**3GPP TSG RAN WG1 #110-bis-e R1-220xxxx**

**e-meeting, 10th – 19th October, 2022**

**Agenda item:** 8.1

**Source:** Moderator (Nokia)

**Title:** Moderator Summary for Rel.17 NR FeMIMO maintenance: mTRP PUCCH/PUSCH enhancement

**Document for:** Discussion and Decision

1. Introduction

The moderator summary of the maintenance-related issues raised in the submitted contributions for Rel.17 NR\_FeMIMO PUCCH/PUSCH enhancement is given below, with the following CR drafts. Company’s comments are requested **by 10/12 @10:00UTC.**

As mentioned by Mr. Chairman, the first 2 days (or less if possible) will be spent to determine which issues to handle in RAN1#110bis-e by email discussion. Once the issues are identified, additional email threads will be assigned and created. Note that only technical corrections are endorsed as individual Cat F CRs. For anything else, we will use alignment CRs from the editors.

1. Maintenance issues

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| **[R1-2208752](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_110b-e/Docs/R1-2208752.zip)** | Draft CR on M-TRP Type 1 configured grant PUSCH to TS38.214 | Lenovo |
| [**R1-2210103**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_110b-e/Docs/R1-2210103.zip) | Draft CR to 38.214 on aperiodic CSI reporting on PUSCH | Ericsson |

## **Issue #1**: Draft CR on M-TRP Type 1 configured grant PUSCH to TS38.214 (R1-2208752 Lenovo)

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| **Company** | **Company inputs (if any)** |
| Mod | **Summary** : Based on R1-2208752, the following is suggested to make sure that mTRP Type 1 CG PUSCH is determined based on *p0-PUSCH-Alpha2* and *powerControlLoopToUse2.*  For PUSCH transmissions with a Type 1 configured grant, when two SRS resource sets with usage set to 'codebook' or 'noncodebook' are configured in srs-ResourceSetToAddModList or srs-ResourceSetToAddModListDCI-0-2, if ~~two SRS resource indicators and two precoding information~~ *p0-PUSCH-Alpha2* and *powerControlLoopToUse2* are provided, the SRS resource set association to (nominal) repetitions is determined as follows. When K = 2, the first and second SRS resource sets are applied to the first and second (nominal) repetitions, respectively.  Mod’s Assessment: Need some more discussion on this. Propose to discuss in RAN1 #110-bis-e |
| QC | Agree to discuss the issue given that two SRS resource indicators or two precoding information may not be always configured for mTRP CG-PUSCH (due to SRS resource set including a single SRS resource, or due to 1-port PUSCH). |
| Lenovo | Support to discuss it consider that there are not always two SRS resource indicators and two precoding information for a M-TRP CG Type 1 PUSCH. |
| ZTE | This is valid issue, support to discuss. |
| OPPO | We are fine to discuss the issue. Based on our understanding, we don’t think “if two…” is the condition for “when two SRS…”. They are two independent conditions for PUCCH repetition. Hence, we propose to delete “if ~~two SRS resource indicators and two precoding information~~ *p0-PUSCH-Alpha2* and *powerControlLoopToUse2* are provided,”, since the first condition is sufficient. |
| Samsung | We can discuss this issue because issue is valid. However, TP is not acceptable because RRC parameter ‘powerControlLoopToUse2’ cannot be configured if twoPUSCH-PC-AdjustmentStates is not configured. |
| vivo | OK to discuss and solve the problem. |
| Google | Support discussing this issue |
| Intel | Agree this is a valid issue |
| Apple | Fine to discuss |
| LG | Fine to discuss |
| Lenovo | @OPPO, First, it can’t determine a CG Type 1 PUSCH is a M-TRP PUSCH just according to the number of SRS resource sets configured for PUSCH since there is no SRS resource set indicator for CG Type 1 PUSCH. Only when there are two TPMIs, two SRS resource indicators, two Power control parameter sets (p0, alpha, closed loop index and pathloss RS) are configured, it can be determined as M-TRP PUSCH. Therefore, the first condition is not sufficient which is “when two SRS…”. Consider that there are not always two SRS resource indicators (they are absent if only one SRS resource is configured per SRS resource set), two TPMIs (they are absent for non-codebook PUSCH), therefore, we propose to use the number of power control parameter set to determine whether it is transmitted to single TRP or multiple TRPs.  @Samsung, we didn’t find there is such restrict that the RRC parameter ‘powerControlLoopToUse2’ cannot be configured if twoPUSCH-PC-AdjustmentStates is not configured according to TS38.213 and TS38.331. Would you tell us where the restrict can be found? However, we are fine to update as “if ~~two SRS resource indicators and two precoding information~~ *p0-PUSCH-Alpha2* is ~~are~~ provided,” . |

