**3GPP TSG-RAN WG2 Meeting #123bis R2-231xxxx**

**Toulouse, FR, 21st – 25th Aug, 2023**

**Agenda item:** 7.2.2

**Source:** Intel Corporation

**Title:** [Post123bis][401][POS] Reply LS to RAN1 on SL positioning MAC agreements (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following at meeting offline discussion:

* [Post123bis][401][POS] Reply LS to RAN1 on SL positioning MAC agreements (Intel)

Scope: Reply to R2-2309419:

 Inform RAN1 of the RAN2 agreement on priority for shared resource pool

 Inform RAN1 of the other related MAC agreements, e.g., collision handling

Detailed list of agreements to be concluded in LS drafting.

Intended outcome: Approved LS

Deadline: Short

# Contact Information

Respondents to the email discussion are kindly asked to fill in the following table.

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# Discussion

RAN2 discussed SL positioning MAC related issues and made the following agreement:

Agreements:

Support the following at least the following contents within the MAC CE for SL-PRS resource request: FFS whether both of them can be items with a list

 Destination ID (indicated by an index rather than the complete destination ID)

 Priority

When UL-SCH resource cannot accommodate SL-PRS resource request MAC CE plus its subheader, the UE should send SR to the gNB, either by SR-PUCCH or SR-PRACH.

SL-PRS resource request MAC CE is cancelled when the MAC CE is transmitted. FFS the other conditions to cancel the MAC CE.

SR triggered by the SL-PRS resource request MAC CE is cancelled when the MAC CE is transmitted. FFS the other conditions to cancel the SR.

Do not support activation/deactivation of the CG type2 by the UE sending a MAC CE.

CG confirmation MAC CE is needed when the DCI for CG type 2 activation/deactivation command is successfully received.

Decide on the issue of whether to reuse the legacy Sidelink Configured Grant Confirmation MAC CE when the CG configurations are provided by RAN1.

Confirm that dedicated/shared RP can be configured at the same time.

Leave the resource pool selection to UE implementation among resource pools allowing SL-PRS transmission when resource selection is triggered for SL-PRS transmission.

Legacy conditions for resource selection/reselection check can be reused when the shared pool is selected.

Legacy conditions for resource selection/reselection can be the baseline when the dedicated pool is selected.

The following two conditions are not applicable for the conditions for resource selection/reselection for dedicated resource pool.

 if PSCCH duration(s) and 2nd stage SCI on PSSCH for all transmissions of a MAC PDU of any selected sidelink grant(s) are not in SL DRX Active time as specified in clause 5.28.3 of the destination that has data to be sent.

 if the selected sidelink grant cannot accommodate a RLC SDU by using the maximum allowed MCS configured by RRC in sl-MaxMCS-PSSCH associated with the selected MCS table and the UE selects not to segment the RLC SDU

If the transmission with the selected grant cannot fulfill the remaining SL-PRS delay budget, resource selection/reselection is performed.

The following legacy parameters are selected/reselected when the TX resource (re-)selection is triggered in the shared resource pool.

(a) Resource reservation interval, when the transmission of periodic SL-PRS

(b) COUNTER value, when the transmission of periodic SL-PRS

(c) Number of HARQ retransmissions

(d) frequency resources within the range

The following parameters are selected/reselected when the TX resource (re-)selection is triggered in the dedicated resource pool. [15/15] FFS the number of retransmissions.

(a) resource reservation interval, when the transmission of periodic SL-PRS

(b) COUNTER value, when the transmission of periodic SL-PRS

When resource selection is triggered for the transmission of both data and SL-PRS on shared resource pool, the priority is determined by MAC as the higher priority of the two for the usage of both MAC and PHY. Send a reply LS to RAN1

The priority of the data should follow the priority of PRS when there is only SL-PRS pending for transmission on shared resource pool.

For a SL grant in dedicated resource pool, MAC layer selects the destination that has the highest priority of the SL PRS for transmission. FFS the other criteria for destination selection in shared resource pool

For a SL Grant in shared resource pool, MAC layer selects the destination with the highest priority of the SL-PRS and SL-SCH data. FFS the other criteria for destination selection in shared resource pool

When the destination of the shared resource pool is already selected when there are both SL-PRS and data pending for transmission, SL PRS is transmitted when there is remaining resources for SL-PRS after the SL-SCH with higher priority has already been allocated; if there is no higher priority data, SL-PRS can be transmitted.

