# **[101-e-NR-5G\_V2X\_NRSL-SL\_PHY\_Procedure-02] Email discussion/approval regarding prioritization**

[101-e-NR-5G\_V2X\_NRSL-SL\_PHY\_Procedure-02] Email discussion/approval regarding prioritization

* + Issue 2-1: Remaining issues on prioritization for SL HARQ reporting on PUCCH or PUSCH
  + Issue 2-3: UL/SL prioritization for the case when multiple UL TX and multiple SL TX overlap in time

Till 5/29, with potential TPs by 6/4 – Hanbyul (LGE)

**1. Remaining issues on prioritization for SL HARQ reporting on PUCCH or PUSCH**

In applying the following agreement, there are several cases where the priority of “PUCCH carrying SL HARQ reporting” is not defined as there is no “priority of the associated PSFCH.” Q1 – Q4 ask how to determine the priority of PUCCH carrying SL HARQ reporting in these cases.

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| * *When PUCCH carrying SL HARQ reporting overlaps with SL TX,*   + *The one with a higher priority is transmitted.*     - *The priority of PUCCH carrying SL HARQ reporting is the highest priority of the associated PSFCH* |

Q1: For configured grant, the TX UE reports ACK to gNB in case no PSCCH/PSSCH is transmitted in a set of resources. In this case, the priority of “PUCCH carrying SL HARQ reporting” is defined as

* Option 1-1: The smallest priority value among the possible values for the grant
* Option 1-2: The largest priority value among the possible values for the grant
* Option 1-3: A (pre-)configured priority value
* Option 1-4: Others (please specify)

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| --- | --- | --- |
| Company | Preferred option | Comment |
| Intel | 1-2  (i.e. least important) | Since this ACK information to gNB in this situation is less important than other information, because missed ACK may result on excessively scheduled retransmission, it is preferred to assign the lowest priority, i.e. largest priority value (least important). |
| LG | Option 1-1 | The purpose of this SL HARQ reporting is to prevent that the gNB schedules retransmission unnecessarily. In that point of view, it needs to be prioritized. |
| Qualcomm | 1-2(i.e. least important) | Our basic assumption is that collision can happen but is a rare event. As such, a few percent missed ACK would amount to a small amount of unused resource and would be totally acceptable. |
| NTT DOCOMO | Option 1-2 | Basically, ACK is not the most important. Excessive scheduling is not good from resource efficiency perspective, but better than dropping other important transmission. |
| vivo | Option 1-2 | The purpose of HARQ feedback is to guarantee the transmission reliability of a TB. If no TB, it is straightforward to set the HARQ feedback as lowest one. |
| OPPO | Option 1-2 |  |
| Samsung | Option 1-2 | If collision happens and the ACK is dropped, gNB will schedule resource for unnecessary retx. But the result is acceptable and is better than drop HARQ-ACK of other transmissions. |
| Fujitsu | Option 1-2 | As there is no PSCCH/PSSCH transmitted at all, the priority should be the lowest. By this way, it can guarantee that SL A/N with PSSCH is prioritized when colliding happens. |
| Huawei,  HiSilicon | Option 1-2 | The ACK is not associated with an actual SL transmission, the priority should be lowest among all possible transmissions. |
| CATT | Option 1-2 | Since no PSCCH/PSSCH is transmited at all, the priority should be the lowest |
| CMCC | Option 1-2 | When there is no TB to transmit in the CG resources, ACK is reported.  Option 1-2 may result in dropped ACK and unnecessary retransmission scheduling by gNB, while option 1-1 may lead to dropping A/N of other transmissions and the reliability of the corresponding TB is not guaranteed. So comparing to the performance loss of option 1-1, we think the resource waste of option 1-2 is acceptable. |
| Ericsson | Option 1-3 | Since there is no associated TB, and therefore, an associated priority, a pre-configured value is used for this case. |
| Apple | Option 1-2 | Since no TB is transmitted or will be retransmitted, the dropping of ACK may result in unnecessary scheduling of reTx resources. This is acceptable. |
| ZTE, Sanechips | Option 1-2 |  |
| InterDigital | Option 1-2 |  |
| FUTUREWEI | Option 1-2 | We see this as a very rare event. When such a collision occurs, there will be an additional scheduling. Given that this is rare, it should not impact much the sysrem performance |

Observation: The priority of “PUCCH carrying SL HARQ reporting” in case no PSCCH/PSSCH is transmitted in a set of resources.

