**3GPP TSG-RAN WG2 Meeting #109-e-Bis *R2-200xxxx***

**Online, 20 April–30 April 2020**

**Agenda item: 5.3.1**

**Source: Samsung**

**Title: Report of [AT109bis-e][003][NR15] MAC Maintenance (Samsung)**

**Document for: Discussion and Agreement**

# 1 Introduction

This is to report the result of the following email discussion in RAN2#109bis-e Meeting [1].

* [AT109bis-e][003][NR15] MAC Maintenance (Samsung)

Scope: Treat all tdocs for AI 5.3.1

Part 1: Determine which issues that need resolution, find agreeable proposals. Deadline: April 23 0700 UTC

Part 2: For the parts that are agreeable, discussion will continue to agree on CRs.

# 2 Discussion

## 2.1 UL Skipping

Regarding the UL skipping operation, RAN2 sent the LS R2-1916572 last November, and received the reply LS in R2-2002515. According to the reply LS (which is not conclusive), the following contributions were submitted under the agenda item 5.3.1:

**UL Skipping**

[R2-2002515](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002515.zip) Reply LS on UL skipping (R1-2001376; contact: vivo) RAN1 LS in Rel-15 NR\_newRAT-Core To:RAN2

Proposed to be noted

[R2-2003610](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003610.zip) Further discussion on UL skipping for UCI multiplexing Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core

[R2-2003594](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003594.zip) CR to 38.321 on UCI transmission in the case the overlapping PUSCH transmission is skipped ZTE, Sanechips CR Rel-15 38.321 15.8.0 0731 - F NR\_newRAT-Core

[R2-2002780](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002780.zip) Discussion on the UL skipping vivo discussion

From the discussion papers above, the following options are on the table:

- Option 1: MAC does not generate a MAC PDU, and UCI is sent on PUCCH (i.e. RAN1 specification has to be updated even though RAN1 did not conclude last meeting.).

- Option 2: MAC generates a MAC PDU when UCI multiplexing on UL-SCH is needed, and thus UCI is sent on PUSCH.

- Option 3: No transmission i.e. UCI is dropped.

- Option 4: Leave it to RAN1 with other option like in R2-2003610.

