**3GPP TSG-RAN2 Meeting 121** **R2-2302027**

**Athens, Greece, Feb. 27 – Mar. 3, 2023**

**Agenda item: 5.2.3**

**Source: LG**

**Title: Summary of [AT121][503][V2X/SL] R16 MAC corrections (LG)**

**Document for: Discussion and Decision**

1. Introduction

This is the summary of below offline discussion.

* [AT121][503][V2X/SL] R16 MAC corrections (LG)

**Scope:** Discuss corrections in R2-2300834/R2-2300835, R2-2300861/R2-2300862, and R2-2301525/R2-2301526. Merge agreeable corrections.

**Intended outcome:** 38.321 CR in R2-2302025/R2-2302026 and discussion summary in R2-2302027 (if needed).

**Deadline:** Comeback at 3/2 CB session

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1. Discussion

## 2.1 For changes in R2-2300834 (For Rel-16)/ R2-2300835 (For Rel-17)

**Reason for change**: During the resource selection procedure for a single MAC PDU, UE needs to select the time and frequency resources according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and/or the latency requirement of the triggered SL-CSI reporting. However, during the resource selection procedure for multiple MAC PDU, the latency requirement of the triggered SL-CSI reporting is not considered.

**Change**: In section 5.22.1.1, during resource selection procedure for multiple MAC PDU, add corresponding descriptions to consider the latency requirement of the triggered SL-CSI reporting.

1. if the MAC entity has selected to create a selected sidelink grant corresponding to transmissions of multiple MAC PDUs, and SL data is available in a logical channel:

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3> if transmission based on random selection is configured by upper layers:

4> randomly select the time and frequency resources for one transmission opportunity from the resources pool, according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and/or the latency requirement of the triggered SL-CSI reporting.

3> else:

4> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7], according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and/or the latency requirement of the triggered SL-CSI reporting.

**Rapporteur view:** It is correct that a text considering the latency requirement of triggered SL-CSI reporting is missing from the multiple MAC PDU procedure.

**Q1: Would your company agree to the change proposed in R2-2300834 (For Rel-16)/ R2-2300835 (For Rel-17)?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Further comments |
| LG | Disagree | OPPO’s observation is correct. Changed the view. |
| OPPO | Disagree | The reason that current spec is limited to single-PDU case is because R2 agreed that typically CSI-report is to be carried by one-shot resource selection, so that limit the impact to it and avoided the impact to multi-shot case.  From this perspective, the CR is to change the previous agreement, and thus NBC. |
| Sharp | Disagree | Share the view with OPPO. |
| Xiaomi | See comment | Proponent  We think technically when UE reserves transmission resources for multiple MAC PDU, if there is any CSI pending for transmission, the latency requirement of the CSI should be considered as well, similar as single PDU case.  However after some further check on the history, it seems during the original discussion, it is a compromise to only agree the single MAC PDU case. So we think the changes for multiple MAC PDU case is techinically correct, but if companies do not want to change, we are also fine to follow the majority. |
| Intel | Disagree | Agree with OPPO |
| Samsung | Disagree | The latency requirement is applied during the multiplexing decision of SL-CSI report MAC CE with the data of the selected resource (see 38.321 clause 5.22.1.7) |
| Huawei, HiSilicon | Disagree | There is one condition for one shot case “when CSI reporting is triggered” and there is no such condition for the multi-shot case, so this difference should have been considered at the time of mplementation of MAC spec. So the current change is not editorial and not agreeable without reverting previous agreement. |
| ASUSTeK | Disagree | Share the same view with OPPO. |
| Lenovo | Disagree | Better to keep this compromise way |
| ZTE | Agree | For OPPO‘s comments, we have different view. First, we agree that the CSI-report is a one shot transmission. During resource selection, UE will select the transmission resource based on the transmission requirement i.e. single MAC PDU or multiple MAC PDU. However, LCP procedure does not differentiate the transmission is a one-shot or multiple-shot grant. Resource selected for multiple-shot MAC PDU can also be used by one-shot MAC PDU as long as the destination of CSI-report MAC CE meets the LCP restrictions. |
| Apple | No | Same view as OPPO |
| vivo | Disagree | Agree with companies that CSI-report is limited for one shot. |
| CATT | Disagree |  |
| Nokia | Disagree | Agree with OPPO |
| Qualcomm | Disagree | Share the view this change is not required |