* Option 1-1: LG (1 company)
* Option 1-2: Intel, Qualcomm, DOCOMO, vivo, OPPO, Samsung, Fujitsu, Huawei, HiSi, CATT, CMCC, Apple, ZTE, Sanechips, IntelDigital, Futurewei (16 companies)
* Option 1-3: Ericsson (1 company)
* Option 1-4:

Q2: The TX UE reports NACK to gNB in the following cases:

* When it does not transmit the corresponding PSCCH/PSSCH due to intra-UE prioritization.
* When it does not receive the corresponding PSFCH due to intra-UE prioritization.

In this case, do you agree that the priority of “PUCCH carrying SL HARQ reporting” is defined as the priority value of the dropped PSSCH or PSFCH?

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| Company | Answer | Comment |
| Intel | Yes | There is an associated priority, and it is straightforward to use |
| LG | Yes. | Even though the PSSCH or PSFCH will be dropped, the TX UE know the priority of the PSSCH to be transmitted or the PSFCH to be received. |
| Qualcomm | Yes |  |
| NTT DOCOMO | Agree |  |
| vivo | Yes |  |
| OPPO | Yes |  |
| Samsung | Yes |  |
| Fujitsu | Yes | Whenever there is associated PSSCH, the priority of the PSSCH should be used. |
| Huawei, HiSilicon | Agree | The reported the NACK is requesting the retransmission resources for corresponding PSCCH/PSSCH, so the priority value of the dropped PSSCH or PSFCH is used. |
| CATT | Yes |  |
| Lenovo,MM | Yes |  |
| CMCC | Yes |  |
| Ericsson | Agree | Use the priority value of the associated PSSCH/PSFCH |
| Apple | Agree |  |
| ZTE, Sanechips | Agree | If the associated PSCCH/PSSCH could be determined, then its priority should be used for associated PSFCH and PUCCH carrying SL HARQ. |
| InterDigital | Yes |  |
| FUTUREWEI | Yes | This is the most logical behavior |

Observation: All companies agreed to the solution in the question.

Q3: If the SL transmission does not use SL HARQ feedback (if supported by RAN2), the UE reports NACK to request further resources for blind retransmission and ACK otherwise. In this case, the priority of “PUCCH carrying SL HARQ reporting” is defined as

* Option 3-1: The smallest priority value among the possible values for the grant
* Option 3-2: The largest priority value among the possible values for the grant
* Option 3-3: A (pre-)configured priority value
* Option 3-4: The priority value of the associated PSSCH
* Option 3-5: Others (please specify)

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| Company | Preferred option | Comment |
| Intel | 3-4 | Since a UE has PSSCH for transmission, the rule to assign it to the corresponding PUCCH can be applied |
| LG | Option 3-4 | For simplicity, the priority of the associated PSSCH can be used considering that the priority of PSFCH is determined by the priority of the corresponding PSSCH. |
| Qualcomm | 3-5 | 3-4 for NACK, 3-2 (least priority) for ACK. Following same principle as Q1. |
| NTT DOCOMO | Option 3-4 |  |
| vivo | Option 3-2 or option 3-4 | we prefer a simple and unified solution for NACK/ACK |
| OPPO | Option 3-4 |  |
| Samsung | Option 3-4 |  |
| Fujitsu | Option 3-4 | Whenever there is associated PSSCH, the priority of the PSSCH should be used. |
| Huawei,  HiSilicon | Option 3-4 | Option 3-4 is more reasonable.  The priority value of associated PSSCH is known by both gNB and UE, same value can be used for prioritization. |
| CATT | Option 3-4 |  |
| Lenovo,MM | Option 3-4 |  |
| CMCC | Option 3-4 |  |
| Ericsson | Option 3-4 | Use the priority value of the associated PSSCH |
| Apple | Option 3-4 |  |
| ZTE, Sanechips | Option 3-4 | This is a straightforward way, with same logic as in HARQ enable case. |
| InterDigital | Option 3-4 |  |
| FUTUREWEI | Option 3-4 | Most straightforward behavior |

Observation: The priority of “PUCCH carrying SL HARQ reporting” in case UE reports NACK to request further resources for blind retransmission

* Option 3-1:
* Option 3-2: vivo (1 company)
* Option 3-3:
* Option 3-4: Intel, LG, DOCOMO, vivo, OPPO, Samsung, Fujitsu, Huawei, HiSi, CATT, Lenovo, MotM, CMCC, Ericsson, Apple, ZTE, Sanechips, InterDitigal, Futurewei (19 companies)
* Option 3-5: Qualcomm (1 company)

