**3GPP TSG-RAN WG2 #118-e R2-220XXXX**

**Online, May 09 – 20, 2022**

**Agenda item: 5.2.3**

**Source: ASUSTeK**

**Title: [AT118-e][703][V2X/SL] MAC corrections (ASUSTeK)**

**Document for: Discussion & Decision**

Introduction

This is to report the result of the following email discussion in RAN2#118-e Meeting [1]:

* [AT118-e][703][V2X/SL] MAC corrections (ASUSTeK)

**Scope:** Discuss the correction in R2-2205125. Prepare agreeable CRs (if correction is needed).

**Intended outcome:** Agree 38.321 CR in R2-2206293 and R2-2206294. Discussion summary in R2-2206295 (if needed). Email approval.

**Deadline:** 5/16 10:00am UTC

2 Contact Information

|  |  |
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# 3 Discussion

In R2-2205125[2], multiple changes are proposed for MAC correction or clarification. In this summary, the rapporteur asks for companies' input on whether each changes are agreed.

## 3.1 Clarification on UL grant skipping

If the MAC entity is configured with uplink grant skipping, periodic BSR with no data and padding BSR would not trigger any UL transmission. Similar principle should also apply to periodic SL-BSR, SL data and padding SL-BSR.

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| The MAC entity shall:  1> if the MAC entity is configured with *enhancedSkipUplinkTxDynamic* with value *true* and the grant indicated to the HARQ entity was addressed to a C-RNTI, or if the MAC entity is configured with *enhancedSkipUplinkTxConfigured* with value *true* and the grant indicated to the HARQ entity is a configured uplink grant:  2> if there is no UCI to be multiplexed on this PUSCH transmission as specified in TS 38.213 [6]; and  2> if there is no aperiodic CSI requested for this PUSCH transmission as specified in TS 38.212 [9]; and  2> if the MAC PDU includes zero MAC SDUs; and  2> if the MAC PDU includes only the periodic BSR and/or the periodic SL-BSR and there is no data and/or SL data available for any LCG, or the MAC PDU includes only the padding BSR and/or the padding SL-BSR:  3> not generate a MAC PDU for the HARQ entity. |

Q1: Do you agree with the first change in R2-2205125?

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| --- | --- | --- |
| **Company** | **Agree as is; Agree with changes; Disagree** | **Detailed Comments** |
| LG | No | If *enhancedSkipUplinkTxDynamic* is not configured with SL TX, no correction is required. It is necessary to discuss whether *enhancedSkipUplinkTxDynamic* can be configured with SL TX. Even if *enhancedSkipUplinkTxDynamic* is configured with SL TX, the correction seems to be a minor optimization. |
| Huawei HiSilicon | See comments | We tend to agree with the intention but since SL data is not transmitted on Uu, the condition “and there is no data available for any LCG” should only applies to Uu data not SL data.  2> if the MAC PDU includes only the periodic BSR and/or the periodic SL-BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR and/or the padding SL-BSR: |
| OPPO | No with comment | We tend to be negative since it seems to be a functional NBC change.  Otherwise, we share the view with Huawei on the inapplicability of SL data. |
| Xiaomi | Yes | Regarding HW’s modificaiton, we think it’s incorrect. If there is SL data, SL BSR shall not be skipped. Otherwise, SL data can’t be transmitted. If periodical SL BSR is triggered, the condistion shall apply to SL data. |
| Qualcomm | No | We share the view expressed by Huawei HiSilicon that SL data is not transmitted over Uu and the text „and/or SL data“ is not required. |
| CATT | No | Agree with huawei’s change. |
| Nokia | No |  |
| Apple |  | Agree with Huawei |
| Samsung | No | We wonder uplink skipping should be supported with sidelink. If supported, then the change from Huawei looks fine. |
| ASUSTeK | Yes with comment | Since it was not discussed if uplink skipping can be configured with SL, we assume that both can be supported naturally at the same time.  For Huawei’s comments, we understand that people may consider the sentence of “there is no data available for any LCG“ is used to describe the aforementioned “MAC PDU“ so surely the sentence is not related to SL data.  2>   if the MAC PDU includes only the periodic BSR and/or the periodic SL-BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR and/or the padding SL-BSR:  Thanks for Xiaomi’s comment. We share the same view that if any SL data is available for transmission over PC5, the UL MAC PDU shuold be generated to include the triggered periodic SL BSR. Given Huawei’s comment, we propose to make it clearer as below.  2>  if the MAC PDU includes only the periodic BSR and/or the periodic SL-BSR and **if** there is no data and/or SL data available for any LCG, or the MAC PDU includes only the padding BSR and/or the periodic SL-BSR:  3>  not generate a MAC PDU for the HARQ entity. |
| ZTE | Yes | Agree with xiaomi |
| vivo | No | Our understanding is that the Sidelink UE doesn’t support uplink grant skipping feature. To avoid any ambiguity, we are OK to add a NOTE to clarify this instead. |

