**3GPP TSG-RAN WG1 Meeting #109-e R1-220xxxx**

**e-Meeting, May 9th - 20th, 2022**

**Agenda Item: 7.2.1**

**Source: Moderator (ZTE)**

**Title: Summary of preparation phase email discussion for Rel-16 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#109-e meeting. The following email discussion is initiated to collect companies’ views:

[109-e-Prep-AI7.2.1 2-step RACH] Preparation phase for Rel-16 NR 2-step RACH maintenance

# Preparation phase discussion

The following 2 CRs are submitted to the maintenance of Rel-16 2-step RACH in RAN1#109-e.

|  |  |  |  |
| --- | --- | --- | --- |
| Issue # | Description | Affected spec | TDoc # |
| 1 | In TS38.213, when determining the δ(b,f,c) value of PUCCH power control, the case of 2-step RACH (fallback RAR) is considered. Similarly, when determining the δ(b,f,c) value of SRS power control, the case of 2-step RACH (fallback RAR) should also be considered. | TS38.213 | R1-2204700 MediaTek |
| 2 | In Rel-16, PUSCH repetition Type A includes Msg3 transmission, which is a PUSCH transmission scheduled by RAR UL grant, by fallbackRAR, or by DCI format 0\_0 with CRC scrambled by TC-RNTI. In section 6.3.1 Frequency hopping for PUSCH repetition Type A, the hopping configuration for PUSCH Repetition Type A is provided in dedicated RRC configurations -- pusch-Config and configuredGrantConfig -- which is incorrect because the dedicated RRC configuration can only be received after the Msg3. A UE may not have been provided the higher layer parameter frequencyHopping in pusch-Config, when it receives RAR UL grant, fallbackRAR or DCI 0\_0 scrambled by TC-RNTI.  | TS38.214 | R1-2204118 Ericsson |

To identify the essential issues, please fill in ‘Yes/No/Editorial’ to the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Issue #1 | Issue #2 | Comments |
| vivo | Yes. | Yes. | For issue #1, the CR seems fine similar to PUCCH power control.For issue#2, the proposed CR is fine for Rel-16 and is more necessary for NR Rel-17 where Msg3 repetition is introduced in our understanding.Note that this issue (i.e. precluding msg3 for FH type determination) was also discussed in NR Rel-17 8.8.1.1 agenda. A proposed conclusion was made by FL though not agreed due to limited time to make a clarification in GTW in RAN1 #108-e meeting.Copy from FL summary [R1-2202569](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_108-e/Docs/R1-2202569.zip):**The latest version of Proposed conclusion on Issue#2-1:*** It is RAN1’s common understanding that:
	+ For PUSCH scheduled (with or without repetitions) by RAR UL grant or by DCI format 0\_0 with CRC scrambled by TC-RNTI, the UE is not required to read *frequencyHopping* in *pusch-Config* for the determination of frequency hopping type or for the determination of whether the frequency hopping is configured for the PUSCH and is required to read the frequency hopping flag information field of the RAR UL grant or the DCI format 0\_0 with CRC scrambled by TC-RNTI for the determination of whether the frequency hopping is configured for the PUSCH or not.
	+ For PUSCH scheduled by DCI format 0\_0 with CRC scrambled by C-RNTI, CS-RNTI or MCS-C-RNTI, the conclusion for R1-2003594 in RAN1#101-e is applied.

It is very unfortunate that the above proposed conclusion was not taken as a conclusion in the March 3 GTW2 session, because of the clarification question at the very last moment. |
| Intel | Yes | No | For issue #1, we are fine to discuss it in this meeting. For issue#2, it was discussed in Rel-17 NR coverage enhancement maintenance in the last meeting but could not reach consensus in the last moment. This issue will be discussed again in this meeting. To avoid the duplicated discussions, it is suggested to treat the same issue in Rel-17 coverage enhancement maintenance.  |
| Qualcomm | Yes | No | Issue#2 is out of the scope of R16 2-step RACH. |
| MTK | Yes | Yes | For issue #1, we think it is a straightforward correction. For issue#2, it can be discussed here or under R17 coverage enhancement maintenance, no strong view here. |
| Nokia, Nokia Shanghai Bell | Yes | No | Issue #1: We are fine to discuss this aspect during this meeting.Issue #2: As this is an aspect that originates from Rel-17 NR coverage enhancements, it sounds strange that we need to modify Rel-16 behavior. Introduction of new features for Rel-17 should imply changes to Rel-16 specifications. If needed, it can be discussed in the Rel-17 maintenance track for NR coverage enhancements. |

# Summary

The outcome of email discussion will be updated later.

# References

1. R1-2204118 Correction for Frequency Hopping for 2-Step RACH Ericsson
2. R1-2204700 On delta value of SRS power control MediaTek Inc.

# Appendix

List of proposals in the submitted contributions.