If a SL PRS is transmitted in the SL grant in the shared pool, legacy LCP rules can be performed to construct MAC PDU associated with the SL grant after TBS is provided from PHY.

If the selected destination only has pending SL PRS, the MAC entity should generate MAC PDU containing only padding MAC subPDU for the transmission along with SL-PRS.

DRX and dedicated resource pool for PRS transmission should not be applied together. This does not preclude the NW configuration for dedicated RP to be configured together with DRX.

Collision handling between SL/UU for SL-PRS is based on the L1 priority.

SL-PRS is prioritized over PUSCH/PUCCH when

 The value of the priority of PUSCH/PUCCH is higher than a threshold, as in legacy

 The value of the priority of SL-PRS is lower than a threshold

When resource selection is triggered for SL-LCH data transmission, dedicated pool should not be selected.

The scope of this discussion is to decide which agreements should be contained in the LS. During online discussion, so far only two agreements are agreed to be sent to RAN1:

1 When resource selection is triggered for the transmission of both data and SL-PRS on shared resource pool, the priority is determined by MAC as the higher priority of the two for the usage of both MAC and PHY. Send a reply LS to RAN1

2 Collision handling between SL/UU for SL-PRS is based on the L1 priority.

However, other agreements may also be helpful for RAN1 discussion, e.g.

3 Support the following at least the following contents within the MAC CE for SL-PRS resource request: FFS whether both of them can be items with a list

 Destination ID (indicated by an index rather than the complete destination ID)

 Priority

4 Decide on the issue of whether to reuse the legacy Sidelink Configured Grant Confirmation MAC CE when the CG configurations are provided by RAN1.

5 Confirm that dedicated/shared RP can be configured at the same time.

6 Leave the resource pool selection to UE implementation among resource pools allowing SL-PRS transmission when resource selection is triggered for SL-PRS transmission.

7 Legacy conditions for resource selection/reselection check can be reused when the shared pool is selected.

8 Legacy conditions for resource selection/reselection can be the baseline when the dedicated pool is selected.

9 The following two conditions are not applicable for the conditions for resource selection/reselection for dedicated resource pool.

 if PSCCH duration(s) and 2nd stage SCI on PSSCH for all transmissions of a MAC PDU of any selected sidelink grant(s) are not in SL DRX Active time as specified in clause 5.28.3 of the destination that has data to be sent.

 if the selected sidelink grant cannot accommodate a RLC SDU by using the maximum allowed MCS configured by RRC in sl-MaxMCS-PSSCH associated with the selected MCS table and the UE selects not to segment the RLC SDU

10 If the transmission with the selected grant cannot fulfill the remaining SL-PRS delay budget, resource selection/reselection is performed.

11The following legacy parameters are selected/reselected when the TX resource (re-)selection is triggered in the shared resource pool.

(a) Resource reservation interval, when the transmission of periodic SL-PRS

(b) COUNTER value, when the transmission of periodic SL-PRS

(c) Number of HARQ retransmissions

(d) frequency resources within the range

12 The following parameters are selected/reselected when the TX resource (re-)selection is triggered in the dedicated resource pool. [15/15] FFS the number of retransmissions.

(a) resource reservation interval, when the transmission of periodic SL-PRS

(b) COUNTER value, when the transmission of periodic SL-PRS

13 The priority of the data should follow the priority of PRS when there is only SL-PRS pending for transmission on shared resource pool.

14For a SL grant in dedicated resource pool, MAC layer selects the destination that has the highest priority of the SL PRS for transmission. FFS the other criteria for destination selection in shared resource pool

15 For a SL Grant in shared resource pool, MAC layer selects the destination with the highest priority of the SL-PRS and SL-SCH data. FFS the other criteria for destination selection in shared resource pool

16 When the destination of the shared resource pool is already selected when there are both SL-PRS and data pending for transmission, SL PRS is transmitted when there is remaining resources for SL-PRS after the SL-SCH with higher priority has already been allocated; if there is no higher priority data, SL-PRS can be transmitted.

17 If a SL PRS is transmitted in the SL grant in the shared pool, legacy LCP rules can be performed to construct MAC PDU associated with the SL grant after TBS is provided from PHY.

