**3GPP TSG-RAN WG1 Meeting #106-e R1-210xxxx**

**e-Meeting, Aug 17th – 28th, 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#106-e meeting.

# Preparation phase discussion

The following 2 CRs are submitted to the maintenance of Rel-16 2-step RACH in RAN1#106-e.

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| --- | --- | --- | --- |
| Issue # | Description | Affected spec | TDoc # |
| 1 | Editorial correction on the DMRS port of MsgA PUSCH | TS38.214 | R1-2107009 |
| 2 | Spatial domain transmission filter for PUCCH | TS38.213 | R1-2107261 |

To share the views on the necessity of the above issues, please fill in ‘Yes/No/Editorial’ to the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Issue #1 | Issue #2 | Comments |
| CATT | Editorial | Yes | Issue#1 is editorial issue and both issues can be discussed during this meeting. |
| Intel | Editorial | No | Editorial change for issue#1. For issue#2, in Section 8.2A, spatial filter for PUCCH transmission during 2-step RACH procedure was clearly defined as follows. It is not clear to us the proposed change is needed. - the PUCCH transmission is with a same spatial domain transmission filter and in a same active UL BWP as a last PUSCH transmission  |
| Nokia, Nokia Shanghai Bel | Editorial | No | For issue #2 the needed text has already been captured in section 8.2A of 38.213.  |
| vivo | Editorial | No | We share the same view as Intel that Spatial domain transmission filter for PUCCH has been already specified in the spec. |
| Samsung | Editorial | No (but a new one could be discussed) | Agree with intel’s assessment on issue#2.In addition, we may find the cited text by [2] was also questionable, i.e., “The UE transmits the PUCCH using the same spatial domain transmission filter as for a PUSCH transmission scheduled by a RAR UL grant as described in Clause 8.3.” Since Msg.3 could be scheduled by DCI as re-transmission, and the beam for msg3 initial and re-transmission is up to UE; so is it correct to always use RAR scheduled msg3 beam (i.e., initial msg3 transmission) for PUCCH? Or it is too late to change since R15 is specified like this.  |
| Ericsson | Editorial | ? | For issue 1, it’s obviously an editorial issue, we propose to pass it to the editor with no need for discussion.For issue 2, maybe proponent company can clarify whether this CR* is only to determine the spatial domain transmission filter of the PUCCH for MsgB HARQ feedback,
* or is to determine the spatial domain transmission filter of all PUCCH transmissions before RRC connection.

We’re open to discuss this if it’s the latter case. |
| OPPO | Editorial | Yes | The definition on spatial filter for PUCCH transmission in Section 8.2A, as copied in the following, is for PUCCH with HARQ-ACK information for RAR only. It is not applied for any PUCCH transmission, e.g. PUCCH with HARQ-ACK for PDSCH transmission without RAR.“transmission of a PUCCH with HARQ-ACK information having ACK value if the RAR message(s) is for successRAR, where - a PUCCH resource for the transmission of the PUCCH is indicated by PUCCH resource indicator field of 4 bits in the successRAR from a PUCCH resource set that is provided by *pucch-ResourceCommon* - a slot for the PUCCH transmission is indicated by a HARQ Feedback Timing Indicator field of 3 bits in the successRAR having a value $k$ from {1, 2, 3, 4, 5, 6, 7, 8} and, with reference to slots for PUCCH transmission having duration $T\_{slot}$, the slot is determined as $n+k+∆$, where $n$ is a slot of the PDSCH reception and $∆$ is as defined for PUSCH transmission in Table 6.1.2.1.1-5 of [6, TS 38.214]- the UE does not expect the first symbol of the PUCCH transmission to be after the last symbol of the PDSCH reception by a time smaller than $N\_{T,1}+0.5$ msec where $N\_{T,1}$ is the PDSCH processing time for UE processing capability 1 [6, TS 38.214]- for operation with shared spectrum channel access, a channel access type and CP extension [15, TS 37.213] for a PUCCH transmission is indicated by a ChannelAccess-CPext field in the successRAR as defined in Table 7.3.1.1.1-4 in TS 38.212 as defined in Table 7.3.1.1.1-4 in TS 38.212 or Table 7.3.1.1.1-4A in TS 38.212 if *ChannelAccessMode-r16* = "*semistatic*" is provided- the PUCCH transmission is with a same spatial domain transmission filter and in a same active UL BWP as a last PUSCH transmission”The CR covers any PUCCH transmission before PUCCH-SpatialRelationInfo is configured.With respect to question from Ericsson, our CR is the latter case. |
| Huawei, HiSilicon | Editorial thus no email needed | Seems Ok |  |
| Qualcomm | Editorial changes only | OK to discuss it further | If the CR intends to address all PUCCH transmissions before RRC connection, it is beyond the scope of R16 2-step RACH maintenance. |