Q4: If the maximum number of HARQ re-transmissions is reached for a TB, the UE sends one bit on the UL resources for SL HARQ-ACK reporting. In this case, the priority of “PUCCH carrying SL HARQ reporting” is defined as

* Option 3-1: The smallest priority value among the possible values for the grant
* Option 3-2: The largest priority value among the possible values for the grant
* Option 3-3: A (pre-)configured priority value
* Option 3-4: The priority value of the associated PSSCH
* Option 3-5: Others (please specify)

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| Company | Preferred option | Comment |
| Intel | 3-4 | Same as Q3 |
| LG | Option 3-4 | For simplicity, the priority of the associated PSSCH can be used. |
| Qualcomm | 3-2 | 3-2 (least priority) for ACK. Following same principle as Q1. |
| NTT DOCOMO | Option 3-4 |  |
| vivo | Option 3-2 or option 3-4 |  |
| OPPO | Option 3-4 |  |
| Samsung | Option 3-4 |  |
| Fujitsu | Option 3-4 | Whenever there is associated PSSCH, the priority of the PSSCH should be used. |
| Huawei,  HiSilicon | Option 3-4 | Similar comments in Q3, same priority value of associated PSSCH can be used for comparison. |
| CATT | Option 3-4 |  |
| Lenovo, MM | Option 3-1 | Least important since gNB may also not schedule any more re-tx since the max re-Tx has been reached. |
| CMCC | Option 3-4 |  |
| Ericsson | Option 3-4 | Use the priority value of the associated PSSCH |
| Apple | Option 3-4 |  |
| ZTE, Sanechips | Option 3-4 |  |
| InterDigital | Option 3-4 |  |
| FUTUREWEI | 3-4 |  |

Observation: The priority of “PUCCH carrying SL HARQ reporting” in case the maximum number of HARQ re-transmissions is reached for a TB

* Option 3-1: Lenovo, MotM, (2 companies)
* Option 3-2: Qualcomm, vivo (2 companies)
* Option 3-3:
* Option 3-4: Intel, LG, DOCOMO, vivo, OPPO, Samsung, Fujitsu, Huawei, HiSi, CATT, CMCC, Ericsson, Apple, ZTE, Sanechips, InterDitigal, Futurewei (17 companies)
* Option 3-5:

Q5: When PUCCH carrying SL HARQ reporting overlaps with PUSCH without UCI, do you agree the following proposal?

Proposal:

* SL HARQ reporting is piggybacked in the PUSCH transmission.

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| Company | Answer | Comment |
| Intel | Yes, but | Is not already agreed, and HARQ CB for UCI on PUSCH is being prepared in Mode-1 AI? |
| LG | Yes | For clarification, we think that this PUSCH is shown to the UE after Uu multiplexing/cancellation. |
| QC |  | It is being discussed in Mode 1. |
| NTT DOCOMO | Agree |  |
| vivo |  | Agree with QC, It is being discussed in Mode 1. |
| OPPO |  | Agree with QC. |
| Samsung | Agree |  |
| Fujitsu | Yes |  |
| Huawei,  HiSilicon | Agree | In general, we agree with this proposal. However, by jointly considering Q5 and Q6, when PUCCH carrying SL HARQ reporting overlaps with multiple UL TXs (e.g. another PUCCH with UCI and PUSCH), the prioritization between PUCCHs is performed first, then followed by multiplexing/prioritization with PUSCH. |
| CATT |  | Agree with QC, should be discussed in mode 1. |
| Lenovo, MM | Yes |  |
| CMCC |  | We agree the principle of the proposal, but we prefer to introduce additional conditions for multiplexing SL HARQ reporting on PUSCH, i.e. similar rule with Q6. If the conditions for prioritizing SL HARQ reporting is satisfied, SL HARQ-ACK can be multiplexed on PUSCH, otherwise, drop SL HARQ-ACK.  And we share similar view with HW that the prioritization between PUCCHs is performed first, then followed by multiplexing/prioritization with PUSCH.  We are fine to discuss this issue in Mode 1 AI. |
| Ericsson |  | This proposal is being discussed in the Mode-1 AI |
| Apple |  | This can be discussed in the Mode-1 AI. |
| ZTE, Sanechips | Agree | Agree with others this is discussed in Mode-1 AI. |

Observation: Many companies responded that this issue is being discussed in Mode 1 AI.

