**3GPP TSG-RAN WG2 Meeting #112-eR2-20xxxxx**

**Online, 2 – 13 Nov, 2020**

Agenda Item: 6.5.3

Source: Huawei, HiSilicon

Title: Summary of [AT112-e][041][IIOT] MAC I

**Document for:** Discussion and Decision

# Introduction

This is the summary of the following email discussion:

* [AT112-e][041][IIOT] MAC I (Huawei)

Scope: Treat tdocs R2-2009500, R2-2009373, R2-2009375, R2-2009483 R2-20010054, R2-2009541, R2-2009374

Intended outcome: Intermediate: Determine agreeable parts. Final: For agreeable parts, agreed CRs.

Deadline: Intermediate deadline(s) by Rapporteur, Final: Thu Nov 12, 1200 UTC

R2-2009500 and R2-20010054 are not included in this email discussion as they have been treated online.

**Contact from companies**

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| --- | --- |
| Company | Email |
| LG | SeungJune Yi (seungjune.yi@lge.com) |
| Nokia | Ping-Heng Wallace Kuo (Ping-Heng.Kuo@nokia.com) |
| Samsung | Sangkyu Baek (sangkyu.baek@samsung.com) |
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# Discussion

## CR on condition of a de-prioritized grant

R2-2009373 states that, in the current MAC spec, an uplink grant can be considered as a de-prioritized/prioritized uplink grant only if the MAC entity is configured with *lch-basedPrioritization*. It is suggested as: “For the MAC entity configured with *lch-basedPrioritization*” is added before the sentence “If the corresponding PUSCH transmission of a configured uplink grant is cancelled by CI-RNTI as specified in clause 11.2A of TS 38.213 [6] or cancelled by a high PHY-priority PUCCH transmission as specified in clause 9 of TS 38.213 [6], this uplink grant is considered as a de-prioritized uplink grant.”, in order to be aligned with other texts in the MAC spec.

**Q1 Do companies agree with the CR above?**

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| --- | --- | --- |
| **Company** | **Agree?**  **(Yes or No)** | **Comments** |
| LG | Yes |  |
| Nokia | Yes |  |
| Samsung | No (no strong view) | When lch-basedPrioritization is not configured, we don’t need to consider it is a de-prioritized uplink grant. But even if we consider it is a de-prioritized uplink grant, this classification is not used anywhere. It does not make anything broken in the current text.  So, we think this CR is a cosmetic change with text improvement. Thus we slight prefer not to do this. But no strong view. |
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**Summary and Proposal:**

## On the case when SR and PUSCH conflict

R2-2009483 discusses the case when the SR and PUSCH conflict, it is argued that:

If *lch-basedPrioritization* is configured, UE behavior on the SR and PUSCH conflict was clearly agreed in RAN2#108 meeting as below:

• For the SR&PUSCH with different LCH priority, MAC delivers SR or PUSCH to PHY based on the LCH priority;

• For the SR&PUSCH with equal LCH priority, MAC delivers PUSCH to PHY.

Accordingly, the below proposal is made:

**Proposal: UE MAC only provides SR or PUSCH to PHY when the SR and PUSCH resource are overlapped, i.e. no possibility to deliver both SR and PUSCH to PHY in the conflict case.**

**Q2 Do companies agree with the proposal above?**

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| --- | --- | --- |
| **Company** | **Agree?**  **(Yes or No)** | **Comments** |
| LG | Yes |  |
| Nokia | Yes | This is also our understanding, but do we need any change in MAC spec. to capture this? It seems quite clear already. |
| Samsung | No | This proposal is related to sequential generation scenario, e.g.  - at t1, MAC PDU is generated and deliverd to PHY. But PHY did not transmit PUSCH yet.  - at t2, SR with higher priority is triggered. There is sufficient timeline, so MAC instruct to signal the SR. MAC PDU is not transmitted.  We think the proposal prohibits this scenario by UE implementation. So we prefer not to agree anything.  Regarding LG’s comment, we agree there is no MAC impact. There may be a RAN1 impact of this proposal. |
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**Summary and Proposal:**

## On data & SR overlapping with equal L1 priority

R2-2009375 discusses the case when Data and SR overlap with equal L1 priority and SR is prioritized in MAC, it is stated that:

In Rel-16, if the priority of the logical channel that triggered SR is higher than the priority of the uplink grant, and the SR and the UL grant are of the same L1 priority, it is not clear whether PHY layer can signal SR if only SR is instructed to the PHY for transmission. If the PHY layer can signal SR, the MAC layer can instruct SR transmission to the PHY layer, otherwise the MAC layer will only deliver the data.

