**3GPP TSG-RAN WG2 Meeting #113bis-e *R2-210xxxx***

**Online, 12–20 April 2021**

**Agenda item: 5.3.1**

**Source: Samsung**

**Title: Report of [AT113bis-e][003][NR15] MAC (Samsung)**

**Document for: Discussion and Agreement**

# 1 Introduction

This is to report the result of the following email discussion in RAN2#113bis-e Meeting [1].

* [AT113bis-e][003][NR15] MAC (Samsung)

Scope: Treat R2-2102683, R2-2102684, R2-2103848, R2-2104053, R2-2104091, R2-2104092, R2-2103448, R2-2104086,

Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

Intended outcome: Report and Agreed-in-principle CRs.

Deadline: Schedule A

# 2 Contact Information

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| Company | Contact: Name (E-mail) |
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# 3 Discussion

## 3.1 Correction to DRX active time criteria with CSI masking

R2-2102683 Correction to DRX active time criteria with CSI masking Qualcomm Incorporated CR Rel-15 38.321 15.12.0 1063 - F NR\_newRAT-Core

R2-2102684 Correction to DRX active time criteria with CSI masking Qualcomm Incorporated CR Rel-16 38.321 16.4.0 1064 - F NR\_newRAT-Core

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| Company | Agree as is; Agree with changes; Disagree | Detailed Comments |
| Samsung | Agree as is (Rel-15)  Rel-16 CR should be Cat.A | We are fine with the change. The error came from Rel-11 LTE text, and can be corrected in NR from Rel-15.  The category of Rel-16 CR should be Cat. A. |
| LG | Disagree | We understood the intention, however the text has been there since Rel-11 and nothing is broken as grants/assignments does not have impact on *drx-onDurationTimer*. |
| Ericsson | Disagree | The current text does not contain any error. A skilled implementor would recognize that there is no need to take grants and assignments into account. |
| Lenovo | Disagree | We have similar view as Ericsson/LG that current text is sufficiently clear and intended behaviour should be well understood |
| Huawei, HiSilicon | Agree with the intention | This issue was discussed in RAN2#107bis Chongqing meeting, and it seems to have been acknowledged by several companies. We understand that no UE behaviour would be changed with this CR which can be considered as text improvement, better than LTE. |
| OPPO | Disagree | We think receiving grants/assignments may have impact on short/long DRX cycle switching thus may have impacts on starting drx-ondurationTimer, therefore, it would be safe to leave the text there considering also the text was there since LTE Rel-11 as indicated by previous companies. |
| Qualcomm | Agree as is | We understand that the current text without the proposed change can work without error. However, inclusion of grants/assignments in that paragraph can cause confusion. In fact, this CR was requested by our developers. They understand that technically grants/assignments are not needed in UE’s decision but they are confused why something unnecessary are still captured in the spec.  This CR is more about text improvement than fixing a bug, to prevent repeated confusions down the road (the same reason why we fix typos in the spec). The fact that it has been there since LTE should not be an excuse preventing us from making the MAC spec be as accurate and as easy to read as possible. |
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**Conclusion:**

**TBD**

## 3.2 Error handling of MAC PDU with invalid order of MAC subPDUs.

R2-2103848 Error handling of invalid MAC PDU formats Apple discussion Rel-15 NR\_newRAT-Core

The discussion paper includes the following proposals and also the curresponding TP for the proposal 1:

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| Proposal 1: RAN2 to specify the intended error behavior in clause 5.13 of TS 38.321.  Proposal 2: RAN2 to discuss the intended behavior including whether it can be up to implementation. |
| When a MAC entity receives a MAC PDU for the MAC entity's C-RNTI or CS-RNTI, or by the configured downlink assignment, containing a MAC CE placed at an invalid order within the MAC PDU, the MAC entity shall at least:  1> discard the received MAC CE and any remaining subPDUs in the MAC PDU. |