Q6: When PUCCH carrying SL HARQ reporting overlaps with another UL TX other than PUSCH without UCI, do you agree the following proposal?

Proposal:

* Reuse UL/SL prioritization rule agreed for PSFCH and UL TX other than PUCCH carrying SL HARQ reporting by replacing PSFCH with PUCCH carrying SL HARQ reporting, i.e.,
  + when UL TX is associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers (i.e., URLLC case)
    - If SL-threshold for URLLC case is configured, LTE rule is used (i.e., UL TX is down-prioritized if the priority value of PUCCH carrying SL HARQ reporting is smaller than SL-threshold, otherwise prioritized)
    - Otherwise, UL TX is prioritized
  + Otherwise, LTE rule is used with another SL-threshold configured for non-URLLC case
  + Additionally, PRACH and PUSCH scheduled by RAR UL grant are always prioritized.

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| Company | Answer | Comment |
| Intel | Disagree | Our understanding, that in case both channels are subject to reception at gNB, the prioritization result should be known to gNB in the moment of scheduling.  Since the above proposal results in prioritization of different channels depending on SL priority, which is in general unknown to gNB, the above assumption/understanding of prioritization determinism is violated.  To solve this, PUCCH carrying SL HARQ reporting in this scenario should be assigned with a semi-static priority: (1) lower than “regular” and “high” Uu, (2) higher than “regular”, lower than “high” Uu, (3) higher than “regular” and “high” Uu |
| LG | Yes | Even for the case when PUCCH carrying SL HARQ reporting overlaps with PUSCH with UCI and UL-SCH, either PUCCH carrying SL HARQ reporting or PUSCH with UCI and UL-SCH will be prioritized. Considering processing time budget, it would not be desirable to replace UCI with SL HARQ reporting for PUSCH transmission. |
| Qualcomm | No | It’s up to UE implementation to handle this case, at least for R16. |
| NTT DOCOMO | Agree |  |
| vivo | Agree | We have spent lots of spec. effort to define rule for UL/SL prioritization. Basically, the cases for UL/SL and above-mentioned UL/UL prioritization are quite similar, we do not need a new rule for above-mentioned UL/UL prioritization. |
| OPPO | Agree |  |
| Samsung | Agree | For the consistency, a similar rule should be used as PSFCH collision with Uu.  Regarding how gNB distinguish SL HARQ report with other UL tx, although the two transmission overlapped in time domain, gNB is still able to allocate different parameters e.g. frequency resource, PUCCH formats, etc. for SL HARQ report and other UL tx. So it’s possible for gNB to perform blind detection and determine which tx is prioritized by SL UE. |
| Fujitsu | Yes | The case is similar with that of PSFCH overlapping with UL. The same principle can be reused. |
| Huawei  HiSilicon | Agree | Similar comments in Q5, no matter the PUSCH is without UCI or the PUSCH contains A-CSI/SP CSI only, a processing order should be defined first. when PUCCH carrying SL HARQ reporting overlaps with multiple UL TXs (e.g. another PUCCH with UCI and PUSCH without UCI), the prioritization between PUCCHs is performed first, then followed by multiplexing/prioritization with PUSCH.  For the prioritization between PRACH/PUSCH scheduled by RAR UL grant and PUCCH with SL HARQ, current rule specified in NR Uu can be reused, i.e. UE does not transmit PRACH and PUCCH in a same slot or has a gap less than N symbols. For the PUSCH scheduled by RAR UL grant, addressing rule is the same with that of a normal PUSCH in CFRA and overlapping would not happen in CBRA. So the last bullet is not needed and others we are supportive. |
| CATT | Agree | This case is simialr as that of PSFCH overlapping with UL, the same principle can be followed. |
| Lenovo, MM | Agree |  |
| CMCC | Agree | The case is similar with that of PSFCH overlapping with UL. The same principle can be reused.  We think this case cannot be up to UE implementation since that some high priority traffic may be dropped and performance will be uncontrollable.  We agree that the decision of which transmission is prioritized is not known to gNB, but gNB can differentiate the two PUCCH resources carrying SL HARQ-ACK or UCI and blind detection can be performed. In our view, this is acceptable comparing to unnecessary drop of high priority traffic. |
| Ericsson | Disagree | This situation should not happen. The gNB has control over it to avoid it. |
| Apple | Agree | We could simply reuse the agreed prioritization rule to address this issue. The deprioritized one is dropped here. |
| ZTE, Sanechips | No | This would lead to gNB blind decoding issue, since gNB can’t know UE’s prioritization result. We propose to rely on priority index indicator and/or RRC configuration of Uu UCI. When Uu UCI is associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers, Uu UCI transmission is prioritized, otherwise, UCI carrying SL HARQ reporting is prioritized. |
| FUTUREWEI | Agree | This is an extension of the priority rules defined for PSFCH |

