**3GPP TSG-RAN WG2 Meeting #117 electronic R2-220xxxx**

**Online, February, 2022**

**Agenda item: 8.15.2**

**Source: OPPO**

**Title: Summary of POST-711**

**Document for: Discussion and Decision**

# Introduction

This document is to discuss the left issues from the following email discussion:

* [AT117-e][711][V2X/SL] UL and SL prioritization (OPPO)

 **Scope:** Prepare the CR with the change above and discuss if the CR is aligned with RAN2 agreements well. Note we’ll focus on the CR and we’ll not have discussion regarding whether circular reference issue needs to be resolved or not.

 **Intended outcome:** CR in R2-2203692. Email approval.

**Deadline:** 3/3 10:00am UTC

    There are 4 changes in the draft-CR as follows:

1. In 5.4.2.2, change to the plural form for LTE V2X communication considering CA in LTE-V2X;
2. In 5.22.1.3.1a, add the UL priority comparison condition and the MAC CE prioritization condition for NR UL transmission;
3. In 5.22.1.3.1a, remove the “neither prioritized as specified in clause 5.4.2.2 nor” and change the sentence into “none of uplink transmission(s) is prioritized by upper layer according to TS 23.287 [19]” to remove the cross-reference issue;
4. In 5.4.2.2, remove the UL priority comparison condition and the MAC CE prioritization condition since the condition is added in 5.22.1.3.1a.

And the concern for the alignment between the changes and previous RAN2 agreements is on change 2/4, so this discussion will check companies’ on whether change 2/4 are aligned with previous RAN2 agreement.

# Discussion

For the 2nd change in the draft-CR, i.e., add the UL priority comparison condition and the MAC CE prioritization condition for NR UL transmission

The related RAN2 agreements on the prioritization of sidelink transmission are as follows:

For between SL-data and UL-data/SRB, the SL transmission is prioritized if the highest priority value of UL LCH(s) with available data is larger than the UL priority threshold and the highest priority value of SL LCH(s) with available data is lower than the SL priority threshold. Otherwise the UL transmission is prioritized.

And the following changes are including the prioritization condition of UL-threshold comparison and MAC CE in 5.22.1.3.1a directly:

|  |
| --- |
| The transmission of the MAC PDU is prioritized over uplink transmission(s) of the MAC entity or the other MAC entity if the following conditions are met:1> if the MAC entity is not able to perform this sidelink transmission simultaneously with all uplink transmission(s) at the time of the transmission, and1. if none of the uplink transmission(s) is prioritized by upper layer according to TS 23.287 [19]; and
2. if none of the NR uplink MAC PDU(s) includes any MAC CE prioritized as described in clause 5.4.3.1.3; and
3. if the value of the highest priority of the logical channel(s) of all the NR uplink transmission(s) is not lower than *ul-PrioritizationThres* if *ul-PrioritizationThres* is configured; and

1> if *sl-PrioritizationThres* is configured and if the value of the highest priority of logical channel(s) or a MAC CE in the MAC PDU is lower than *sl-PrioritizationThres*. |

**Q1: Do you think the above change is aligned with the related previous RAN2 agreements?**

1. **Yes**
2. **No (Please point the not-aligned part and provide the suggestion on revision)**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Samsung | Yes |  |
| ZTE | Yes |  |
| Nokia | Yes, if majority | Just a small note that in the actual draft CR, “the” is missing in the second condition; ‘if none of the uplink’ although it is stated hereOPPO: Thanks for spotting this, will modify in the next version. |
| Huawei, HiSilicon | Yes |  |
| Apple | Yes |  |
| CATT | Yes |  |
| vivo | Yes with comments | We suggest the highlighted part of the following two sentences are captured using the same style, i.e., the two “if xxx is configured” conditions are either at the beginning or at the end of corresponding sentence.1. if the value of the highest priority of the logical channel(s) of all the NR uplink transmission(s) is not lower than *ul-PrioritizationThres* if *ul-PrioritizationThres* is configured; and

1> if *sl-PrioritizationThres* is configured and if the value of the highest priority of logical channel(s) or a MAC CE in the MAC PDU is lower than *sl-PrioritizationThres*. |
| Lenovo | Yes |  |
| LG | Yes but not support CR | We are supportive of Huawei’s CR R2-220276.Please check next comments. |

