3GPP TSG RAN WG1 #102-e R1-20xxxxx

e-Meeting, August 17th – 28th, 2020

Source: vivo

Title: Summary of email discussion [102-e-NR-7.1CRs-11]-phase 2

Agenda Item: 7.1

Document for: Discussion and Decision

# Introduction

The document provides a summary for the phase 2 of email discussion thread [102-e-NR-7.1CRs-11]. **Note that the deadline for the discussion on TPs for the email thread is set to be 8/24. Please provide the comments by 8/24 UTC 11:59 pm.**

* [102-e-NR-7.1CRs-11] Maintenance on PUSCH skipping with overlapping UCI on PUCCH – **Xiaohang (vivo)**
	+ For Rel-16, Issue#29 (including R1-2006837) in R1-2006958
	+ Discussion/Agreements by 8/19, TPs by 8/24

# Email discussion summary

**Outcomes of email discussion phase #1**

**Agreement**

For UL skipping of dynamic UL grant in non-CA and CA case, when there is PUCCH carrying UCI overlapping with a set of PUSCHs, the PUSCH with UCI multiplexing from the set cannot be skipped. MAC generates MAC PDU for the PUSCH and the UCI is multiplexed on the PUSCH.

# Discussions

Regarding the agreed UE behaviours for UL skipping for Case 1/2 in non-CA and CA case, the expected spec impacts are in PHY and MAC.

* Case 1: PUSCH skipping without overlapping CSI/HARQ-ACK on PUCCH (LTE behavior)
* Case 2: PUSCH skipping with overlapping CSI/HARQ-ACK on PUCCH (UE behavior defined in Rel.16)

Following TPs for PHY and MAC are provided for discussion. In this phase, we mainly focus on the CR to implement the agreements in RAN1 for UL skipping and send a LS to RAN2 to trigger their spec update. Note that the TP for MAC spec is just for information.

## TPs for PHY spec

### TP #1 for 38.213

For Case 2, as the PUSCH with UCI multiplexing from the set cannot be skipped, there would be interaction between MAC and PHY for MAC to generate MAC PDU for the PUSCH. The TP #1 for 38.213 provided in R1-2005328 is mainly to define the UE behavior for Case 2 in 38.213 section 9 that layer 1 shall notify higher layers that there is UCI to be multiplexed on a PUSCH.

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| 9 UE procedure for reporting control information<unchanged part omitted>If a UE - would multiplex UCI in a PUCCH transmission that overlaps with a PUSCH transmission, and - the PUSCH and PUCCH transmissions fulfill the conditions in Clause 9.2.5 for UCI multiplexing, the UE - notifies higher layers there is UCI to be multiplexed on the PUSCH by Layer 1 when *skipUplinkTxDynamic* provided by higher layers is set to *true*.- multiplexes only HARQ-ACK information, if any, from the UCI in the PUSCH transmission and does not transmit the PUCCH if the UE multiplexes aperiodic or semi-persistent CSI reports in the PUSCH;- multiplexes only HARQ-ACK information and CSI reports, if any, from the UCI in the PUSCH transmission and does not transmit the PUCCH if the UE does not multiplex aperiodic or semi-persistent CSI reports in the PUSCH.<unchanged part omitted> |

**Please provide your comments on TP #1 for 38.213.**

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| **Company** | **Comment** |
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### TP #2 for 38.214

The TP #2 for 38.214 provided in R1-2006680 is mainly to capture the behaviour that UE does not transmit a PUSCH if there is no MAC PDU generated.