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| Company | Do you agree with Proposal 1 in R2-2103848? | Detailed Comments |
| Samsung | No;  can be up to implementation | Even though a transmitter (i.e. either UE or gNB) must follow the procedures as defined in TS 38.321 subclause 6.1.2, the proposed behaviour seems overkill, and to define a new behaviour according to the Proposal 1 would even cause unexpected interoperability issue. Hence, we think it can be left to UE/network implementation. |
| LG | No | The reason of having invalid value checking for error handling is to cope with the case where misalignment between the UE and the NW happens due to e.g., loss of signalling or etc. The bad implementation, i.e., violation of the specification, needs not to be covered by error handling. |
| Ericsson |  | Currently the UE behaviour is not speficied.  Question to Apple: Has this behaviour (incorrect order of MAC sub-PDUs) been seen in field? |
| Lenovo | No | We think that this would be some overspecification which is unnecessary. Agree with LG that we don’t specify error handling for erroneous implementations. |
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| Huawei, HiSilicon | No but | Same question as Ericsson, appreciate if Apple and other vendors who have seen this issue would provide more clarifications.  For the sake of removing the concerns from this contribution, we think it is sufficient to confirm that we can leave it to UE/NW implementation. |
| OPPO | No | We prefer to keep the current spec as it is, and also agree we should not specify error handling for error implementations. |
| Qualcomm | No | This is an error case that can be handled by UE implementation. |
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**Conclusion:**

**TBD**

## 3.3 Whether to have further clarification on reporting multiplexed CSI on PUCCH in DRX

R2-2104053 Clarification on reporting multiplexed CSI on PUCCH in DRX Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

The discussion paper includes the following proposal:

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| Observation 1: Based on the current NOTE in TS 38.321, in DRX non-Active Time, the UE may still report the CSI which is originally configured on a PUCCH resource outside DRX Active Time on PUCCH.  Proposal 1: Clarify that the NOTE relevant to CSI multiplexed with other UCI(s) in subclause 5.7 of TS 38.321 only refers to the case that the UE performs CSI multiplexing in DRX Active Time or in the on-duration period if CSI masking is setup but would report the multiplexed CSI on a PUCCH resource outside DRX Active Time or outside on-duration period if CSI masking is setup. |

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| Company | Do you agree with Observation 1 and Proposal 1 in R2-2104053? | Detailed Comments |
| Samsung | No | From the condition at the beginning of the sentence (i.e. "*If a UE multiplexes a CSI configured on PUCCH with other overlapping UCI(s) according to the procedure specified in TS 38.213 [6] clause 9.2.5*"), sensible implementation would not consider the Case 2 in R2-2104053, and thus no further changes would be needed. |
| LG | No | Considering how CSI-masking works without CSI multiplexing, it could be naturally understood that the case2 in 4053 is not the intended case of the current Note.  If it is assumed that Note lets UE to multiplex CSI/ACK outside the Active Time, it is also questionable what if the multiplexed PUCCH now falls into Active Time. |
| Ericsson | No | It should be obvious that interpretation 1 is the correct one. No need to clarify. |
| Lenovo | No | Don’t see a need for the clarification |
| Huawei, HiSilicon |  | We understand that, from the current MAC and PHY spec, UCI multiplexing doesn't take DRX operation into account and hence we are concerned on the ambiguity of Case 2. The feature of UCI multiplexing is valued by both UE and NW side as discussed over long period in NR. Therefore, we think it would be clear to clarify the common understanding in the minutes to avoid any potential risk for inter-operability issue as stated in the coversheet. |
| OPPO | No | No need to clarify. |
| Qualcomm | Disagree with Observation 1. Fine with Proposal 1 but do not think it is needed | We do not think the interpretation of “the Note” on UCI multiplexing as stated in Observation 1 is correct. The current MAC spec specifies that CSI on PUCCH are not sent outside DRX active time. Hence in Case 2, MAC entity in a sensible implementation would instruct PHY not to generate a CSI if its PUCCH resource is located outside DRX active time, regardless of whether there is a overlapping UCI or not.  If the intention of Proposal 1 is to clarify that Case 2 does not need to be considered, we are fine with that. But we do not think it is necessary, as the current spec is sufficiently clear on that (as we have commented above). |
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**Conclusion:**