**Conclusion 1: TBD**

## 3.2 Clarification on LCP restriction for type-1 CG

The field description of *sl-configuredGrantType1Allowed* in RRC has added that the capability lcp-RestrictionSidelink should be also considered in LCP:

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| ***sl-ConfiguredGrantType1Allowed***  If present and set to true, or if the capability *lcp-RestrictionSidelink* as specified in TS 38.306 [26] is not indicated, SL MAC SDUs from this sidelink logical channel can be transmitted on a sidelink configured grant type 1. Otherwise, SL MAC SDUs from this logical channel cannot be transmitted on a sidelink configured grant type 1. Corresponds to 'sl-configuredGrantType1Allowed' in TS 38.321 [3]. |

Same restriction should also be reflected in MAC specification:

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| 5.22.1.4.1.2 Selection of logical channels  The MAC entity shall for each SCI corresponding to a new transmission:  1> select a Destination associated to one of unicast, groupcast and broadcast, having at least one of the MAC CE and the logical channel with the highest priority, among the logical channels that satisfy all the following conditions and MAC CE(s), if any, for the SL grant associated to the SCI:  2> SL data is available for transmission; and  2> *SBj* > 0, in case there is any logical channel having *SBj* > 0; and  2> *sl-configuredGrantType1Allowed*, if configured, is set to *true* or if the capability *lcp-RestrictionSidelink* as specified in TS 38.306 [26] is not indicated in case the SL grant is a Configured Grant Type 1; and  **…**  1> select the logical channels satisfying all the following conditions among the logical channels belonging to the selected Destination:  2> SL data is available for transmission; and  2> *sl-configuredGrantType1Allowed*, if configured, is set to *true* or if the capability lcp-RestrictionSidelink as specified in TS 38.306 [26] is not indicated in case the SL grant is a Configured Grant Type 1; and.  2> *sl-AllowedCG-List*, if configured, includes the configured grant index associated to the SL grant; and |

Q2: Do you agree with the second change in R2-2205125?

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| --- | --- | --- |
| **Company** | **Agree as is; Agree with changes; Disagree** | **Detailed Comments** |
| LG | No | If the UE does not have the capability of *lcp-RestrictionSidelink*, the gNB will not set sl-configuredGrantType1allowed. It seems to be a minor optimization. |
| Huawei HiSilicon | No | In Uu, we don’t have this kind of restriction. Can leave to NW implementation to avoid the error case. |
| OPPO | No | Agree with LG and Huawei it should be leave to NW implementation. |
| Xiaomi | No | Agree with above |
| Qualcomm | No | Agree with prior comments |
| CATT | No | It can be left to gNB implementation. |
| Nokia | No |  |
| Apple | No |  |
| Samsung | No | Agree with LG and Huawei |
| ZTE | No |  |
| vivo | No | Agree with LG. |

