**3GPP TSG RAN WG1 #103-e R1-200XXXX**

**e-Meeting, October 26th – November 13th, 2020**

**Agenda item:** 7.1

**Source:** Moderator (CATT)

**Title:** Summary of [103-e-NR-7.1CRs-06] Correction for UCI on Msg3 PUSCH and MsgA PUSCH (Rel-16)

**Document for:** Discussion and Decision

# Introduction

This document is created to facilitate the email discussion “[103-e-NR-7.1CRs-06] Correction for UCI on Msg3 PUSCH and MsgA PUSCH (Rel-16)”. This thread is triggered by draft CR to Rel-16 TS38.213 in R1-2007802 [1].

The issue was initially brought up in R1-2005661 in RAN1#102-e meeting. The conclusion was to further discuss for Rel-16 as follows.

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| [R1-2005661](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_102%5CDocs%5CR1-2005661.zip) Correction for UCI on Msg3 PUSCH CATTRejected for Rel-15 but further consider for Rel-16 (in RAN1#103-e) |

# Company views

Please provide your views in the tables below:

**Q1: Do you agree with the issue raised in R1-2007802?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comment (If No, why?)** |
| Ericsson | Partially agree. | We agree that for MSG3 this procedure shall be clarified. However, for MsgA the discussion shall be held in the 2-step RACH maintenance. |
| Samsung | Yes | Regarding MsgA issue, we tend to agree with concern from Ericsson.  |
| ZTE | Yes | Common understanding is Msg3/MsgA PUSCH would not multiplex with UCI as such case is rare.  |
| Spreadtrum | Yes | We agree with the issues raised in the CR. |
| Intel | Partially yes | We agree the issue for the case when Msg3 PUSCH overlaps with PUCCH. However, for MsgA PUSCH, the following conclusion was made for 2-step RACH in RAN1#101-e meeting. Basically, it is up to UE implementation to handle the overlapping case. **Conclusion:*** For single cell operation or for operation with carrier aggregation in a same frequency band, it is up to UE whether to transmit MsgA PUSCH and/or PUSCH/PUCCH/SRS within a same slot or when the gap is not satisfied.
	+ Note: it is not intended to have any impact on UE capability signalling
 |
| NTT DOCOMO | Yes | We are fine either way to discuss MsgA case. |
| Panasonic | Yes | We agree that the issues raised in R1-2007802 should be clarified. |
| CATT |  | According to the comments so far, companies agree with the issue raised in the CR at least for Msg3 PUSCH:* Agree with the issue for Msg3 PUSCH
	+ Discuss MsgA PUSCH in 2-step RACH WI
		- Ericsson, Samsung, DCM
	+ Up to UE implementation for MsgA PUSCH
		- Intel
* Agree with the issue for both Msg3 PUSCH and MsgA PUSCH
	+ - ZTE, Spreadtrum, DCM, Panasonic

@Intel, I am not sure whether the conclusion covers non-overlapping MsgA PUSCH and other channels/signal within a same slot only or overlapping case as well. Anyway, given the comments from other companies, it seems better to focus on Msg3 PUSCH only for now. |
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**Q2: Do you agree with the text proposals in R1-2007802?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comment (If No, why?)** |
| Ericsson | No | We would in general be fine with the TP if it is to be applied for only Msg3. Currently the TP aims to cover scenarios for both Msg3 and MsgA. |
| Samsung | No | Although we understand the motivation of the CR, this is not essential correction one because it is very rare that UE performs RA procedure in RRC connected mode and overlapping PUCCH with HARQ-ACK is given to the UE. We think that this probability is quite lower than DCI missing probability. So, we don’t expect that there is a meaning gain to achieve.  |
| ZTE | No | Share the similar view with Samsung, I also hesitate that there is the case that UCI and Msg3/MsgA PUSCH would transmit simultaneously. |
| Spreadtrum | Yes | We are fine to make this clarify for UCI multiplexing, at lease it is needed for Msg3 to make the UE’s operation clearly. It is benefit for UE and gNB’s implementation.  |
| Intel | No | As mentioned above, it is up to UE implementation to handle overlapping between MsgA PUSCH and PUCCH. For overlapping between Msg3 PUSCH and PUCCH, we tend to agree with Samsung and ZTE that this may be a corner case so the CR may not be needed.  |
| NTT DOCOMO | Yes | We are fine either way of multiplexing UCI or dropping.Important thing for us is to clarify UE behavior of this overlap case from the following three reasons.* In DC, MCG provides PUCCH resource for P-CSI in SCG addition. Then UE does RACH at SCG, in this case, P-CSI PUCCH could overlap Msg3.
* In CA, a UE with single TAG is reconfigured with multi TAG. In this case, similar situation to the first bullet could occur.
* In LTE, there is a rule to solve this overlap if we understand correctly (section 10.1 of 36.213).
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| Panasonic | Yes | We are fine with the TP. LTE specification has also covered the scenario for Msg.3. In TS36.213 Section 10.1, there is following description:If a non-BL/CE UE is configured for a single serving cell and is not configured for simultaneous PUSCH and PUCCH transmissions, then in subframe/slot/subslot *n* uplink control information (UCI) shall be transmitted<…>* on PUSCH if the UE is transmitting PUSCH in subframe/slot/subslot *n* unless the PUSCH transmission corresponds to a Random Access Response Grant or a retransmission of the same transport block as part of the contention based random access procedure, in which case UCI is not transmitted
 |
| CATT |  | According to the comments so far, companies’ views on whether to address the issue:* Clarify UE behavior of the overlapping case
	+ Ericsson (Msg3 only), Spreadtrum (at least for Msg3), NTT DOCOMO, Panasonic
* No clarification of UE behavior of the overlapping case
	+ Samsung, ZTE, Intel

For the comments on the scenarios when the case would happen, please refer to the reply from DOCOMO. In addition, it can also happen if UE requests UL scheduling via RACH procedure.Besides, as commented by DOCOMO and Panasonic, the same UE behavior is defined in LTE. |
|  |  |  |

# Conclusion

To be added after the discussion.

# Reference

1. R1-2007802, Correction for UCI on Msg3 PUSCH and MsgA PUSCH, CATT, RAN1#103-e