**TBD**

## 3.4 Clarification on DL HARQ process number

R2-2104091 Clarification on DL HARQ process number Huawei, HiSilicon CR Rel-15 38.321 15.12.0 1092 - F NR\_newRAT-Core

R2-2104092 Clarification on DL HARQ process number Huawei, HiSilicon CR Rel-16 38.321 16.4.0 1093 - A NR\_newRAT-Core

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| Company | Agree as is; Agree with changes; Disagree | Detailed Comments |
| Samsung | Disagree | We do not see any ambiguity with the sentence "*The dedicated broadcast HARQ process is used for BCCH.*", and thus the CR is not needed. |
| LG | Disagree | Due to the text *The dedicated broadcast HARQ process is used for BCCH*, we also think it is clear. |
| Ericsson | Disagree | The interpretation of the text is that there is a set of parallel HARQ processes and there is a dedicated HARQ process for BCCH. No problem and in line with their clarification. |
| Lenovo | Disagree | We don’t see any ambiguity. |
| Huawei, HiSilicon | Agree as is | In NR, the total number of DL HARQ numbers are configured by NW, and hence we see some benefit to clearly state that the broadcast HARQ process is not counted in the total number for unicast to avoid any potential misalignment for implementation. We are fine to capture the common understanding in the minutes if it is achieved. |
| OPPO | Disagree | No ambiguity, it seesm in LTE the clarification was made in phy spec which should be the same case in NR. |
| Qualcomm | Disagree | We have the same comment as Ericsson. |
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## 3.5 Correction on Truncated BSR

R2-2103448 Correction on Truncated BSR ASUSTeK CR Rel-16 38.321 16.4.0 1088 - F NR\_newRAT-Core

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| Company | Agree as is; Agree with changes; Disagree | Detailed Comments |
| Samsung | Disagree | RAN2 had discussed the issue (several times), and the current text captures the intention correctly: the text in subclause 5.4.5 is about which LCGs would be included but does not specify the actual order of LCG in the MAC CE, while the text in subclause 6.1.3.1 is about the actual order in the MAC CE. Hence, the CR is not needed. |
| LG | Disagree | The current specification is correct, i.e., LCG to be reported is selected based on the LCG priority whereas the order of inclusion is is ascending order.  RAN2#99 agreement  6. For truncated BSR the LCGs are selected based highest order of priority  RAN2#100 agreement:  => L field for both. Bitmap indicates which LCG has data is available for tructated BSR and for long BSR the bitmap includes all LCG being reported.  => The BS order is in order of LCG index for both cases |
| Ericsson | Disagree | This has been discussed, explained, and dismissed a number of times, as presented by Samsung and LG. |
| Lenmovo | Disagree | Agree with other companies |
| Huawei, HiSilicon | Disagree | Agree with above |
| OPPO | Disagree | RAN2 had discuss this issues, 5.4.5 decides which LCGs can be reported but 6.1.3.1 specifies the order of the BS field in the format, thus the spec is clear. |
| Qualcomm | Disagree | We have the same comment as Samsung. |
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## 3.6 Clarification on SUL switch

R2-2104086 Clarification on SUL switch LG Electronics UK CR Rel-16 38.321 16.4.0 1091 - F TEI16

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| Company | Agree as is; Agree with changes; Disagree | Detailed Comments |
| Samsung | Disagree | We do not see ambiguity, as 'SUL switch' here should be interpreted as both switching from NUL to SUL and switching from SUL to NUL. Hence, the CR is not needed. |
| LG | Agree | Without explicit definition of SUL switch, it seems not clear what SUL switch exactly means. |
| Ericsson | Disagree | There is no ambiguity. The CR is not needed. |
| Lenovo | Disagree | We don’t see any ambiguity. |
| Huawei, HiSilicon | Disagree | Not needed. |
| OPPO | Disagree | We don’t see the ambiguity proposed in the CR. |
| Qualcomm | Disagree | We have the same comment as Samsung. |
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# 4 Conclusion

**TBD**

# 5 References

[1] R2-113bise Chairman notes 2021-04-11.docx