- Option 5: Wait for RAN1

- …

**Please provide the company input to the following table. You may add another option above.**

|  |  |  |
| --- | --- | --- |
| Company | Which option do you support? | Additional comments/suggestion |
| Samsung | Option 1 | Even if RAN1 was not able to conclude the issue last meeting, we understand that Option 1 should be the intended behaviour. |
| LG | Option 1 |  |
| vivo | For legacy UE, Option 3.  For new UEs, Option 4 or Option 2. | As the Rel-15 UE is already in the market, we should not change the legacy UE behaviours. However we should also clarify what UE behaviours are allowed according to the current specification, to facilitate the UE implementation and the test.  As Option 1 prvodied in the previous RAN2 meeting has got lots of concerns from many RAN1 companies, RAN1 can probably discuss the potential solutions first to avoid the some potential issues. |
| Huawei | Option 4 (Focus on RAN2 part only: MAC doesn't generate a MAC PDU) | Generally we understand that the principle of MAC for Option 1, 3 and 4 is the same that no MAC PDU is generated, which can be considered as a guidance from RAN2 to go a step further. How to transmit the UCI in this case should be part of RAN1 work.    More specifically, according to RAN1 feedback, it is clear that RAN1 has concerns on the uncertainty of UCI transmission overlapping with PUSCH. So we should avoid back-forth discussions. From RAN2 perspective, we think it is sufficient to just indicate that MAC doesn't generate a TB in this case, then leave RAN1 to conclude UCI transmission regardless of Option 1, 3 and 4 since we cannot decide L1 functionality which is totally invisible to MAC spec. |
| Ericsson | Option 5 | We understand there was no specific action to RAN2 in the incoming LS R2-2002515. We also understand that RAN1 will discuss this issue and we think RAN2 should give them that that time to discuss. |
| ZTE | Option 2 or option 4 or option 3 | Since the CSI reporting is puncturing transmission which can be studied in RAN1, RAN2 only can be responsible for determining whether to generate a padding PDU for multiplexing the CSI on PUSCH or do nothing. If we go for doing noting, it shall be left to RAN1 discussion. |
| ASUSTeK | Option 1 | It is our understanding that option 1~option 4 would result in specification change more or less in RAN1 or RAN2. We believe option 1 is intended behaviour as mentioned by Samsung and it comply with LTE behaviour for UL skipping. Also, options other than option 1 would lead to non-trivial specification change which is not desired at this late stage.  Option 5 should not be pursued since RAN1 discussion is pending on RAN2 input so that they didn’t plan to discuss the relevant RAN1 contributions in this e-meeting (The following is quoted from the corresponding summary document :  “Company views are divided on whether discussion on this draft CR is necessary in RAN1#100bis-e. One suggested alternative would be to treat this issue after a RAN2 response. Based on the comments so far, recommendation would be to discuss this issue in future meetings.”)  Therefore, it is more efficient to send RAN1 reply LS in this emeeting so that they could discuss the issue in the following RAN1 meeting if necessary. |
| CATT |  | First of all we agree with Huawei and Ericssion that discussion can be left to RAN1.  On the other hand, it is would be helpful to RAN1 we are OK to confirm again in LS or in RAN2 minutes that no spec changes are introduced by RAN2 to solve the **R2-2002515.** |
| MediaTek | Option 1 | We share same view with Samsung and ASUSTeK. |
| Qualcomm | Option 5, 1 | RAN1 is discussing this issue. We can wait and see if they can reach an agreement this time.  We do not support Option 2, 3 and 4. |
| OPPO | Option 5 | There is no clear action in the LS and RAN1 informs that they will ocntunue discussion, so let’s wait from RAN1 and we also think it’s not expected to change the R15 MAC spec. |
| Intel |  | Our understanding is that this issue has been discussed in both RAN1 and RAN2, and it might not be desirable to further send LS back and forth between RAN1 and RAN2. In previous discussion, RAN2’s view is option 1, while there are concerns in RAN1 regarding option 1. Given that we’re discussing Rel-15 behavior and there are already Rel-15 UEs in market, we should understand which options have been implemented already (and cannot be changed) and we should allow such implementations. |

**Conclusion:**

In total, 12 companies provided their input to the discussion. Among 12 companies, five companies (Samsung, LG, ASUSTek, MediaTek, and Intel) supports Option 1 while one company (vivo; for Rel-15) supports Option 3. The remaining six companies (Huawei, Ericsson, ZTE, CATT, Qualcomm, and OPPO) suggests waiting for RAN1 discussion further (Note that rapporteur counted Intel as Option 1 and Huawei and ZTE as Option 5 based on their comments).

One thing that rapporteur can observe is that most (or all) companies do not consider updating MAC specification (i.e. MAC does not generate a MAC PDU). Hence, the proposals are:

**Proposal 1: The LS in R2-2002515 is noted.**

**Proposal 2: For Case 2 in the LS R2-2002515 (i.e. dynamic PUSCH skipping with overlapping CSI/HARQ-ACK on PUCCH), RAN2 assumes MAC does not generate a MAC PDU as in the current MAC specification: no changes to MAC are needed.**

**Proposal 3: RAN2 waits for further input from RAN1.**

## 2.2 BFR

Regarding BFR, the following contributions were (re-)submitted, and one says some changes are needed and the other explains that nothing is needed.

[R2-2002612](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2002612.zip) Clarification on the Random Access parameters for BFR Samsung discussion Rel-15 NR\_newRAT-Core

[R2-2003481](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003481.zip) Correction on the RACH parameters for BFR Huawei, HiSilicon CR Rel-15 38.321 15.8.0 0728 - F NR\_newRAT-Core

[R2-2003484](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003484.zip) Correction on the RACH parameters for BFR Huawei, HiSilicon CR Rel-16 38.321 16.0.0 0729 - A NR\_newRAT-Core