[Summary Q1] Out of 15 companies

Agree: 1

Disagree: 13

Follow the majority: 1

**Rapporteur summary**: Most companies oppose the correction because CSI reporting has limitations of one shot transmission. Rapporteur thinks that the resource selected for multiple MAC PDU transmission does not cause multiple CSI reporting transmission when performing the below RAN2 agreements-based UE behaviour. This is the same view as Xiaomi and ATE.

#108 agreement

*“CSI report event shall be cancelled if the CSI report has been transmitted. CSI report is one-shot transmission.”*

#109-e’s agreement

“*Among multiple CSI reports, it is up to UE implementation to select destination to which CSI reporting.”*

However, according to the majority view, we can follow the majority view (i.e., no change).

**(1, 13) Proposal 1. Correction (“In section 5.22.1.1, during resource selection procedure for multiple MAC PDU, add corresponding descriptions to consider the latency requirement of the triggered SL-CSI reporting.”) in R2-2300834 (For R16)/ R2-2300835 (for R17) is not agreed.**

## 2.2 For changes in R2-2300861 (For Rel-16)/ R2-2300862 (For Rel-17)

**Reason for change**: According to MAC spec, when setting the cast type in SCI for a MAC PDU, it stated that:

|  |
| --- |
| 5> set the cast type indicator to one of broadcast, groupcast and unicast as indicated by upper layers; |

But if the MAC PDU containing only MAC CE(s), considering the MAC CE is generated by MAC layer, upper layer will not indicate the cast type. Hence, the current MAC spec is not correct.

In Rel-16, there is only one SL MAC CE transmitted in PC5, that is Sidelink CSI Reporting MAC CE, only unicast type is supported for it. In Rel-17, besides the Sidelink CSI Reporting MAC CE, three new SL MAC CEs (Sidelink DRX Command MAC CE, Inter-UE Coordination Request MAC CE and Inter-UE Coordination Information MAC CE) are introduced. For the first two SL MAC CEs, it is obvious that only unicast is used. For the last SL MAC CE, according to R2-2300896, same as the other SL MAC CEs, only unicast is used.

**Change in the R2-2300861 (For Rel-16)**: In subclause 5.22.1.3.1, clarify that the cast type indicator should be set as unicast for MAC PDU only containing SL MAC CE(s).

NOTE 3: Void.

5> if the MAC PDU only contains MAC CE:

6> set the cast type indicator to unicast.

5> else:

6> set the cast type indicator to one of broadcast, groupcast and unicast as indicated by upper layers.

**Change in the R2-2300862 (For Rel-17)**:

NOTE 3: Void.

5> if the MAC PDU is for NR sidelink discovery:

6> set the cast type indicator to broadcast.

5> else if the MAC PDU only contains MAC CE(s):

6> set the cast type indicator to unicast.

**Rapporteur view:** For R16 CR, correction is acceptable. For R17 CR, there is no need to modify the current text because condition based IUC supports GC/BC for IUC scheme 1.