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

For issue#1 (CR in R1-2107009), seems so far all the company are fine with the editorial change, and it is proposed to pass it to the 38.214 editor directly.

For issue#2 (CR in R1-2107261), it has been clarified by the proponent company that “the CR covers any PUCCH transmission before PUCCH-SpatialRelationInfo is configured”. This issue is beyond what we have agreed during the WI phase, specifically regarding the PUCCH for MsgB HARQ feedback as pointed out by several companies. It is suggested to have a short email discussion to further check whether such condition is necessary or not.

Proposal:

* Endorse the draft CR in R1-2107009, and include it in the editors’ alignment CR;
* 1 email thread to discuss the draft CR in R1-2107261 (Spatial domain transmission filter for PUCCH before RRC connection); Moderator: OPPO.

# Email discussions

# Summary

The outcome of email discussion will be updated later.

Any other comments?

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| Company | Comment |
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# References

1. R1-2107009 Editorial correction on the DMRS port of MsgA PUSCH ZTE
2. R1-2107261 Draft CR on spatial domain transmission filter for PUCCH OPPO

# Appendix

List of proposals in the submitted contributions.

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| --- | --- |
| TDoc | Proposals |
| R1-2107009, ZTE | ***Reason for change:*** Misalignment of higher-layer parameter name between 38.214 and 38.331.***Summary of change:*** Alignment of higher-layer parameter name.***Consequences if not approved:*** Implementation error may occur due to the misalignment of the parameter name.========CR to TS38.214=======6.2.2 UE DM-RS transmission procedure< Unchanged parts are omitted >For MsgA PUSCH transmission, if the UE is not configured with *msgA-PUSCH-NrofPorts,* the UEshall assume that 4 ports are configured per DM-RS CDM group for double-symbol DM-RS. Otherwise, *msgA-PUSCH-NrofPorts* with value of 0 indicates the first port per DM-RS CDM group, while a value of 1 indicates the first two ports per DM-RS CDM group.< Unchanged parts are omitted > |
| R1-2107261, OPPO | ***Reason for change:*** In current spec, regardless of random access scheme, spatial domain transmission filter for PUCCH is always the same as PUSCH transmission scheduled by a RAR UL grant.However, when 2-step RACH is applied, there is no PUSCH transmission scheduled by a RAR UL grant. The spatial domain transmission filter for PUCCH can be not be determined.In 2-step RACH procedure, PUSCH for Type-2 random access procedure has similar function and transmission parameter as PUSCH scheduled by a RAR UL grant in legacy random access procedure. So, it is straightforward to apply the same spatial domain transmission filter for PUCCH as PUSCH for Type-2 random access procedure when 2-step RACH is applied.***Summary of change:***PUCCH uses the same spatial domain transmission filter as for PUSCH for Type-2 random access procedure.***Consequences if not approved:*** Spatial domain transmission filter determination for PUCCH is missed when 2-step RACH is applied.========CR to TS38.213=======9.2.1 PUCCH Resource Sets<Unchanged part omitted>The UE transmits the PUCCH using the same spatial domain transmission filter as for a PUSCH transmission scheduled by a RAR UL grant as described in Clause 8.3 or PUSCH for Type-2 random access procedure as described in Clause 8.1A<Unchanged part omitted> |