**3GPP T****SG-RAN WG2 Meeting #115-electronic R2-210xxxx**

**Online, August 16th – August 27th, 2021**

**Agenda item: 6.1.3.1**

**Source: vivo**

**Title:** **Report of [AT114-e][019][NR16] MAC I (vivo)**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is aimed at reporting the discussion and results of the following email discussion:

* [AT115-e][019][NR16] MAC I (vivo)

Scope: Take on-line outcome into account, Treat remaining aspects, determine agreeable parts and agree CRs Treat R2-2106926, R2-2106997, R2-2108232, R2-2107927, R2-2108092, R2-2108093, R2-2107198, R2-2107609, R2-2107163, R2-2107160, R2-2107161, R2-2108781.

Intended outcome: Report, Agreed CRs.

Deadline: On-Line first, Schedule 1

The discussion scope is to gather companies’ comments on the revised text proposal for capturing the conclusion in RAN1 LS [1], draft LS to RAN1 regarding cupturing the RAN2 WA that LCH based priority has higher priority than UL skipping, and to check if there is sufficient support to pursue the CRs [11] [12].

Then, the rapporteur would like to point out the specific deadline for this discussion with two phases,

* In phase 1, companies are invited to provide their views by August 19th (Thursday), 2021, 12:00 UTC.
* In phase 2, the corresponding summary proposals, draft CR(s), draft LS to RAN1 will be provided. Further comments are invited to be provided by August 26th (Thursday), 2021, 12:00 UTC.

# 2 Participants

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| Sangkyu Baek | sangkyu.baek@samsung.com |
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# 3 Phase-1 Discussion

## 3.1 Revised RRC text proposal

During the online discussion at RAN2#115-e meeting, a discussion on the modeling of capturing the RAN1 conclusion given in the RAN1 LS [1] was launched. The corresponding discussion records are given as below:

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| R2-2106926 LS on UL skipping for PUSCH in Rel-16 (R1-2106370; contact: vivo) RAN1 LS in Rel-16 NR\_newRAT-Core, TEI16 To:RAN2   * Noted   R2-2106997 Correction on UL Skipping for PUSCH in Rel-16    vivo, ZTE corporation, Xiaomi Communications    CR    Rel-16    38.331    16.5.0    2708    -    F    TEI16   * Revised/Merged   R2-2108092 Corrections to R16 UL skipping with repetitions    Ericsson, NTT DOCOMO INC.    discussion   * Noted   R2-2108093 Corrections to R16 UL skipping with repetitions    Ericsson, NTT DOCOMO INC.    CR    Rel-16    38.321    16.5.0    1135    -    F    NR\_IIOT-Core   * Not Pursued   DISCUSSION  - Huawei think both RRC or MAC based impl could work.  - HW Think that the condition on LCH prioritization is not nessecarily valid, there are proposals to remove it. LG agrees. ZTE think this is still under discussion in R1, Oppo also think this need to be confirmed in R1.  - LG prefer to specify in RRC think this is natural. Samsung also think RRC is better and think that was the intention by R1, but think the RRC CR can be simpler, e.g. acc to Oppo or MTK CR, prefer these.  - Apple think that MAC impl is more complex think RRC could be better.  - MTK think that as late in the release it is better to modify RRC.  - QC think we should stick to RRC, and this was the intention in R1.  - ZTE also prefer RRC. Lenovo and Oppo prefer RRC.  - Nokia support MAC but agrees R1 intention was RRC.  - Chair: We go with an RRC solution, and as there was support to go for simpler text as in MTK, and OPPO papers below, suggest a multi-sourced joint CR.   * We go with a RRC solution.   R2-2108232 On enhanced UL skipping and PUSCH repetitions    MediaTek Inc.    discussion    Rel-16    TEI16   * Noted, Proposal is merged   R2-2107927 CR on the enabling restriction on R16 PUSCH skipping and PUSCH repetitions    OPPO    CR    Rel-16    38.331    16.5.0    2745    -    F    TEI16   * Merged |

