----------------------------------------1. In case of 2-step RACH only operation, when *transformPrecoder* is not provided, waveform of normal PUSCH is determined based on *msgA-transformPrecoder* according to TP2.

------------------------------- TP2 of 38.214 V16.5.0 ------------------------------------------\*\*\* unchanged text omitted\*\*\*For PUSCH transmission scheduled by a PDCCH with CRC scrambled by CS-RNTI with NDI=1, C-RNTI, or MCS-C-RNTI or SP-CSI-RNTI:- If the DCI with the scheduling grant was received with DCI format 0\_0, the UE shall, for this PUSCH transmission, consider the transform precoding either enabled or disabled according to the higher layer configured parameter *msg3-transformPrecoder* if a Type-1 random access is configured for the BWP or *msgA-transformPrecoder* if a Type-1 random access is not configured for the BWP. - If the DCI with the scheduling grant was not received with DCI format 0\_0 - If the UE is configured with the higher layer parameter *transformPrecoder* in *pusch-Config*, the UE shall, for this PUSCH transmission, consider the transform precoding either enabled or disabled according to this parameter.- If the UE is not configured with the higher layer parameter *transformPrecoder* in *pusch-Config*, the UE shall, for this PUSCH transmission, consider the transform precoding either enabled or disabled according to the higher layer configured parameter *msg3-transformPrecoder* if a Type-1 random access is configured for the BWP or *msgA-transformPrecoder* if a Type-1 random access is not configured for the BWP.For PUSCH transmission with a configured grant- If the UE is configured with the higher layer parameter *transformPrecoder* in *configuredGrantConfig*, the UE shall, for this PUSCH transmission, consider the transform precoding either enabled or disabled according to this parameter.- If the UE is not configured with the higher layer parameter *transformPrecoder* in *configuredGrantConfig*, the UE shall, for this PUSCH transmission, consider the transform precoding either enabled or disabled according to the higher layer configured parameter *msg3-transformPrecoder* if a Type-1 random access is configured for the BWP or *msgA-transformPrecoder* if a Type-1 random access is not configured for the BWP.\*\*\* unchanged text omitted\*\*\*------------------------------ TP2 of 38.214 V16.5.0 ------------------------------------- |
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