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

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

**Agenda item:** 8.1

**Source:** Moderator (Nokia)

**Title:** Summary for [110bis-e-R17-MIMO-07] : Maintenance of Rel-17 mTRP UL

**Document for:** Discussion and Decision

This summary is to discuss the issue #1, which was identified as a remaining maintenance issue on Rel-17 UL mTRP.

[110bis-e-R17-MIMO-07] Email discussion on remaining maintenance issues on UL mTRP by October 13 – Keeth (Nokia)

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

The draft CR is submitted by Lenovo in the following contribution and can be used to start the discussion.

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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 |

## Issue #1

Based on the preparation phase discussion, the majority seems ok with the highlighted issue in [**R1-2208752**](https://www.3gpp.org/ftp/TSG_RAN/WG1_RL1/TSGR1_110b-e/Docs/R1-2208752.zip). However, some comments are on the exact changes and how to capture this in TS 38.213. Based on some comments in the preparation phase, it seems that mentioning “*p0-PUSCH-Alpha2”* as the condition seems sufficient to determine the mTRP CG-PUSCH type 1 transmission.

**Proposal 1 :** The following changes in red are endorsed for TS38.213, Section 6.1.2.3.

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| **6.1.2.3 Resource allocation for uplink transmission with configured grant** < Unchanged parts are omitted >  For PUSCH transmissions with a Type 2 configured grant, when two SRS resource sets are configured in srs-ResourceSetToAddModList or srs-ResourceSetToAddModListDCI-0-2, the SRS resource set association to (nominal) repetitions follows MappingPattern in ConfiguredGrantConfig as defined in Clause 6.1.2.1 for PUSCH scheduled by DCI format 0\_1 and 0\_2. 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~~ ~~are~~ *p0-PUSCH-Alpha2* is 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.  - When K > 2 and cyclicMapping in ConfiguredGrantConfig is enabled, the first and second SRS resource sets are applied to the first and second (nominal) repetitions, respectively, and the same SRS resource set mapping pattern continues to the remaining (nominal) repetitions.  - When K > 2 and sequentialMapping in ConfiguredGrantConfig is enabled, first SRS resource set is applied to the first and second (nominal) repetitions, and the second SRS resource set is applied to the third and fourth (nominal) repetitions, and the same SRS resource set mapping pattern continues to the remaining (nominal) repetitions.  < Unchanged parts are omitted > |

Please provide your comments/suggestions below.

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| **Company** | **Company inputs (if any)** |
| CATT | Support |
| ZTE | Support |
| LG | Support |
| Apple | We are fine with the CR. |
| Google | OK with this proposal. |
| Intel | support, thank you |
| Samsung | We can support this TP. |
| Lenovo | Support. |
| vivo | OK with the proposal. |

## For easy reference : Company inputs in the preparation phase

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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,” . |
| NTT Docomo | Support to discuss |
| Moderator | Majority support to discuss this issue. |