**3GPP TSG-RAN WG1 Meeting #105-e R1-210xxxx**

**e-Meeting, May 10th – 27th, 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#105-e meeting.

# Maintenance issues

The following 2 issues are identified based on the submitted contributions in RAN1#104b-e.

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| --- | --- | --- |
| Issue # | Description | Related TDoc # |
| 1 | Editorial correction on the DMRS parameter for MsgA | R1-2104474 |
| 2 | Determination of power control parameter and PUSCH waveform in case of 2-step RACH only operation | R1-2105507 |

Views on the above issues, please fill in ‘Yes/No/Editorial’ to the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Issue #1 | Issue #2 | Comments |
| Huawei | Y | Y |  |
| Ericsson | Editorial | Y |  |
| Qualcomm | Editorial | Y | In addition to the two issues above, we think it is necessary to clarify the *dataScramblingIdentityPDSCH* and *nRNTI* applicable to msgB PDSCH (and msg2 PDSCH). In Clause 7.3.1.1, TS 38.211, neither msgB-RNTI nor RA-RNTI is mentioned in the list of RNTIs when PDSCH (msg2 or msgB) is scheduled using DCI format 1\_0 in a CSS. This will create ambiguity in the processing of msgB/msg2 in RACH. |
| CATT | Editorial | Y |  |
| SS | Editorial | Y(?) | Is this the issue #2 the same issue discussed last meeting? The common understanding was the same issue should be handled in Rel15 CR if needed, if I remember correctly. I wonder is there any progress on it. |
| Nokia | Editorial | Y(?) | As we read the contribution, the deployment scenario is a bit artificial, as the cell/BWP is configured with 2-step RACH only, meaning that all Rel-15 UEs are excluded from accessing the cell as well as all Rel-16 UEs that does not support 2-step RACH. We are not really sure that we need to account for this kind of mis-configuration. Probably OK to discuss the need, but our starting point is that we do not need this change. |
| Intel | Editorial | Y(?) | Share similar view as Nokia that we may need to first discuss the need for this configuration. If this is not needed, the CR is not necessary.  |

# Summary

The summary and scope for the potential email discussion will be updated later based on companies’ comments.

For issue#1, seems all the company are fine with the editorial change, so I think it can be proposed to the 211 editor to include it in the alignment CR directly.

For issue#2, based on the comments, it seems necessary to first clarify if the case that 4-step RACH is not configured for any of the BWPs exists or not for Rel-16. Not sure if this can be resolved in RAN1, so probably we can also ask for RAN2’s clarification together with the proposal 1 in Ericsson’s contribution (to mention 2-step RACH when describing *p0-AlphaSets* parameter in RRC specification).

Proposed outcome of the preparation phase:

* Endorse the draft CR in R1-2104474, and include it in the editors’ alignment CR;
* Discuss the potential LS to RAN2 on the description of RRC parameter *p0-AlphaSets* and whether 4-step RACH can be absent for any of the BWPs.

Any other comments?

|  |  |
| --- | --- |
| Company | Comment |
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# References

1. R1-2104474 Correction on higher layer parameter for MsgA PUSCH DMRS CATT
2. R1-2105507 Discussion on corrections for 2-step RACH Ericsson

# Appendix

List of proposals in the submitted contributions.