Taking all the contributions [2]-[6] and [9] into account, the rapporteur has updated the RRC text proposal on capturing the RAN1 conclusion as follows,

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| ***skipUplinkTxDynamic, enhancedSkipUplinkTxDynamic, enhancedSkipUplinkTxConfigured***  If set to *true*, the UE skips UL transmissions as described in TS 38.321 [3]. The network does not configure *enhancedSkipUplinkTxDynamic* or *enhancedSkipUplinkTxConfigured* with value *true*, when PUSCH repetition Type A, in case *K*>1, or PUSCH repetition Type B is applied for the corresponding PUSCH transmission of the uplink grant (see TS 38.214 [19], clause 6.1.2.1 and clause 6.1.2.3). |

Please NOTE that the number of actual repetitions within a nominal repetition with *K*=1 can be larger than 1 based on the current 38.214 spec. Thus, once PUSCH repetition Type B is applied for a PUSCH transmission scheduled by a dynamic grant or a configured grant Type 1 or Type 2, the Rel-16 PUSCH skipping feature is not expected to be enabled, as indicated in the RAN1 LS. Besides, it is the rapporteur’s understanding that the condition (i.e. Rel-16 LCH based prioritization is not configured and there is a single PHY priority for UL transmissions) mentioned in the RAN1 LS is not needed since we have agreed to remove the condition (i.e. if the MAC entity is not configured with *lch-basedPrioritization*) in the current MAC spec.

Please share your view on the above-revised RRC text proposal.

**Q1: Do companies agree with the updated RRC text proposal?**

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| **Company** | **Yes/No** | **Detailed comments** |
| vivo | Yes | We are fine with the proposed text. Meanwhile, we think it should be allowed to enable CG(DG) PUSCH skipping feature if PUSCH repetition is only configured for DG(CG) PUSCH skipping feature. |
| Samsung | Yes | We are fine with the proposed text. It looks simple and enough. |
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**Summary:**

## 3.2 Draft LS to RAN1

In addition, during the online discussion at RAN2#115-e meeting, it was agreed to send an LS to RAN1 indicating that RAN2 agrees to remove the condition (i.e. if the MAC entity is not configured with *lch-basedPrioritization*). In the rapporteur’s understanding, removing this condition means that the MAC entity does not generate a MAC PDU for a deprioritized uplink grant even when its associated PUSCH is overlapping with PUCCH. In this sense, the core text part of draft LS is given as follows,

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| **Text of draft LS to RAN1:** Overall description RAN2 has further discussed the overlapped data and SR with equal L1 priority (i.e. case 2-2 and case 3 mentioned in R1-2102244). And RAN2 has concluded the following,   |  | | --- | | * Agree to remove the condition as proposed in this CR, send an LS to R1. |   Specifically, with this agreement, RAN2 agrees that the MAC entity does not generate a MAC PDU for a deprioritized uplink grant even when its associated PUSCH is overlapping with PUCCH. Actions **To RAN1**  **ACTION:** RAN2 respectfully asks RAN1 to take the above into account. |

Please share your view on the above-mentioned text of draft LS.

**Q2: Do companies agree with the intention of the text of draft LS?**

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| **Company** | **Yes/No** | **Detailed comments** |
| vivo | Yes | We think RAN2 should send this LS out as soon as possible. Currently, there is an ongoing parallel discussion about the previously achieved RAN2 WA, where there is a majority view that the RAN2 WA can be confirmed in RAN1. In this sense, this LS may help to lubricate the RAN1 discussion. |
| Samsung | Yes but | More important thing is that removing the condition is to make UL skipping independent of LCH-based Prioritization. |
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**Summary:**

## 3.3 UL skipping correction

In contribution [10][11], it is found that no MAC PDU can be generated for the case where there is an overlapping between CG PUSCH and UCI, based on the current MAC spec. The reason is that the conditions of Rel-15 CG PUSCH skipping can be fulfilled in this case. To resolve this issue, the following changes are proposed fro the MAC spec,