Accordingly, the below proposal is made:

**Proposal 1: RAN2 to confirm the intended UE behaviour for the case that the overlapped data and SR are of equal L1 priority and SR is prioritized in MAC, i.e. whether the MAC can instruct PHY for SR transmission.**

**Q3: Which below option on the intended UE behavior companies agree with, for the case when SR and data overlap with equal L1 priority and SR is prioritized in MAC?**

**Option 1: MAC can instruct PHY for SR transmission**

**Option 2: MAC deliver only the data to PHY for transmission**

**Other option(s):**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option** | **Comments** |
| LG | 1 | We think there is no problem to send SR in PHY layer if MAC instructs SR transmission without delivering data. |
| Nokia | 1 | Since the SR has higher LCH priority than the UL grant, we should deliver SR only. This way we can have a MAC behavior that is consistent with data v.s. data conflict, i.e. deliver the one with higher LCH priority. |
| Samsung | 1 | LCH based prioritization didn’t assume PHY prioritization. So, we can say that we already considered the equal PHY priority case as a baseline. |
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**Summary and Proposal:**

## On configuring L2 priority and PHY priority

R2-2009541 discusses the configuration of L2 priority and PHY priority based on the below agreement:

* R2 assumes that PHY-based prioritization and LCH-based prioritization are configured independently and one can be configured without the other (assumption may be modified when LS reply from R1 is received)
* Postpone the discussion on additional conditions for Phy Priority and L2 priority feature (assume this can be added later).

It is argued that, there is no need for joint LCH based prioritization and PHY based prioritization, considering:

* The UE capability on LCH based and PHY based prioritization is separate.
* There are potential not complex solutions for only one of the two is configured.
* It is up to gNB implementation to assure LCH based prioritization and PHY based prioritization configured together.

Accordingly, the below proposal is made:

**Proposal 1 LCH based prioritization and PHY based prioritization can be configured independently.**

**Q4 Do companies agree with the proposal above?**

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| **Company** | **Agree?**  **(Yes or No)** | **Comments** |
| LG | No | We don’t see any benefit in configuring only one of them. The purpose of IIOT WI is to ensure prioritized transmission of URLLC data, and if only one of them is configured, the WI purpose is not met. |
| Nokia | Yes | In practice we think it is the best to configure both of them to optimize intra-UE prioritization features. But from spec. point of view we probably don’t need to mandate such joint configuration, so we can have more gNB implementation flexibility. Besides, RAN2 has agreed before that they can be configured independently. |
| Samsung | Yes | Agree with Nokia |
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**Summary and Proposal:**

## On explicit indication of PHY based prioritization

R2-2009374 discusses the configuration for physical layer prioritization and makes the below proposal:

It is stated that, when UE reports the capability parameter *ul-IntraUE-Mux-r16* to the network, the network can decide whether PHY based prioritization can be configured for the UE.

It is observed that, if any of the following parameters is configured by the network, PHY based prioritization shall be viewed as configured for the UE.

* *priorityIndicatiorDCI-0-1* in PUSCH-Config;
* *priorityIndicatiorDCI-0-2* in PUSCH-Config;
* *phy-PriorityIndex* in ConfiguredGrantConfig;
* *phy-PriorityIndex* in SchedulingRequestResourceConfig.

Accordingly the below proposal is made:

**Proposal 1: No explicit indication of PHY based prioritization is needed.**

**Q5 Do companies agree with the proposal above?**

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| **Company** | **Agree?**  **(Yes or No)** | **Comments** |
| LG | Yes | We think it is already agreed in the online session. |
| Nokia | Yes | The agreement made online already captures this:   * No need to introduce additional configuration for Phy Priority and L2 priority feature. |
| Samsung | Yes | No need to discuss again |
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**Summary and Proposal:**

# Conclusion

**Proposals:**

# References

1. R2-2009373 Clarification on the condition of a de-prioritized grant Huawei, HiSilicon CR Rel-16 38.321 16.2.1 0928 - F NR\_IIOT-Core
2. R2-2009375 Clarification of PHY behaviour for Data & SR overlapping with equal L1 priority Huawei, HiSilicon discussion Rel-16 NR\_IIOT-Core
3. R2-2009483 Clarification on the SR and PUSCH conflict with equal LCH priority Apple discussion Rel-16 NR\_IIOT-Core
4. R2-2009541 Consideration on L2 priority and PHY priority feature OPPO discussion Rel-16 NR\_IIOT-Core
5. R2-2009374 Clarification of configuration for physical layer prioritization Huawei, HiSilicon discussion Rel-16 NR\_IIOT-Core.