**3GPP TSG RAN WG1 #106bis-e R1-211xxxx**

**e-Meeting, October 11th – 19th, 2021**

**Agenda item:** 8.8

**Source:** Moderator (Qualcomm)

**Title:** FL summary of discussion on incoming LS [R1-2108703](file:///C%3A%5CUsers%5Cyouns%5COneDrive%5CDocuments%5C3GPP%5CRAN1%20tdocs%5CTSGR1_106b-e%5CDocs%5CR1-2108703.zip) on PUCCH and PUSCH repetitions

**Document for:** Discussion/Decision

# Discussion

In R1-2108703(R4-2114991) “Reply LS on PUCCH and PUSCH transmissions”, RAN 4 asked the following question to RAN1:

* **What are the consequences if phase continuity cannot be maintained in the case of UL transmissions from other signals/channels in the repetition gap?**

Companies are welcome to provide answers in the table below.

|  |  |
| --- | --- |
| **Company name** | **Answer to RAN4 question** |
| Ericsson | To motivate our answer we’d first offer some observations:* PUCCH is likely to be transmitted at different power and in fewer PRBs than PUSCH, and is more likely to be frequency hopped that PUSCH
* SRS is used for CSI, and so tends to be transmitted in wider bandwidths and/or frequency hopped
* Many SRS configurations involve switching among antenna ports or beams different from PUSCH

Then we propose to answer RAN4’s question with:**Proposal:*** The consequences of not maintaining phase continuity for the case where UE transmits other signals/channels are not likely to be serious, since the constraints to meet phase continuity preclude the common use of this case for JCE.
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| CATT | In this case:* The UE is not required to maintain power consistency and phase continuity between the interrupted PUSCH/PUCCH.
* RAN1 may treat such interruption as an event, where an actual time domain window (TDW) in which the UE performs DMRS bundling shall be terminated. A new actual TDW may resume in the remaining PUSCH/PUCCH, depending on the UE capability. RAN1 is still discussing the details.
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| Intel | In our view, if phase continuity cannot be maintained in the case of UL transmission from other signals/channels during the repetition gap, joint channel estimation based on the PUSCH or PUCCH repetitions before and after the repetition gap may not be performed. This can be treated as starting point of a new actual time domain window. Especially when phase offset after repetition gap cancels that before repetition gap, this may cause detrimental effect on the channel estimation performance, and hence lead to potential decoding failure.So our understanding is that joint channel estimation may not be performed at the receiver if phase continuity cannot be maintained in the case of UL transmissions from other signals/channels in the repetition gap. |
| QC | Here is our response:RAN1 is already working on a procedure to handle such scenarios. The UE is allowed to terminate bundling if such a transmission occurs and UE is expected to resume (subject to UE capability) bundling after the intervening transmission ends, assuming there are more PUSCH/PUCCH repetitions to transmit.On the whole we do not think this is likely to have a big impact on the overall performance. |

# Conclusion

TBD