18 If the selected destination only has pending SL PRS, the MAC entity should generate MAC PDU containing only padding MAC subPDU for the transmission along with SL-PRS.

19 DRX and dedicated resource pool for PRS transmission should not be applied together. This does not preclude the NW configuration for dedicated RP to be configured together with DRX.

20 SL-PRS is prioritized over PUSCH/PUCCH when

 The value of the priority of PUSCH/PUCCH is higher than a threshold, as in legacy

 The value of the priority of SL-PRS is lower than a threshold

21 When resource selection is triggered for SL-LCH data transmission, dedicated pool should not be selected.

Therefore, there are following options:

**Option 1**: Send all MAC related agreements to RAN1; (This can simplify our discussion)

**Option 2**: Only send selected agreements to RAN1

Note: The draft LS is based on option 1.

**Discussion point 1: Any preference from companies on which agreements should be sent to RAN1? Please indicate which agreements should be contained in the LS if your preference is option 2.**

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| **Company** | **Option 1 or Option 2** | **Remark** |
| **ZTE** | **OPTION 1** | **Support to send all the agreements to RAN1 and highlight the selected two agreements** |
| **Qualcomm** | **Option 1** | **Should help to avoid/identify any potential misalignments between RAN2 and RAN1.** |
| **InterDigital** | **Option 1** | **Send all agreements since the purpose of the LS is to inform the RAN2 agreements. There is no issue with sending all agreements.** |
| **Huawei, HiSilicon** | **Option2** | **It seems clear that what to include in the reply LS is the scope of the discussion**   * [Post123bis][401][POS] Reply LS to RAN1 on SL positioning MAC agreements (Intel)   Scope: Reply to R2-2309419:   Inform RAN1 of the RAN2 agreement on priority for shared resource pool   Inform RAN1 of the other related MAC agreements, e.g., collision handling  Detailed list of agreements to be concluded in LS drafting.  Intended outcome: Approved LS  Deadline: Short  **Not all the agreements are relevant to RAN1. We think the following agreements should be included in the reply LS**  Support the following at least the following contents within the MAC CE for SL-PRS resource request: FFS whether both of them can be items with a list   Destination ID (indicated by an index rather than the complete destination ID)   Priority  The priority of the data should follow the priority of PRS when there is only SL-PRS pending for transmission on shared resource pool.  When the destination of the shared resource pool is already selected when there are both SL-PRS and data pending for transmission, SL PRS is transmitted when there is remaining resources for SL-PRS after the SL-SCH with higher priority has already been allocated; if there is no higher priority data, SL-PRS can be transmitted.  If the selected destination only has pending SL PRS, the MAC entity should generate MAC PDU containing only padding MAC subPDU for the transmission along with SL-PRS.  DRX and dedicated resource pool for PRS transmission should not be applied together. This does not preclude the NW configuration for dedicated RP to be configured together with DRX.  SL-PRS is prioritized over PUSCH/PUCCH when   The value of the priority of PUSCH/PUCCH is higher than a threshold, as in legacy   The value of the priority of SL-PRS is lower than a threshold |

**Discussion point 2: Any comments on the draft LS?**

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| **Company** | **Remark** |
| **ZTE** | **The selected two agreements (priority and collision handling) should be separately presented, e.g., in different paragraph**  **[Rapp] If we put agreements in different box, it may give RAN1 impression that only first two agreements are related to them. Would be good to avoid this.** |
| **InterDigital** | **According to the RAN1 LS (R1-2308559), RAN1 asks that RAN2 takes RAN1’s agreement when defining priority levels for SL PRS and PSSCH.**  ***RAN1 agreement: “For a slot, a single priority value is provided by higher layers to the physical layer…”***  **In our view, as a response LS, it would be clear to mention that providing a single priority value for an alignment of RAN1’s understanding/agreement.**  **For example, RAN2 confirms that MAC layer can provide a single priority (i.e., higher priority of data and SL-PRS) based on the RAN2 123bis agreement…**  **[Rapp] It can be reflected by following agreements. Would be good to not emphasize any of these agreements.**  When resource selection is triggered for the transmission of both data and SL-PRS on shared resource pool, the priority is determined by MAC as the higher priority of the two for the usage of both MAC and PHY. |
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# Summary

Based on the input from companies, we have the following proposals: