**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 $P\_{O\\_NOMINAL\\_PUSCH,f,c}\left(0\right)$, 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. |

# 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 $Δ\_{MsgA\\_PUSCH}$ is equal to $Δ\_{PREAMBLE\\_Msg3}$, *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 $P\_{O\\_NOMINAL\\_PUSCH,f,c}\left(0\right)$ is determined by $P\_{O\\_PRE}\_{}$and $Δ\_{MsgA\\_PUSCH}$, and *msgA-Alpha* is provided, $α\_{b,f,c}(0)$ is the value of *msgA-Alpha*- elseif- $P\_{O\\_NOMINAL\\_PUSCH,f,c}\left(0\right)$ is determined by $P\_{O\\_PRE}\_{}$ and $Δ\_{PREAMBLE\\_Msg3}$, 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';- $l\_{d}=4$ 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 $P\_{O\\_NOMINAL\\_PUSCH,f,c}(0)=P\_{O\\_PRE}+Δ\_{MsgA\\_PUSCH}$ and *msgA-Alpha* is provided, $α\_{b,f,c}(0)$ is the value of *msgA-Alpha*- elseif $P\_{O\\_NOMINAL\\_PUSCH,f,c}(0)=P\_{O\\_PRE}+Δ\_{PREAMBLE\\_Msg3}$ 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 $j=1 $or $j\in S\_{J}, $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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