**Please provide the company input to the following table.**

|  |  |  |
| --- | --- | --- |
| Company | Is any change needed to the specification? (Yes/No) | Additional comments/suggestion |
| Samsung | No | We provided our understanding in R2-2002612. |
| LG | No |  |
| vivo | No | Agree with Samsung. |
| Huawei | Yes | Firstly, regarding *rsrp-ThresholdSSB*, based on the field description in RRC spec, this parameter is used for CF-BFR only but it is not reflected in MAC spec, so we think it is necessary to clarify it in MAC to align with RRC spec.  Secondly, regarding *PowerRampingStep* and *initialReceivedTargetPower* in BFR Config, according to RAN1 LS, we think it is clear that they are specific to CF-BFR only, and there is no reason to apply these two parameters for CB-BFR so the clarification is needed as well. |
| Ericsson | No | We think no change is needed in the specification. |
| ZTE | Partly yes | For the parameter rsrp-ThresholdSSB, we share the same view with HW, it can not be found any explict description in MAC specifcation where the rsrp-ThresholdSSB for RACH case other than BFR can be applied although we all know it shall be from RACH-ConfigCommon.  For the parameter *PowerRampingStep* things, we share the same view with Samsung. No need to change anything. |
| ASUSTeK | No | If it is the intended behavior that the parameters are extended to cover CBRA based BFR, no change is needed in MAC specification. |
| CATT | No | Agree with Samsung. |
| MediaTek | Partly yes | Regarding *rsrp-ThresholdSSB,* we have sympathy with HW on the consistency between MAC and RRC spec. However, we wonder whether it could be fixed by updating RRC field description rather than changing MAC spec?  For preamble transmission power, we think the intended behavior is acceptable, i.e. we prioritize the whole RACH procedure for BFR and thus we cover each preamble transmission regardless of whether the transmission is via CFRA or CBRA. So, we prefer no change to the power part. |
| Qualcomm | No | We agree with Samsung. |
| OPPO | No | For rsrp-ThresholdSSB configured in BeamFailureRecoveryConfig, It’s already clear in the field description that the parameter only applis to contention free BFR RACH. |
| Intel | Partially yes | Agree with MediaTek that we might need clarification in RRC field description that some parameters from rach-ConfigBFR is applicable to CBRA. |

**Conclusion:**

In total, 12 companies provided their input to the discussion. Among 12 companies, eight companies think no changes are needed at all. Among remaining four companies, three companies (Huawei, ZTE, and MediaTek) want to clarify the text (either in MAC or RRC) regarding *rsrp-ThresholdSSB*, and two companies (Huawei (counted again) and Intel) want to clarify the text further for some parameters (e.g. *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax*).

Regarding *rsrp-ThresholdSSB*, rapporteur thinks that it is already clearly specified in RRC that it is used for CFRA BFR:

***rsrp-ThresholdSSB***

L1-RSRP threshold used for determining whether a candidate beam may be used by the UE to attempt contention free random access to recover from beam failure (see TS 38.213 [13], clause 6).

Regarding *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax*, rapporteur thinks that it is already clearly specified in MAC that it is used (for both CFRA BFR and CBRA BFR) once it is configured.

|  |
| --- |
| 1> if the Random Access procedure was initiated for beam failure recovery (as specified in clause 5.17); and  1> if *beamFailureRecoveryConfig* is configured for the active UL BWP of the selected carrier:  2> start the *beamFailureRecoveryTimer*, if configured;  2> apply the parameters *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax* configured in the *beamFailureRecoveryConfig*; |

Hence, the proposals are:

**Proposal 4: RAN2 confirms that *rsrp-ThresholdSSB* in *beamFailureRecoveryConfig*, if configured, is used for CFRA BFR only, as specified in RRC. No changes to MAC or RRC are needed.**

**Proposal 5: RAN2 confirms that *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax* in *beamFailureRecoveryConfig*, if configured, are used for CFRA BFR and CBRA BFR, as specified in MAC. No changes to MAC or RRC are needed.**

## 2.3 Others

One contribution is submitted to discuss the issue from RAN1:

**Others**

[R2-2003643](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_109bis-e\Docs\R2-2003643.zip) UL grant overridden between configured grant and RAR grant ASUSTeK discussion Rel-15 NR\_newRAT-Core

The contribution above wants to confirm RAN2 understanding which interpretation is correct when both configured grant and RAR grant are available in MAC layer and their corresponding PUSCHs overlap with each other:

- Interpretation 1: RAR grant takes precedence over configured grant

- Interpretation 2: Up to UE implementation

**Please provide the company input to the following table.**

|  |  |  |
| --- | --- | --- |
| Company | Which interpretation is correct? | Additional comments/suggestion |
| Samsung | Interpretation 1 | No changes are needed to MAC. From our understanding, NOTE 3 is for the activation scenario with DCI (and thus it has to send the CG confirmation MAC CE) where it is left to UE implementation. In other cases, RAR grant should take precedence over periodic occasions of CG grants, as specified in MAC. |
| LG | Interpretation 1 |  |
| vivo | Interpretaiton 1 | Agree with Samsung on the legacy UE behavious.  However there may be issues for the Rel-16 IIOT work item. As IIOT already agreed that:   * An uplink grant addressed to CS-RNTI with NDI=1 (retransmission of CG) is a dynamic grant in prioritization. * An uplink grant addressed to CS-RNTI with NDI=0 ((re-)activation of type 2 CG) is a configured grant in prioritization.   Then it seems that the Rel-16 UE behaivours are different for the Rel-15 UE. Maybe this issue could be resolved in the IIOT work item. |
| Huawei | Interpretation 1 |  |
| Ericsson |  | We understand the root of the paper comes from a discussion in RAN1 and that the same paper (more or less) has been submitted to RAN1. If there is a question in RAN1 how 38.321 should be interpreted in this case, RAN1 should send an LS. |
| ZTE | Interpretation 1 |  |
| ASUSTeK | Interpretation 1 | The corresponding RAN1 contibution has been pending on RAN2 input since last meeting and it would not be discussed in this emeeting since several companies would like to dicuss the RAN1 contribution after RAN2’s input is available. Therefore, it is more efficient to reach conclusion in this RAN2 meeting so that RAN1 could consider their part in the future meetings if necessary. |
| CATT | Interpretation 1 |  |
| MediaTek | Interpretation 1 | We share same view with Samsung. And we are ok to have some clarification in RAN2, so that RAN1 can make progress based on RAN2’s understanding/consensus. |
| Qualcomm | Interpretation 1 | We share the same view with Samsung and do not think changes to MAC Spec are needed. |
| OPPO | Interpretation 1 | The note handles the case for (re-)activation UL grant overlaps with UL grant in RAR, and in this case it’s up to UE implementation. In other case, RAR prioritizes the CG. |
| Intel | Interpretation 1 |  |

**Conclusion:**

In total, 12 companies provided their input to the discussion, and all the companies think Interpretation 1 is correct except for the (re-)activation case (as in NOTE 3), as specified in the current MAC specification. Hence the proposal is:

**Proposal 6: Regarding the priority between RAR grant and configured grant, the current MAC specification is correct, so no changes to MAC are needed.**

# 3 Conclusion

## 3.1 UL Skipping

**Proposal 1: The LS in R2-2002515 is noted.**

**Proposal 2: For Case 2 in the LS R2-2002515 (i.e. dynamic PUSCH skipping with overlapping CSI/HARQ-ACK on PUCCH), RAN2 assumes MAC does not generate a MAC PDU as in the current MAC specification: no changes to MAC are needed.**

**Proposal 3: RAN2 waits for further input from RAN1.**

## 3.2 BFR

**Proposal 4: RAN2 confirms that *rsrp-ThresholdSSB* in *beamFailureRecoveryConfig*, if configured, is used for CFRA BFR only, as specified in RRC. No changes to MAC or RRC are needed.**

**Proposal 5: RAN2 confirms that *powerRampingStep*, *preambleReceivedTargetPower*, and *preambleTransMax* in *beamFailureRecoveryConfig*, if configured, are used for CFRA BFR and CBRA BFR, as specified in MAC. No changes to MAC or RRC are needed.**

## 3.3 Others

**Proposal 6: Regarding the priority between RAR grant and configured grant, the current MAC specification is correct, so no changes to MAC are needed.**

# 4 References

[1] R2-109bis-e Chair MainSession 20-04-20 0800 UTC.docx