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| **TS 38.321 clause 5.4.3.1.3:**  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 the MAC entity is not configured with *lch-basedPrioritization*; and  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 there is no data available for any LCG, or the MAC PDU includes only the padding BSR:  3> not generate a MAC PDU for the HARQ entity.  2> else:  3> generate a MAC PDU for the HARQ entity.  1> else if the MAC entity is configured with *skipUplinkTxDynamic* with value *true* and the grant indicated to the HARQ entity was addressed to a C-RNTI, or the grant indicated to the HARQ entity is a configured uplink grant; and  1> if there is no aperiodic CSI requested for this PUSCH transmission as specified in TS 38.212 [9]; and  1> if the MAC PDU includes zero MAC SDUs; and  1> if the MAC PDU includes only the periodic BSR and there is no data available for any LCG, or the MAC PDU includes only the padding BSR:  2> not generate a MAC PDU for the HARQ entity. |

Please share your view on the [CR R2-2107161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs/R2-2107161.zip).

**Q3: Do companies agree with the intention of CR R2-2107161?**

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| **Company** | **Yes/No** | **Detailed comments** |
| vivo | Yes | We are fine with the CR. |
| Samsung | Yes but | We are agree with the problem and the change.  But the following part is not necessary:  2> else:  3> generate a MAC PDU for the HARQ entity.  This paragraph only mention when MAC PDU shall not be generated. When MAC PDU is generated is specified in 5.4.2.1. |
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**Summary:**

## 3.4 Stopping configured grant timer

In contribution [12], it is suggested the running *configuredGrantTimer* should be stopped when a UL grant addressed to C-RNTI is received and there is no obtained MAC PDU due to UL skipping or when a UL grant addressed to CS-RNTI is received and the corresponding HARQ buffer is empty. Otherwise, the MAC cannot use a configured grant for this HARQ process (without any buffered data) for a while.

Please share your view on the CR [R2-2108781](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_115-e/Docs/R2-2108781.zip).

**Q4: Do companies agree with the intention of CR R2-21088781?**

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| **Company** | **Yes/No** | **Detailed comments** |
| vivo | Comments | We generally agree that there might be an issue as mentioned in the CR. However, we think this optimization would incur misalignment on the CGT maintenance between the network and UE. For example, when a CG grant is skipped by the UE, the network may misunderstand that the radio condition is bad and keep the CGT running at the network side. Then, the UE will stop the CGT and use the next CG occasion associated with the same HARQ process for the new transmission. However, the network may assume that CG occasion will not be used since the CGT is still running.  In conclusion, we think this optimization is not needed for Rel-16. |
| Samsung | No | Agree with vivo. This optimization is not needed for Rel-16. We think the network can continuously rely on dynamic grant allocation by keeping CGT running at the NW side. |
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**Summary:**

# 5 Conclusion

The contribution is summarized with proposals as follows,

***Phase-1***

# 6 Reference

1. R2-2106926, LS on UL skipping for PUSCH in Rel-16, vivo.
2. R2-2106997, Correction on UL Skipping for PUSCH in Rel-16, vivo, ZTE corporation, Xiaomi Communication.
3. R2-2108092, Corrections to R16 UL skipping with repetitions, Ericsson, NTT DOCOMO INC.
4. R2-2108093, Corrections to R16 UL skipping with repetitions, Ericsson, NTT DOCOMO INC.
5. R2-2108232, On enhanced UL skipping and PUSCH repetitions, MediaTek Inc.
6. R2-2107927, CR on the enabling restriction on R16 PUSCH skipping and PUSCH repetitions, OPPO.
7. R2-2107198, Correction on UL skipping with lch-basedPrioritization, CATT, Samsung.
8. R2-2107609, Enhanced UL skipping with intra-UE prioritization, APPLE.
9. R2-2107163, Discussion on R16 uplink skipping with TB repetitions, Huawei, HiSilicon.
10. R2-2107160, Discussion about a loophole for R16 uplink skipping procedure, Huawei, HiSilicon.
11. R2-2107161, Correction on R16 uplink skipping procedure, Huawei, HiSilicon.
12. R2-2108781, Stopping configuredGrantTimer upon ignored or skipped uplink grant, LG Electronics UK.