**Conclusion 2: TBD**

## 3.3 clarification on dynamic grant SL LCP

According to the current text, the UE selects a logical channel with *sl-AllowedCG-List*, if configured, including the configured grant index associated to the SL grant. However, this condition currently applies to dynamic SL grant as well. If the SL grant is dynamically scheduled, it would never pass this condition check and the SL grant will not be used. Therefore, it is proposed to clarify that this condition is for CG:

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| 5.22.1.4.1.2 Selection of logical channels  The MAC entity shall for each SCI corresponding to a new transmission:  1> select a Destination associated to one of unicast, groupcast and broadcast, having at least one of the MAC CE and the logical channel with the highest priority, among the logical channels that satisfy all the following conditions and MAC CE(s), if any, for the SL grant associated to the SCI:  2> SL data is available for transmission; and  2> *SBj* > 0, in case there is any logical channel having *SBj* > 0; and  2> *sl-configuredGrantType1Allowed*, if configured, is set to *true* in case the SL grant is a Configured Grant Type 1; and  2> *sl-AllowedCG-List*, if configured, includes the configured grant index associated to the SL grant in case the SL grant is a Configured Grant; and  2> *sl-HARQ-FeedbackEnabled* is set to *disabled*, if PSFCH is not configured for the SL grant associated to the SCI.  …  1> select the logical channels satisfying all the following conditions among the logical channels belonging to the selected Destination:  2> SL data is available for transmission; and  2> *sl-configuredGrantType1Allowed*, if configured, is set to *true* in case the SL grant is a Configured Grant Type 1; and.  2> *sl-AllowedCG-List*, if configured, includes the configured grant index associated to the SL grant in case the SL grant is a Configured Grant; and |

Q3: Do you agree with the third change in R2-2205125?

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| --- | --- | --- |
| **Company** | **Agree as is; Agree with changes; Disagree** | **Detailed Comments** |
| LG | No | Since the SL grant is associated with the configured grant index, it is clear that the SL grant is a configured grant. |
| Huawei HiSilicon | See comments | Agree with the intention but not sure if we really need to have this change since in Uu, it is also not emphasized the UL grant is a UL configured grant. Fine to follow the majority. |
| OPPO | No | Seems not necessary. |
| Xiaomi | No | It seems to be clear already |
| Qualcomm | No | Seems an unnecessary change |
| CATT | No | Current spec is already clear. |
| Nokia | No | Current spec is already clear |
| Apple | No |  |
| Samsung | No | Current spec is clear. |
| ZTE | No |  |
| vivo | No | Seems wording improvement. |

**Conclusion 3: TBD**

## 3.4 Clarification on padding SL-BSR triggering

In SL, a SL-BSR MAC CE is a MAC CE with variable size containing buffer size information for LCGs for all destinations. When there are remaining padding bits for a UL resource, a padding SL-BSR can be triggered. However, according to the current text, in order to trigger a padding SL-BSR, the remaining UL resource should be larger than or equal to size of the SL-BSR MAC CE plus its subheader, which can be a large number and the UE can never trigger a padding SL-BSR including a truncated part of LCGs. Therefore, it should be clarified that Padding SL-BSR would be triggered if the padding bits remaining after a Padding BSR (for UL) has been triggered is equal to or larger than the minimum size of the Truncated SL-BSR MAC CE plus its subheader:

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| An SL-BSR shall be triggered if any of the following events occur:  1> if the MAC entity has been configured with Sidelink resource allocation mode 1:  2> SL data, for a logical channel which belongs to an LCG of a Destination, becomes available to the MAC entity; and either  3> this SL data belongs to a logical channel with higher priority than the priorities of the logical channels containing available SL data which belong to any LCG belonging to the same Destination; or  3> none of the logical channels which belong to an LCG belonging to the same Destination contains any available SL data.  in which case the SL-BSR is referred below to as 'Regular SL-BSR';  2> UL resources are allocated and number of padding bits remaining after a Padding BSR has been triggered is equal to or larger than the minimum size of the Truncated SL-BSR MAC CE plus its subheader, in which case the SL-BSR is referred below to as 'Padding SL-BSR'; |

Q4: Do you agree with the fourth change in R2-2205125?

