**3GPP TSG-RAN WG1 Meeting #104-e R1-21xxxxx**

**e-Meeting, January 25th – February 5th, 2021**

**Title: LS on UL skipping for PUSCH in Rel-16**

**Release: Rel-16**

**Work Item: NR\_newRAT-Core, TEI16**

**Source:** RAN1

**To:** RAN2

**Cc:**

**Attachments:**

**Contact Person:**

**Name:** Xiaohang Chen

**E-mail Address:** chenxiaohang@vivo.com

**1. Overall Description:**

In RAN1 #104-e meeting, RAN1 discussed the behavior of PUSCH skipping with UCI for Case 1-6 considering both dynamic grant and configured grant in Rel-16 and made the following agreement.

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| **Proposed agreement:**For the case (Case 1-6) when DG PUSCH and CG PUSCH are overlapping on a serving cell and CG PUSCH is overlapping with PUCCH, and DG PUSCH is non-overlapping with the PUCCH * In Rel-16, when timeline condition is met, for Case 1-6 in non-CA and CA cases, when DG PUSCH skipping is configured and Rel-16 LCH based prioritization is not configured and there is a single PHY priority for UL transmissions, and when PUSCH repetition is not applied,
	+ When a CG PUSCH overlaps with a PUCCH on a same or different serving cell, a DG PUSCH overlaps with the CG PUSCH on one serving cell and the DG PUSCH does not overlap with the PUCCH, and there is no remaining PUSCH(s) on any serving cell(s) overlapping with the PUCCH, the UCI is transmitted on the PUCCH.
		- This is for case 1-6a and 1-6b in Figure 1.
		- MAC does not generate PDU for the CG PUSCH
		- If there is data for the DG PUSCH, MAC generates PDU for the DG PUSCH. If there is no data for the DG PUSCH, MAC does not generate PDU for the DG PUSCH
	+ When a CG PUSCH overlaps with a PUCCH on a same or different serving cell, a DG PUSCH overlaps with the CG PUSCH on one serving cell and the DG PUSCH does not overlap with the PUCCH, and there is remaining PUSCH(s) on any serving cell(s) overlapping with the PUCCH, the PUSCH from the remaining PUSCH(s) for UCI multiplexing is determined following the existing UCI multiplexing rules, MAC generates MAC PDU for the PUSCH and delivers the MAC PDU to PHY and the UCI is multiplexed on the PUSCH.
		- Note the remaining PUSCH(s) are not overlap with DG PUSCH if they are on same serving cell
		- This is for case 1-6c in Figure 1.
		- MAC does not generate PDU for the CG PUSCH
		- If there is data for the DG PUSCH, MAC generates PDU for the DG PUSCH. If there is no data for the DG PUSCH, MAC does not generate PDU for the DG PUSCH
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| **Case 1-6a** | **Case 1-6b** |
|  |
| **Case 1-6c** |

**Figure 1: Case 1-6a/1-6b/1-6c for non-CA and CA case**

For PUSCH skipping with PUSCH repetitions, RAN1 made the following agreements for Rel-16 DG PUSCH skipping or Rel-16 CG PUSCH skipping with repetitions.

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| **Proposed agreement:**For ~~DG~~ PUSCH with repetitions, when Rel-16 DG PUSCH skipping or Rel-16 CG PUSCH skipping is configured and Rel-16 LCH based prioritization is not configured and there is a single PHY priority for UL transmissions, * + ~~Option 1:~~ When there’s a PUCCH overlapping with any of the repetitions of the DG PUSCH or CG PUSCH, MAC generates MAC PDU for the DG PUSCH or the CG PUSCH and delivers the MAC PDU(s) to PHY and the UCI is multiplexed on the DG PUSCH or the CG PUSCH.
	+ Note: the UCI multiplexing timeline condition for the first repetition of DG PUSCH or the CG PUSCH should be ensured ~~is always met~~ according to current spec.
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**2. Actions:**

RAN1 respectfully asks RAN2 to

* Take into account the above agreements and update Rel-16 RAN2 specifications to support Rel-16 PUSCH skipping

**3. Date of Next RAN1 Meetings:**

TSG-RAN WG1 Meeting #104bis-e 12th April – 20th April 2021 E-meeting.

TSG-RAN WG1 Meeting #105-e 19th May – 27th May 2021 E-meeting.