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| 6.1 UE procedure for transmitting the physical uplink shared channel<unchanged part omitted>A UE shall upon detection of a DCI format scheduling a PUSCH transmit the corresponding PUSCH unless the UE does not generate a transport block as described in [10, TS38.321]. Upon detection of a DCI format 0\_1 or 0\_2 with "UL-SCH indicator" set to "0" and with a non-zero "CSI request" where the associated "reportQuantity" in *CSI-ReportConfig* set to "none" for all CSI report(s) triggered by "CSI request" in this DCI format 0\_1 or 0\_2, the UE ignores all fields in this DCI except the "CSI request" and the UE shall not transmit the corresponding PUSCH as indicated by this DCI format 0\_1 or 0\_2. When the UE is scheduled with multiple PUSCHs by a DCI, HARQ process ID indicated by this DCI applies to the first PUSCH, as described in clause 6.1.2.1, HARQ process ID is then incremented by 1 for each subsequent PUSCH(s) in the scheduled order, with modulo 16 operation applied. For any HARQ process ID(s) in a given scheduled cell, the UE is not expected to transmit a PUSCH that overlaps in time with another PUSCH. For any two HARQ process IDs in a given scheduled cell, if the UE is scheduled to start a first PUSCH transmission starting in symbol *j* by a PDCCH ending in symbol *i*, the UE is not expected to be scheduled to transmit a PUSCH starting earlier than the end of the first PUSCH by a PDCCH that ends later than symbol *i*. The UE is not expected to be scheduled to transmit another PUSCH by DCI format 0\_0, 0\_1 or 0\_2 scrambled by C-RNTI or MCS-C-RNTI for a given HARQ process until after the end of the expected transmission of the last PUSCH for that HARQ process. <unchanged part omitted> |

**Please provide your comments on TP #2 for 38.214.**

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## TPs for MAC spec

### TP #3 for 38.321

This section is intended for information only in RAN1, but companies are welcome to share their views, if any.

The TP#3 for 38.321 is proposed for consideration. After the spec changes for PHY are finalized, a LS including RAN1 agreements and endorsed CRs should be sent to trigger RAN2 discussion for the spec change.

The TP #3 for 38.321 in the following is mainly to define the UE behavior for Case 2 in 38.321 section 5.4.3.1.3 that MAC entity shall not generate a MAC PDU for the HARQ entity if there is no UCI to be multiplexed on this PUSCH transmission as indicated by Layer 1.

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| 5.4.3.1.3 Allocation of resources<unchanged part omitted>The MAC entity shall not generate a MAC PDU for the HARQ entity if the following conditions are satisfied:- the MAC entity is configured with *skipUplinkTxDynamic* with value *true* and the grant indicated to the HARQ entity was addressed to a C-RNTI, or the grant indicated to the HARQ entity is a configured uplink grant; and- there is no aperiodic CSI requested for this PUSCH transmission as specified in TS 38.212 [9]; and- there is no notification of UCI to be multiplexed on this PUSCH transmission received from lower layers; and- the MAC PDU includes zero MAC SDUs; and- the MAC PDU includes only the periodic BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR.<unchanged part omitted> |

**Note that the above TP#3 for 38.321 is for information only, but your comments are welcome**

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## Other impacts due to UL skipping

### PHR calculation

It was proposed by Qualcomm that the impact on the PHR calculation due to the PUSCH skipping should be clarified. Companies are welcome to express their views on the proposal below.

**Proposal: When a PUSCH is skipped in the case of UL CA, then for PHR calculation and for the purposes of UL power scaling of other channels, the skipped PUSCH(s) are considered not present.**

**Please provide your comments, if any.**

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| **Company** | **Comment** |
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# List of contributions

1. R1-2005327 Disucssion on PUSCH skipping with overlapping UCI on PUCCH vivo

1. R1-2005328 Draft 38.213 CR on PUSCH skipping with overlapping UCI on PUCCH vivo

1. R1-2006680 Draft 38.214 CR on PUSCH skipping with overlapping UCI on PUCCH vivo
2. [R1-2006331](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_102%5CDocs%5CR1-2006331.zip) Discussion on dynamic PUSCH skipping with overlapping UCI on PUCCH in Rel-16 ZTE

1. R1-2006902 UL skipping and overlapping PUSCH/PUCCH Ericsson, Nokia and Nokia Shanghai Bell

1. R1-2006837 Discussion of flexible NR UE bandwidth TEI and UL skipping Qualcomm Incorporated