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| **Company** | **Agree as is; Agree with changes; Disagree** | **Detailed Comments** |
| LG | No | Correction is not aligned with the UL BSR sentence of 5.4.5.  **5.4.5 buffer Status Reporting**  The MAC entity determines the amount of UL data available for a logical channel according to the data volume calculation procedure in TSs 38.322 [3] and 38.323 [4].  A BSR shall be triggered if any of the following events occur for activated cell group:   * UL resources are allocated and number of padding bits is equal to or larger than the size of the Buffer Status Report MAC CE plus its subheader, in which case the BSR is referred below to as 'Padding BSR';     Moreover, existing sentence below already explains the intention of correction.  **5.22.1.6 Buffer Status Reporting**  For Padding BSR:  1>  if the number of padding bits remaining after a Padding BSR has been triggered is equal to or larger than the size of an SL-BSR containing buffer status for all LCGs having data available for transmission plus its subheader:  2>  report SL-BSR containing buffer status for all LCGs having data available for transmission;  1>  else:  2>  report Truncated SL-BSR containing buffer status for as many LCGs having data available for transmission as possible, taking the number of bits in the UL grant into consideration. |
| Huawei HiSilicon | No | Similar description as that in Uu. Do not see any issue with the current wording. |
| OPPO | No | Agree with LG and Huawei that it should be aligned with Uu. |
| Xiaomi | No | Agree with LG, 5.22.1.6 already covers the intention. |
| Qualcomm | No | We share the view expressed by Huawei HiSilicon that the current wording is satisfactory. |
| CATT | No | It should be align with Uu. |
| Nokia | No strong view | Fine to align with Uu |
| Apple | No | Not an essential correction, |
| Samsung | No | Prefer to align with Uu |
| ZTE | No | Agree with LG. |
| vivo | No | Agree with above. |

**Conclusion 4: TBD**

## 3.5 Editorial change on padding SL-BSR

In sidelink BSR reporting section, ‘Padding BSR’ is changed to ‘Padding SL-BSR’ in order to align the term with other part of the section since Padding BSR is for UL data and Padding SL-BSR is for SL data.

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| 2> UL resources are allocated and number of padding bits remaining after a Padding BSR has been triggered is equal to or larger than the size of the SL-BSR MAC CE plus its subheader, in which case the SL-BSR is referred below to as 'Padding SL-BSR';  …  For Padding SL-BSR:  1> if the number of padding bits remaining after a Padding BSR has been triggered is equal to or larger than the size of an SL-BSR containing buffer status for all LCGs having data available for transmission plus its subheader:  2> report SL-BSR containing buffer status for all LCGs having data available for transmission;  1> else:  2> report Truncated SL-BSR containing buffer status for as many LCGs having data available for transmission as possible, taking the number of bits in the UL grant into consideration. |

Q5: Do you agree with the fifth change in R2-2205125?

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| **Company** | **Agree as is; Agree with changes; Disagree** | **Detailed Comments** |
| LG | Yes |  |
| Huawei HiSilicon | Yes |  |
| OPPO | Yes |  |
| Xiaomi | Yes |  |
| Qualcomm | Yes |  |
| CATT | Yes |  |
| Nokia | Yes |  |
| Apple | Yes |  |
| Samsung | Yes |  |
| ZTE | Yes |  |
| vivo | Yes |  |

**Conclusion 5: TBD**

# Reference

[1] 3GPP RAN2#118-e meeting chairman note

[2] R2-2205125 Corrections on SL configured grant and SL BSR ASUSTeK