## **Issue #2:** Draft CR to 38.214 on aperiodic CSI reporting on PUSCH (R1-2210103 Ericsson)

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| **Company** | **Company inputs (if any)** |
| Mod | Summary : The following is mentioned in R1-2210103,  --------------------------------------------------\  In Clause 5.2.3, it is specified that when DCI format 0\_1 schedules multiple PUSCH allocations, the aperiodic CSI report is carried on either the second PUSCH (if two PUSCHs are scheduled) or the penultimate PUSCH (if more than two PUSCHs are scheduled).  However, in Clause 6.1.2, when *AP-CSI-MultiplexingMode* is enabled, a different behaviour is specified for multiplexing aperiodic CSI multilplexing on PUSCH as copied below:  For PUSCH repetition Type A, when a DCI format 0\_1 and DCI format 0\_2 indicate codepoint “10” or “11” for the *SRS resource set indicator* and schedule aperiodic CSI report(s) on PUSCH with transport block by a ‘*CSI request’* field on a DCI, the CSI report(s) multiplexing is determined as follows  - if higher layer parameter *AP-CSI-MultiplexingMode* in *CSI-AssociatedReportConfigInfo* is enabled and UCI other than CSI report(s) are not multiplexed on PUSCH, the CSI report(s) is transmitted separately only on the first transmission occasion associated with the first SRS resource set and the first transmission occasion associated with the second SRS resource set.  - otherwise, the CSI report(s) is transmitted only on the first transmission occasion.  Even though our understanding is that the clauses in 5.2.3 and 6.1.2 are ultiplex different features, there may be a potential ambiguity on how to ultiplex Aperiodic CSI on PUSCH.  --------------------------------------------------\  Mod’s Assessment: The suggested changes in R1-2210103 makes sense to clarify this further. Propose to discuss in RAN1 #110-bis-e |
| QC | We think the current spec is clear. Clause 5.2.3 is related to single-DCI scheduling multiple PUSCHs. Also, if clarifications are needed, it should be related to Rel-16 and not Rel-17. Even for single-TRP, we have the following:   * When single-DCI schedules multiple PUSCHs (Rel-16 NRU feature) 🡪 A-CSI is either on the last PUSCH or on the second-to-last PUSCH * When DCI schedules PUSCH repetitions (Rel-15 slot aggregation or Rel-16 PUSCH repetition Type B) 🡪 A-CSI is on the first repetition |
| Lenovo | Similar view with QC that the current spec is clear. But if majority support the change to make the spec more clear, we are OK with it too. |
| ZTE | Even without this change, the current specification is clear to us. Alternatively, we can be fine to this if majority prefer. |
| OPPO | We intend to agree with QC. |
| Samsung | As QC mentioned, Clause 5.2.3 is for sDCI based multi-PUSCH scheduling (R16) other than mTRP PUSCH repetition (R17). Therefore, this seems clear. |
| vivo | Agree that the sentence in Clause 5.2.3 is not relevant to PUSCH repetition. For PUSCH repetition, the text in Clause 6.1.2 is clear. |
| Google | We are supportive of discussing this issue. |
| Intel | We are okay to clarify it further – |
| LG | We intend to agree with QC. |