3GPP TSG RAN WG1 #104-e R1-2102150

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

**Title: [Draft] Reply LS on overlapped data and SR are of equal L1 priority**

**Release: Rel-16**

**Work Item: NR\_IIOT-Core**

**Source:** vivo [To be RAN1]

**To:** RAN2

**Cc:**

**Attachments:**

**Contact Person:**

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**1. Overall Description:**

RAN1 would like to thank RAN2 for the LS R1-2100026 (R2-2011124) onhandling collision between SR and PUSCH with an equal L1 priority.

RAN1 discussed the following cases when LCH based prioritization is configured. The examples are provided in the figures for each case.

* Case 1: only SR overlaps with PUSCH of equal L1 priority
* Case 2: other UCI(s) i.e., HARQ-ACK/CSI overlap with SR of an equal L1 priority and the SR overlaps with the PUSCH of an equal L1 priority
  + Case 2-1: the final PUCCH resource after UCI multiplexing among different PUCCHs carrying HARQ-ACK/CSI and SR does not overlap with the PUSCH
  + Case 2-2: the final PUCCH resource after UCI multiplexing among different PUCCHs carrying HARQ-ACK/CSI and SR overlaps with the PUSCH
* Case 3: other UCI(s) i.e., HARQ-ACK/CSI overlap with a PUSCH of an equal L1 priority, SR overlaps with the PUSCH of equal L1 priority, but other UCI(s) do not overlap with the SR
* Case 4: other UCI(s) i.e., HARQ-ACK/CSI overlap with SR of an equal L1 priority, but SR do not overlap with the PUSCH of an equal L1 priority



Case 1: only SR overlaps with PUSCH of equal L1 priority



Case 2-1: the final PUCCH resource after UCI multiplexing does not overlap with PUSCH



Case 2-2: the final PUCCH resource after UCI multiplexing overlaps with PUSCH



Case 3: other UCI(s) overlap with a PUSCH, SR overlaps with the PUSCH, SR does not overlap with other UCI(s)



Case 4: other UCI(s) overlap with SR of an equal L1 priority, but SR do not overlap with the PUSCH of an equal L1 priority

For case 1, RAN1 is positive in principle and thinks that the intended UE behaviour as described in the LS, can be supported if the CR [R1-2009687](file:///E:\laptop\RAN_1_meeting\103\Docs\R1-2009687.zip) is implemented into the specification. But, some companies in RAN1 think it may have impacts on the PHY processing timeline.

For case 2-1, if there are other UCI(s) i.e., HARQ-ACK/CSI of the equal L1 priority overlapping with SR, and the final PUCCH resource after UCI multiplexing among different PUCCHs does not overlap with the PUSCH and does not overlap with any other PUSCH if any, RAN1 has the following two understandings:

* Understanding 1: MAC is not aware of the UCI multiplexing in PHY, MAC does not know whether the final PUCCH overlaps with the PUSCH or not, MAC only knows configured PUCCH resource for SR. Therefore, MAC can decide to deliver SR or PUSCH.
* Understanding 2: MAC is aware of the UCI multiplexing in PHY based on UL skipping agreement (as in LS R1-2009772). If MAC is aware that the final PUCCH resource does not overlap with the PUSCH, and does not overlap with any other PUSCH, then for case 2-1, MAC can send both SR and PUSCH to PHY.

For case 2-2 and case 3, RAN1 has the following two different understandings:

* Understanding 1: the UL skipping-related check is prioritized over the LCH based prioritization check in MAC. Therefore, if the PUSCH in the LS is expected to have UCI multiplexing, MAC does not prioritize SR over PUSCH, and send a MAC PDU to PUSCH instead.
* Understanding 2: the LCH based prioritization check is prioritized over the UL skipping-related check in MAC. Therefore, the SR in the LS is prioritized in MAC and is delivered and MAC shall not deliver the MAC PDU for the PUSCH.

For case 4 of resource overlapping between SR and other UCI(s) i.e., HARQ-ACK/CSI of the equal L1 priority, if there is no resource overlapping between SR and PUSCH of an equal L1 priority, and the final PUCCH resource after UCI multiplexing among different PUCCHs overlap with the PUSCH, RAN1 would like to inform RAN2 that for such case, RAN1 has the following two understandings:

* Understanding 1: MAC is not aware of the UCI multiplexing in PHY, MAC does not know whether the final PUCCH overlaps with the PUSCH or not, MAC only knows configured PUCCH resource for SR. Therefore, MAC can send both SR and PUSCH to PHY, based on current RAN1 specification TS 38.213, PHY will multiplex other UCI(s) i.e., HARQ-ACK/CSI in the PUSCH and does not transmit SR.
* Understanding 2: MAC is aware of the UCI multiplexing in PHY, If MAC is aware that the final PUCCH resource overlaps with the PUSCH, then MAC can decide to deliver SR or PUSCH according to LCH based prioritization.

**2. Actions:**

**To RAN2 group**

**ACTION:**

RAN1 respectfully ask RAN2 to provide their views on which understanding (understanding 1 or 2 above) is the intended MAC layer behavior or to provide an alternate understanding, for above case 2-1, case 2-2, case 3 and case 4.

**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.