**Q2: Would your company agree to the change proposed in R2-2300861 (For Rel-16)?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Further comments |
| LG | Agree |  |
| OPPO | Disagree | In our view, there is nothing wrong in the current spec: Yes CSI reporting was limited to UC, yet the UC attributive including cast-type, L2 ID and etc are indicated by upper layer.  There seems no ambiguity for UE implementation without this CR. |
| Sharp | Agree |  |
| Xiaomi | Disagree | Cast type is associated with the L2 ID of the generated MAC PDU regardless of what is contained in the MAC PDU. For the determined L2 ID, whether the associated cast type is UC, BC or GC is indicated by upper layer. The current procedure is sufficient. |
| Intel | See comment | With the assumption that upper layer provides the cast type, we think no change is necessary |
| Samsung | Disagree | We think that the existing procedure is clear for MAC CE only PDU without the proposed change. |
| Huawei, HiSilicon | Agree |  |
| ASUSTeK | See comment | While the upper layer may not be able to provide cast type for MAC CE-only PDU, if the MAC layer can derive associated cast type with the selected destination ID (indicated by upper layer), the change may not be needed. |
| Lenovo | Disagree | Current procedure is not broken without the CR. Tend to agree with Xiaomi’s comments |
| ZTE | Disagree | For R17, changes is incorrect, according to latest RAN1 agreement, non-preferred resource supports GC/BC for conditional IUC. Therefore, cast type of IUC MAC CE contains non-preferred resource can be set to GC/BC.  So, to align with R17, we think this change is not necessary, can be left to UE implementation.  And if we need to clarify the cast type of IUC MAC CE, we can mimic the similar description for DRX MAC CE as shown in following:   |  | | --- | | 6.1.3.52 Sidelink DRX Command MAC CE  The Sidelink DRX Command MAC CE is identified by a MAC subheader with LCID as specified in Table 6.2.4-1. The priority of the Sidelink DRX Command MAC CE is fixed to '1'.  It has a fixed size of zero bits.  SL DRX Command MAC CE is only supported in sidelink unicast. | |
| Apple | No | Usually, L2 Dest ID is only associate with a unique cast type. So the changer is not needed. |
| vivo | Disagree | Agree that the MAC CEs are used in unicast but the cast type should be set according to upper layer. |
| CATT | Agree | Rapp’s analysis is correct.  The current spec is:  set the cast type indicator to one of broadcast, groupcast and unicast as indicated by upper layers;  However, MAC CE is generated by MAC layer. Hence upper layer will not indicate cast type for it. If it is not changed, it will lead misunderstanding. |
| Nokia | Disagree | Nothing seems broken |
| Qualcomm | Disagree |  |

**Q3: Would your company agree to the change proposed in R2-2300862 (For Rel-17)?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Further comments |
| LG | Disagree |  |
| OPPO | Disagree | Comment as in Q2 above. |
| Sharp | Disagree | It is assumed that the Change in the R2-2300861 is enough and no need for the change in 0862. |
| Xiaomi | Disagree | Comment as in Q2 above. |
| Intel |  | Same comment as in Q2 above |
| Samsung | Disagree |  |
| Huawei, HiSilicon | Disagree |  |
| ASUSTeK |  | Same comment as Q2, and also agree with rapporteur’s view that IUC MAC CE(s) can support GC/BC, so the change is not complete |
| Lenovo | Diagree | Comment as in Q2 above. |
| ZTE | Diagree | Same as Q2. |
| Apple | No |  |
| vivo | Disagree |  |
| CATT | Disagree | RAN2 has reached agreement on IUC information triggered by condition which containing non-preferred resource set, the cast type can be any of UC/GC/BC. Hence, the description in R2-2300862 should be updated accordingly. |
| Nokia | Fine to follow majority |  |
| Qualcomm | Disagree |  |

[Summary Q2] Out of 15 companies

Agree: 4

Disagree: 11

**Rapporteur summary**: Most companies think that the UE can choose the cast type & L2 DST ID well as a UE implementation. But rapporteur has a different view. The L2 IDs given by the V2X layer is the L2 SRC ID (i.g., UC case) based on the station ID of the UE and the service related ID in GC/BC. In other words, the L2 ID for MAC CE is not the responsibility of the V2X layer. However, according to the opinion of majority companies, if the UE can implementably choose the L2 ID of the MAC CE based on the L2 ID it is keeping, then this option is fine.