Observation: Responses to the questioned solution

* Agree: LG, DOCOMO, vivo, OPPO, Samsung, Fujitsu, Huawei, HiSi, CATT, Lenovo, MotM, CMCC, Apple, Futurewei (14 companies)
* Not agree: Intel, Qualcomm, Ericsson, ZTE, Sanechips (5 companies)

Q7: When PUSCH carrying SL HARQ reporting overlaps with another UL TX,

* Option 7-1: Rule for PUSCH without SL HARQ reporting is reused (i.e. UL transmission associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers is prioritized)
* Option 7-2: PUSCH carrying SL HARQ reporting is prioritized
  + if the SL HARQ reporting is prioritized over the overlapping UL TX, or
  + if the PUSCH carrying SL HARQ reporting is associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers and the overlapping UL TX is not associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers
* Option 7-3: Others (please specify)

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| Company | Preferred option | Comment |
| Intel | 7-2 |  |
| LG | Option 7-1 | If the PUSCH used for piggyback of SL HARQ reporting is shown to the UE after Uu multiplexing/cancellation, this prioritization rule would not be needed.  If the prioritization rule is needed for this case, we prefer to use Option 7-1 for simplicity. |
| Qualcomm | Option 7-3 | It’s up to UE implementation to handle this case, at least for R16. |
| NTT DOCOMO | Option 7-2 |  |
| vivo | Option 7-1 | For the UL/SL prioritization, we did not handle PUSCH carrying SL HARQ specially, i.e., option 7-1 was assumed. If companies want to option 7-2, the difference between UL/SL and above-mentioned UL/UL prioritization should be clarified. |
| OPPO | Option 7-3 | We haven’t discussed how to multiplex SL FB into PUSCH. When it was discussed and agreed, we can discuss the prioritization further. |
| Samsung | Option 7-2 | Multiplexing of SL FB on PUSCH is discussed in Mode 1 AI now. It seems Option 7-2 make sense by taken the priority of SL HARQ into consideration. |
| Fujitsu | Option 7-2 | As PUSCH includes both SL and UL, these SL and UL should be separately compared with overlapped UL. Option 7-2 followed this principle. |
| Huawei,  HiSilicon | Option 7-3 | We have concerns whether this case is valid or not. In our understanding, this case is proposed under a pre-assumption that when PUCCH with SL HARQ overlaps with multiple UL TXs including PUSCH without UCI, SL HARQ is multiplexed on the PUSCH first and then compared with other overlapped UL TX(s). If we follow the NR Uu rule, the prioritization between PUCCHs can be performed first, and based on agreement in RAN1 #99, no support of multiplexing of SL HARQ and Uu UCI on PUCCH or PUSCH in Rel-16, so only SL HARQ or other UCI is picked to prioritize/multiplex with one of PUSCHs. The PUSCH is selected based on the NR Uu rule as well. No further comparison between other UL Tx if the SL HARQ is already multiplexed on the PUSCH. So we think this case is invalid if we have defined a processing order and a proposal can be discussed alliteratively:  Proposal:  • When overlapping with multiple UL TXs, the prioritization between PUCCHs is performed first, then followed by multiplexing/prioritization with PUSCH. |
| CMCC | option 7-3 | We share similar view with HW that this case may be not valid if the prioritization between PUCCHs is performed first, then followed by multiplexing/prioritization with PUSCH. |
| Ericsson | Option 7-1 |  |
| Apple | Option 7-2 | It makes sense to take the priority of SL HARQ into account.    The case “PUSCH carrying SL HARQ reporting overlaps with **SL** TX” was in FL summary of issue 2-1. It seems this case is missed in the email thread. We could apply the similar rule as Option 7-2 for that case. |
| ZTE, Sanechips | Option 7-1 | This is simpler and imposes less impact to Uu. |
| InterDigital | Option 7-1 |  |
| FUTUREWEI | Option 7-1 | We would also be okay leaving this case up to UE implementation |