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| --- | --- |
| TDoc | Proposals |
| R1-2204700, MediaTek | **Observation 1: In 38.213 V16.9.0 [1], when determining the δ(b,f,c) value of PUCCH power control, the case of 2-step RACH (fallback RAR) is considered. However, when determining the δ(b,f,c) value of SRS power control, the case of 2-step RACH (fallback RAR) is NOT considered.****Observation 2: The determination of δ(b,f,c) value of SRS power control in 38.213 V16.9.0 [1] is similar to the one of PUCCH power control in 38.213 V15.3.0 [2]. Similar modification for SRS power control in 38.213 V16.9.0 [1] should be applied, if we follow the logic of revision of PUCCH power control from 38.213 V15.3.0 [2] to 38.213 V16.9.0 [1].**Proposal 1: Adopt the CR below in 38.213 V16.9.0 [1] to revise SRS power control following the logic of revision of PUCCH power control from 38.213 V15.3.0 [2] to 38.213 V16.9.0 [1]:If a configuration for a  value or for a  value for a corresponding SRS power control adjustment state  for active UL BWP  of carrier  of serving cell  is provided by higher layers-  - Else- $h\_{b,f,c}\left(0\right)= ΔP\_{rampup,b,f,c}+δ\_{msg2,b,f,c}$where$δ\_{msg2,b,f,c}$ is * the TPC command value indicated in the random access response grant corresponding to ~~the random access preamble that the UE transmitted on active UL BWP  of carrier  of the serving cell ,~~ a PRACH transmission according to Type-1 random access procedure, or in a random access response grant corresponding to MsgA transmissions according to Type-2 random access procedure with RAR message(s) for fallbackRAR, or
* the TPC command value indicated in a successRAR corresponding to MsgA transmissions for Type-2 random access procedure,

and ;  |
| R1-2204118 Ericsson | ***Reason for change:*** In Rel-16, PUSCH repetition Type A includes Msg3 transmission, which is a PUSCH transmission scheduled by RAR UL grant, by fallbackRAR, or by DCI format 0\_0 with CRC scrambled by TC-RNTI. In section 6.3.1 Frequency hopping for PUSCH repetition Type A, the hopping configuration for PUSCH Repetition Type A is provided in dedicated RRC configurations -- pusch-Config and configuredGrantConfig -- which is incorrect because the dedicated RRC configuration can only be received after the Msg3. A UE may not have been provided the higher layer parameter frequencyHopping in pusch-Config, when it receives RAR UL grant, fallbackRAR or DCI 0\_0 scrambled by TC-RNTI. 1. PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI, which is wrongly included in the “PUSCH repetition Type A” in the first sentence, doesn’t apply to “frequencyHopping provided in pusch-Config for PUSCH transmission scheduled by a DCI format other than 0\_2”.
2. PUSCH scheduled by RAR UL grant or by fallbackRAR UL grant, which is also wrongly included in the “PUSCH repetition Type A” in the first sentence, doesn’t match ‘PUSCH transmission scheduled by DCI format 0\_2, or by a DCI format other than 0\_2 or configured PUSCH transmission”

***Summary of change:*** Exclude PUSCH scheduled by RAR UL grant, PUSCH scheduled by fallbackRAR UL grant and PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI from PUSCH repetition Type A, where frequency hopping is dependent on the higher layer parameter *frequencyHopping* in *pusch-Config*.***Consequences if not approved:*** For initial access procedures involving PUSCH transmission scheduled by RAR UL grant, fallbackRAR or DCI format 0\_0 with CRC scrambled by TC-RNTI, a UE has to be configured by the higher layer parameter *frequencyHopping* in *pusch-Config*, which can only be received after the initial access procedure. In other words, the frequency hopping can not be applied during the initial access according to the current specification.========TS38.214=======6.3.1 Frequency hopping for PUSCH repetition Type AFor PUSCH repetition Type A, other than the PUSCH scheduled by RAR UL grant or by fallbackRAR UL grant or by DCI format 0\_0 with CRC scrambled by TC-RNTI, (as determined according to procedures defined in Clause 6.1.2.1 for scheduled PUSCH, or Clause 6.1.2.3 for configured PUSCH), a UE is configured for frequency hopping by the higher layer parameter *frequencyHoppingDCI-0-2* in *pusch-Config* for PUSCH transmission scheduled by DCI format 0\_2, and by *frequencyHopping* provided in *pusch-Config* for PUSCH transmission scheduled by a DCI format other than 0\_2*,* and by *frequencyHopping* provided in *configuredGrantConfig* for configured PUSCH transmission. One of two frequency hopping modes can be configured:- Intra-slot frequency hopping, applicable to single slot and multi-slot PUSCH transmission, each of multiple PUSCH transmissions scheduled by a DCI if the higher layer parameter *pusch-TimeDomainAllocationListForMultiPUSCH* is configured and each of multiple configured grant PUSCH transmissions in a configuration where the higher layer parameters *cg-nrofSlots* and *cg-nrofPUSCH-InSlot* are provided.- Inter-slot frequency hopping, applicable to multi-slot PUSCH transmission. |