[Summary Q3] Out of 15 companies

Agree: 0

Disagree: 15

**Rapporteur summary**: The correction is not valid because it supports IUC GC/BC MAC CE in R17.

**(For R16 CR: 4,11), (For R17 CR: 0, 15) Proposal 2. Correction (“In subclause 5.22.1.3.1, clarify that the cast type indicator should be set as unicast for MAC PDU only containing SL MAC CE(s)”) in R2-2300861 (For R16)/ R2-2300862 (for R17) is not agreed.**

## 2.3 For changes in R2-2301525 (For Rel-16)/ R2-2301526 (For Rel-17)

**Reason for change**: In the current specification, when a UE performs MAC reset, the UE does not clear configured sidelink grant. This could lead to UE keep using NW configured sidelink resources after the serving cell changes or the NW releases the connection.

**Change**: Added that the UE clears configured sidelink grant when performing MAC reset.

If a reset of the MAC entity is requested by upper layers, the MAC entity shall:

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1. clear, if any, configured sidelink grants;

**Rapporteur view:** Uplink configured grant is not cleared when a MAC reset occurs in Uu as well. Besides, RAN2 has never discussed or made an agreement on the correction.

**Q4: Would your company agree to the change proposed in R2-2301525 (For Rel-16)/ R2-2301526 (For Rel-17)?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Further comments |
| LG | Disagree |  |
| OPPO | Disagree | Same view as Rapp. |
| Sharp | Disagree |  |
| Xiaomi | Disagree | Same view as Rapp. |
| Intel | Disagree |  |
| Samsung | Disagree | We do not see a need of different handling of SL CG grant comparing with UL CG grants. As UL CG grants release, SL CG grants should be released based on gNB command in upper layer (i.e., RRC) |
| Huawei, HiSilicon | Agree | We think in Uu MAC reset, DL SPS, UL CG are cleared, which is specified in clause 5.2, same as when “timeAlighmentTimer” is expired.    clause 5.2 : |
| ASUSTeK | Agree | Proponenet. For DL/UL CG, they are cleared as the TA timer is considered to be expired when performing MAC reset, while there’s no similar mechanism for SL CG and could lead to resources being unnecessarily occupied. |
| Lenovo | Disagree |  |
| ZTE | Disagree | Configured sidelink grant is actually stored in RRC layer. If configured sidelink grant needs to be cleared, then corresponding configuration should be performed in RRC layer, not MAC layer. And share same view with Rapp, Uu configured grant does not be cleared after MAC Reset. |
| Apple | No | Agree with the rapp. |
| Vivo | Disagree | No strong view on this. Can follow the majority. |
| CATT | Agree | Reasonable, no strong view and can follow the majority’s view. |
| Nokia | Slightly agree | But no strong view |
| Qualcomm | Disagree |  |

[Summary Q4] Out of 15 companies

Agree: 4

Disagree: 11

**Rapporteur summary**: Rapporteur has same view as some company said, clearing the UL CG based on the *timeAlignmentTimer* (RRC parameter) in NR Uu means clearing UL CG by RRC, so it may not be desirable to apply the Uu solution to the sidelink. And also, RAN2 has never made an agreement regarding the correction.

**(4, 11) Proposal 3. Correction (“Added that the UE clears configured sidelink grant when performing MAC reset.”) in R2-2301525 (For Rel-16)/R2-2301526 (For Rel-17) is not agreed.**

1. Conclusion

**(1, 13) Proposal 1. Correction (“In section 5.22.1.1, during resource selection procedure for multiple MAC PDU, add corresponding descriptions to consider the latency requirement of the triggered SL-CSI reporting.”) in R2-2300834 (For R16)/ R2-2300835 (for R17) is not agreed.**

**(For R16 CR: 4,11), (For R17 CR: 0, 15) Proposal 2. Correction (“In subclause 5.22.1.3.1, clarify that the cast type indicator should be set as unicast for MAC PDU only containing SL MAC CE(s)”) in R2-2300861 (For R16)/ R2-2300862 (for R17) is not agreed.**

**(4, 11) Proposal 3. Correction (“Added that the UE clears configured sidelink grant when performing MAC reset.”) in R2-2301525 (For Rel-16)/R2-2301526 (For Rel-17) is not agreed.**