Observation: When PUSCH carrying SL HARQ reporting overlaps with another UL TX

* Option 7-1: LG, vivo, Ericsson, ZTE, Sanechips, InterDigital, FUTUREWEI (7 companies)
* Option 7-2: Intel, DOCOMO, Samsung, Fujitsu, Apple (5 companies)
* Option 7-3: Qualcomm, OPPO, Huawei, HiSi, CMCC (5 companies)

**2. UL/SL prioritization for the case when multiple UL TX and multiple SL TX overlap in time**

Q8: Regarding whether to confirm the following working assumption,

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| ***Agreements:***   * ***(Working assumption) For handling the case where more than one SL and UL transmissions overlap, adopt the following principle***   + ***For more than one SL transmissions overlapping with a UL transmission, the highest priority of SL transmissions is used for the prioritization.***   + ***For more than one UL transmissions overlapping with a SL transmission, the highest priority of UL transmissions is used for the prioritization.*** * ***FFS details*** |

* Option 8-1: Working assumption is confirmed and details are up to UE implementation.
* Option 8-2: Working assumption is confirmed and look-ahead operation is assumed in the details.
  + To decide whether SL TX in slot i is prioritized, the priority of SL TX in slot i+1 can be used. To decide whether UL TX in slot n is prioritized, the priority of UL TX in slot n+1 can be used.
* Option 8-3: Working assumption is confirmed and look-ahead operation is NOT assumed in the details
  + To decide whether SL TX in slot i is prioritized, the priority of SL TX in slot i+1 is not used, and to decide whether UL TX in slot n is prioritized, the priority of UL TX in slot n+1 is not used.
* Option 8-4: Others (please specify)

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| Company | Preferred option | Comment (including elaboration of the specification impact of the preferred option) |
| Intel | 8-3 | Make prioritization on slot-by-slot basis without considering other slots during prioritization in a given slot |
| LG | Option 8-3  Option 8-1 | Considering specification effort, look-ahead operation needs to take into account processing time, numerology of UL and SL, and so on. In this case, for simplicity, the priority rule could be performed without consideration of look-ahead operation. Alternatively, it can be considered to leave it UE implementation. |
| QC | Option 8-1 | We share the concern about specification and implementation complexity of 8-2.  Beside the listed cases, we need to consider the cases where sidelink overlap with an UL transmission involved in UL prioritization, cancelation, or multiplexing. |
| NTT DOCOMO | Option 8-4 | - Some SL/UL channels use PHY layer priority to determine the priority and some use higher layer priority. Unless clarification, definition of association among them are provided, the working assumption does not work.  - ‘Group’ that this rule is applied to should be clarified; otherwise, there would be more than one result.  Regarding look-ahead operation, we are not sure what is the motivation. |
| Vivo | Option 8-1 | Slot by slot operation is preferred, in some case, it is not possible to always predict the situation in next slot, however, it is fine to leave the look-head operation to UE implementation as a compromise. |
| OPPO |  | We need to clarify what’s the meaning of multiple SL transmission in the WA? There are two understandings:   1. The multiple SL transmission are all NR SL transmission. Multiple SL transmission overlap with one UL transmission because of different SCS of SL and UL. 2. The multiple SL transmission include NR SL and LTE SL, and in different carriers.   For the former case, we prefer option 8-3.  For the latter case, the WA is not confirmed especially for the power sharing case. In power sharing case, the transmission with higher priority is promised firstly, then allcoate remaining power to the transmission with lower priority. In this case, we prefer the priority of each SL or UL transmission should be considered. |
| Samsung | Option 8-1 | We prefer UE implementation for the purpose of reducing system complexity and specification work load. The gain of other options are unclear. In addition, we share similar view as vivo about the feasibility of look-head operation. |
| Fujitsu | Option 8-1 | Overlapping can be complex, e.g., it can be an overlapping chain. Therefore, look-ahead will introduce more complexity. |
| Huawei,  HiSilicon | Option 8-1 | Details can be up to UE implementation. |
| CATT | Option 8-1 | Details can be left for UE implementation. |
| Lenovo, MM | 8-1 |  |
| Ericsson | Option 8-1 | The details are left to UE implementation, so we do not expect any further specification impact. |
| Apple | Option 8-1 | It can be handled by UE implementation. |
| ZTE, Sanechips | 8-4 | We prefer not to confirm the WA. Within WA, to indentify the highest priority signal/channel in each of “Uu group” and “SL group” could cause additional and unnecessary priority comparison within the group, such as priority comparison among Uu channels; it also makes the priority rules vulnerable to modification due to future spec evolution, such as allowing two SL channels that cannot be transmitted at the same time in Rel-16 to be able Tx at the same time, which requires new priority comparison rule to be added to the framework.  As mentioned in R1-2003552, we would like to propose the following solution to solve above issue but meanwhile has equivalent consequence to current WA :   * + - If one or multiple SL transmissions and/or PSFCH receptions overlap with one or multiple UL transmissions,       1. SL takes priority as long as at least one overlapping SL transmission/reception is prioritized over all the UL transmissions.       2. UL transmissions take priority as long as at least one UL transmission is prioritized over all the SL transmissions/receptions. |
| InterDigital | Option 8-1 |  |
| FUTUREWEI | 8-1 | It can be left up to UE implementation |