|  |  |
| --- | --- |
| TDoc | Proposals |
| R1-2104474, CATT | ***Reason for change:*** Misalignment of higher-layer parameter name between 38.211 and 38.331.***Summary of change:*** Alignment of higher-layer parameter name.***Consequences if not approved:*** Misaligned parameter name.6.4.1.1.1.1 Sequence generation when transform precoding is disabledIf transform precoding for PUSCH is not enabled, the sequence  shall be generated according to.where the pseudo-random sequence  is defined in clause 5.2.1. The pseudo-random sequence generator shall be initialized with$$c\_{init}=\left(2^{17}\left(N\_{symb}^{slot}n\_{s,f}^{μ}+l+1\right)\left(2N\_{ID}^{\overbar{n}\_{SCID}^{\overbar{λ}}}+1\right)+2^{17}\left⌊\frac{\overbar{λ}}{2}\right⌋+2N\_{ID}^{\overbar{n}\_{SCID}^{\overbar{λ}}}+\overbar{n}\_{SCID}^{\overbar{λ}}\right)mod 2^{31}$$where  is the OFDM symbol number within the slot, $n\_{s,f}^{μ}$ is the slot number within a frame, and- $N\_{ID}^{0},N\_{ID}^{1}\in \left\{0,1,…,65535\right\}$ are given by the higher-layer parameters *scramblingID0* and *scramblingID1*, respectively, in the *DMRS-UplinkConfig* IE if provided and the PUSCH is scheduled by DCI format 0\_1 or 0\_2, or by a PUSCH transmission with a configured grant;- $N\_{ID}^{0}\in \left\{0,1,…,65535\right\}$ is given by the higher-layer parameter *scramblingID0* in the *DMRS-UplinkConfig* IE if provided and the PUSCH is scheduled by DCI format 0\_0 with the CRC scrambled by C-RNTI, MCS-C-RNTI, or CS-RNTI; - $N\_{ID}^{0},N\_{ID}^{1}\in \left\{0,1,…,65535\right\}$ are, for each msgA PUSCH configuration, given by the higher-layer parameters *msgA-ScramblingID0* and *msgA-ScramblingID1*, respectively, in the *msgA-DMRS-Config* IE if provided and the PUSCH transmission is triggered by a Type-2 random access procedure as described in clause 8.1A of [5, TS 38.213];- $N\_{ID}^{\overbar{n}\_{SCID}^{\overbar{λ}}}=N\_{ID}^{cell}$ otherwise;< Unchanged parts are omitted > |
| R1-2105507, Ericsson | **Observation 1 In case of non-standalone, *rach-ConfigCommon* is in dedicated RRC signaling and it’s required to be present since delta signaling is expected.****Observation 2 In case of NR standalone, *rach-ConfigCommon* may be absent in SIB1 and not available according to the RRC signaling design, however it may have to be configured in Rel-15 since there’s only one random acces type.****Observation 3 In NR Rel-16, 2-stepRACH and 4-step RACH configurations are independent from each other, and *rach-ConfigCommon* may be not available when only 2-step RACH (i.e*.* *msgA-ConfigCommon-r16*) is configured.**[Proposal 1 Inform RAN2 that 2-step RACH was not considered when describing *p0-AlphaSets* parameter in RRC specification for Rel-16.](#_Toc71712950)[Proposal 2 In case of 2-step RACH only operation, when *p0*-*AlphaSets* is not provided, for power control of normal PUSCH, *alpha* for msgA PUSCH is used, according to TP1, or *alpha* is fixed to be 1 according to TP2.](#_Toc71712951)[Proposal 3 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 TP3 or is fixed to be CP-OFDM according to TP4.](#_Toc71712952)-------------------------------start of 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 *msg3-Alpha* configured for msg3 PUSCH if a Type-1 random access is configured for the BWP or uses *msgA-Alpha* for msgA PUSCH if only a Type-2 random access procedure is configured for the BWP.\*\*\* unchanged text omitted\*\*\*-------------------------------- end of TP1 of 38.213 V16.5.0 ------------------------------------------------------------- start of TP2 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 *msg3-Alpha* configured for msg3 PUSCH if a Type-1 random access is configured for the BWP or UE assumes $α\_{b,f,c}\left(j\right)=1$ if only a Type-2 random access procedure is configured for the BWP.\*\*\* unchanged text omitted\*\*\*------------------------------ end of TP2 of 38.213 V16.5.0 ---------------------------------------------------------------------- start of TP3 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 only a Type-2 random access procedure is 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 only a Type-2 random access procedure is 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 only a Type-2 random access procedure is configured for the BWP.\*\*\* unchanged text omitted\*\*\*------------------------- end of TP3 of 38.214 V16.5.0 ---------------------------------------------------------- start of TP4 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 consider the transform precoding always disabled if only a Type-2 random access procedure is 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 consider the transform precoding always disabled if only a Type-2 random access procedure is 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 consider the transform precoding always disabled if only a Type-2 random access procedure is configured for the BWP.\*\*\* unchanged text omitted\*\*\*------------------ end of TP4 of 38.214 V16.5.0 ----------------------------------- |
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