Then, since the UL priority comparison condition and the MAC CE prioritization condition for NR UL transmission have been moved to section 5.22.1.3.1a, it is straight forward to remove the corresponding part in 5.4.2.2 to avoid duplication as follows:

|  |
| --- |
| The transmission of the MAC PDU is prioritized over sidelink transmission or can be performed simultaneously with sidelink transmission if one of the following conditions is met:- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and neither the transmission of NR sidelink communication is prioritized as described in clause 5.22.1.3.1a nor the transmission(s) of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22]; or- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and the MAC entity is able to perform this UL transmission simultaneously with the transmission of NR sidelink communication and/or the transmission(s) of V2X sidelink communication; or- if there is only configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and either none of the transmissions of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22] or the MAC entity is able to perform this UL transmission simultaneously with the transmission(s) of V2X sidelink communication; or- if there is only a sidelink grant for transmission of NR sidelink communication at the time of the transmission, and if the transmission of NR sidelink communication is not prioritized as described in clause 5.22.1.3.1a, or there is a sidelink grant for transmission of NR sidelink communication at the time of the transmission and the MAC entity is able to perform this UL transmission simultaneously with the transmission of NR sidelink communication; or- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and either only the transmission of NR sidelink communication is prioritized as described in clause 5.22.1.3.1a or only the transmission(s) of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22] and the MAC entity is able to perform this UL transmission simultaneously with the prioritized transmission of NR sidelink communication or V2X sidelink communication: |

**Q2: Do you think the above change is aligned with the related previous RAN2 agreements/specification?**

1. **Yes**
2. **No (Please point the not-aligned part and provide the suggestion on revision)**

|  |  |  |
| --- | --- | --- |
| Company | Yes or No | Comment |
| Samsung | Yes |  |
| ZTE | Yes |  |
| Nokia | Yes, if majority |  |
| Huawei, HiSilicon | Yes |  |
| Apple | Yes |  |
| CATT | Yes |  |
| vivo | Yes |  |
| Lenovo | Comments | For first change (second paragraph), it is for the case when both NR SL and V2X SL has transmission and UL has higher priority than threshold (also MAC CE). In this case UL will prioritised over both NR SL and V2X SL. If removed, this case seems cannot be covered consider the updated 5.22.1.3.1a is only for the NR SL transmission is prioritized or not prioritized over UL. So prefer to keep this paragraph. OPPO: Thanks for the comments, for this first change, as offline-ed, since the conditions (UL-threshold comparison and MAC CE) are all for prioritization between NR UL and NR SL, i.e., there is nothing to do with LTE SL in the actual prioritization procedure. Please see the below RAN2 agreement in R16:3: LTE-solution should be applied to LTE UL and NR SL cross-RAT case (if needed). FFS on the need of this prioritization.4: For NR UL and LTE SL cross-RAT case, RAN2 aims at no change to LTE SL protocol, and LTE-solution is the baseline (if needed). FFS on the need of this prioritization.Therefore, with moving the related conditions in 5.22.1.3.1a and move this paragraph, nothing is missing.For the second change, ok for that. |
| LG | Comments | We have the same understanding of current spec/RAN2 agreements with Lenovo. - “When both NR SL and V2X SL has transmission and UL has higher priority than threshold (also MAC CE), UL will prioritised over both NR SL and V2X SL.”So, we prefer this to be specified in section 5.4.2.2 for readability of the spec in both the first change and the second change.OPPO: Please see the above reply to Lenovo. |

**Q3: Do you have any other comments on the running-CR?**

|  |  |
| --- | --- |
| Company | Comment |
| Huawei, HiSilicon | With the current changes, I believe all prioritization handling between UL and SL will happen in 5.22.1.3.1a. There shall be no reference of such prioritization back to 5.4.2.2. “prioritized as specified in clause 5.4.2.2” in one of the level 1 conditions shall be removed (as done in our CR R2-2202716). I provided one revision on this. OPPO: Thanks for the comment. For the deletion of the other reference to 5.4.2.2 (as in your CR), we may have different understanding. * Firstly, this reference is used for determination of whether a SL transmission can be performed instead of SL prioritization;
* And if we delete this some cases where SL is prioritized but cannot be transmitted (since UL should be transmitted in the same time) will be missing. For example, in UL CA case, according to 5.22.1.3.1a SL is prioritized when simul-tx between SL and “all uplink transmission(s)” cannot be done, while according to 5.4.2.2 UL is prioritized when simul-tx between SL and “this UL transmission” can be done, i.e., UL and SL transmission can be prioritized in the same time. And in this case, according to legacy spec, our understanding is SL transmission should not be performed.