Observation: On confirming the working assumption

* Option 8-1: LG, QC, vivo, Samsung, Fujitsu, Huawei, HiSi, CATT, Lenovo, MotM, Ericsson, Apple, InterDigital, Futurewei (14 companies)
* Option 8-2:
* Option 8-3: Intel, LG, OPPO (clarification needed) (3 companies)
* Option 8-4: DOCOMO, ZTE, Sanechips (3 companies)
* Option 8-5:

Proposal for agreement v001

Proposal 1:

* For configured grant, the TX UE reports ACK to gNB in case no PSCCH/PSSCH is transmitted in a set of resources
  + the priority of the “PUCCH carrying SL HARQ reporting” is defined as the largest priority value (i.e. the least important one) among the possible values for the grant.

Proposal 2:

* When a UE does not transmit PSCCH/PSSCH or receive PSFCH due to intra-UE prioritization,
  + the priority of the corresponding “PUCCH carrying SL HARQ reporting” is defined as the priority value of the dropped PSSCH or PSFCH

Proposal 3:

* When the SL transmission does not use SL HARQ feedback (if supported by RAN2) and the UE reports NACK to request further resources for blind retransmission and ACK otherwise,
  + the priority of the “PUCCH carrying SL HARQ reporting” is defined as the priority value of the associated PSSCH

Proposal 4:

* When the maximum number of HARQ re-transmissions is reached for a TB and the UE sends one bit on the UL resources for SL HARQ-ACK reporting
  + the priority of the “PUCCH carrying SL HARQ reporting” is defined as the priority value of the associated PSSCH

Proposal 5:

* Discuss in Mode 1 agenda the detailed SL HARQ-ACK piggybacking to PUSCH.

Proposal 6:

* When PUCCH carrying SL HARQ reporting overlaps with another UL TX other than PUSCH without UCI, UL/SL prioritization rule agreed for PSFCH and UL TX other than PUCCH carrying SL HARQ reporting is reused by replacing PSFCH with PUCCH carrying SL HARQ reporting, i.e.,
  + when UL TX is associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers (i.e., URLLC case)
    - If SL-threshold for URLLC case is configured, LTE rule is used (i.e., UL TX is down-prioritized if the priority value of PUCCH carrying SL HARQ reporting is smaller than SL-threshold, otherwise prioritized)
    - Otherwise, UL TX is prioritized
  + Otherwise, LTE rule is used with another SL-threshold configured for non-URLLC case
  + Additionally, PRACH and PUSCH scheduled by RAR UL grant are always prioritized.

Proposal 7: Down-select one of the following alternatives in RAN1#101-e:

* Alt 1: Rule for PUSCH without SL HARQ reporting is reused (i.e. UL transmission associated with a DCI indicating “high” in “priority field” or configured with “high priority” by higher layers is prioritized)
* Alt 2: UE does not expect an overlap of PUSCH carrying SL HARQ reporting and another UL TX.

Proposal 8:

* Confirm the following working assumption with red-colored changes:
  + ***(Working assumption) For handling the case where more than one SL and UL transmissions overlap, adopt the following principle***
    - ***For more than one SL transmissions overlapping with a UL transmission, the highest priority of SL transmissions is used for the prioritization.***
    - ***For more than one UL transmissions overlapping with a SL transmission, the highest priority of UL transmissions is used for the prioritization.***
  + Details are up to UE implementation