Therefore, our understanding is this reference to 5.4.2.2 cannot be removed, please correct me if any misunderstanding here. |
| Apple | Actually, we have different view as Huawei, all prioritization handling between UL and SL is now in 5.4.2.2 as 5.4.2.2 includes not only a reference to 5.22.1.3.1a, but also have more full set of rules. So, what we need to delete is the “ and the sidelink transmission is prioritized over uplink transmisison “ part which is no longer needed. |
| Lenovo | We were supportive for Huawei’s CR R2-2202716We understand 5.22.1.3.1a is from NR SL perspective to determine whether NR SL can be transmitted in case there has UL. In case UE cannot transmit them all, as long as NR SL has higher priority than threshold and UL has not higher priority than threshold, NR SL can be transmitted no matter whether partial UL can be transmitted together or not.OPPO: Thanks for the comment. We agree that “5.22.1.3.1a is NR SL perspective to determine whether NR SL can be transmitted”, but in case UE cannot transmit them all, our understanding of the legacy spec is NR SL can only be transmitted when **NR UL is not prioritized** + **NR SL is prioritized**, i.e. the 2 conditions have to be both satisfied.And for 5.4.2.2, it is from UL perspective to determine whether UL can be transmitted, which consider not only NR SL but also V2X SL. In 5.22.1.3.1a, remove “and the sidelink transmission is prioritized over uplink transmisison “ part means "UL is not prioritized then NR SL can be transmitted, but UL is not prioritized could also because of V2X SL is prioritized. So we think this part should not be removed.Not sure if above understanding is correct and sorry if we misunderstanding something here. |
| LG | When both NR SL and V2X SL has transmission and UL has higher priority than threshold (also MAC CE), UL will prioritised over both NR SL and V2X SL. So, we prefer this to be specified in So, we support HW's CR R2-220276 from this point of view.OPPO: We have different understanding on “When both NR SL and V2X SL has transmission and UL has higher priority than threshold (also MAC CE), UL will prioritised over both NR SL and V2X SL” since UL-priority threshold is not used in the LTE SL prioritization which can be seen in the following RAN2 agreements: 3: LTE-solution should be applied to LTE UL and NR SL cross-RAT case (if needed). FFS on the need of this prioritization.4: For NR UL and LTE SL cross-RAT case, RAN2 aims at no change to LTE SL protocol, and LTE-solution is the baseline (if needed). FFS on the need of this prioritization. |

# Comment for Post-117

Please provide your comments for the updated-CR in the following table

|  |  |  |
| --- | --- | --- |
| Company | Section | Comment |
| Apple | 5.22.1.3.1a | As there are more conditions added in the last paragraph of 5.22.1.3.1a , we have a concern that this may lead to NBC changes for a sidelink UE. For example, when a SL UE already knows the UL transmission is not going to happen according to 5.4.2.2, it is now required to do a check again for the UL traffic priority and NR UL-threshold, which may cause the UE to prioritize UL traffic over SL traffic in this case. So, we would like to check company view about whether this is a reasonable change. |
| Lenovo | comments | For Apple’s comments, our understanding is that if UL is not prioritized according to 5.4.2.2, it includes the case UL is not prioritize over NR SL. So we would like to understand more e.g. in which case if UL is not prioritized according to 5.4.2.2, UL can prioritize over NR SL after check condition in 5.22.1.3.1a? |
| Huawei, HiSilicon |  | On Apple’s concern on NBC change, our understanding is that UL/SL prioritization is one UE internal operation. With the current change/moving the prioritization check to clause 5.22.1.3.1a, one UE will not cause IOT issue against the network without the change or another UE without the change. On our proposed change to remove “prioritized as specified in clause 5.4.2.2", we disagree with OPPO’s comments on “condition for transmission” and “prioritization for simultaneous transmission”. The check for prioritization is done before SL transmission, there is no much difference between conditions for transmission and conditions for SL/UL prioritization. The prioritization has to be done before the transmission. OPPO: We agree with “The check for prioritization is done before SL transmission” but may have different understanding on “there is no much difference between conditions for transmission and conditions for SL/UL prioritization”. Our understanding is SL being prioritized is a precondition of SL can be transmitted, i.e., **NR SL can only be transmitted** when **NR UL is not prioritized** + **NR SL is prioritized,** which means NR SL can only be transmitted is not equal to NR SL is prioritized.Second, all prioritization between UL/SL is done on the assumption that simultaneous UL/SL transmission cannot be done. In other words, when doing prioritization operation, the assumption is that only SL or UL can be transmitted. OPPO: We may have different understanding on “all prioritization between UL/SL is done on the assumption that simultaneous UL/SL transmission cannot be done”, i.e., our understanding is simultaneous transmission is also a condition for UL/SL prioritization in the current spec.The reference back to clause 5.4.2.2 is still circular reference (at least will cause redundant specification) since clause 5.4.2.2 refers back to 5.22.1.3.1a, so it is good to remove the circular reference altogether.  |
| LG |  | When both NR SL and V2X SL has transmission and UL has higher priority than threshold (also MAC CE), UL will prioritised over both NR SL and V2X SL. So, we prefer this to be specified in section 5.4.2.2 for readability of the spec.As we have replied above, UL-threshold can not be used in cross-RAT prioritization between NR UL and LTE SL.In conclusion, we are supportive of Huawei’s CR R2-220276. |

# Summary

#  Reference

1. R2-2202193 Correction on UL-SL prioritization\_option1 OPPO
2. R2-2202716 Clarification on the UL and NR SL prioritization Huawei, HiSilicon, Lenovo, Motorola Mobility