3GPP TSG-RAN WG2 #116bis-e *R2-22xxxxx*

e-Meeting, 17th-25th January, 2022

**Agenda item:** **8.5.3**

**Source: vivo(Rapporteur)**

**Title:** **Report of [AT116bis-e][504][IIOT] UCE open issues**

**Document for: Discussion and Decision**

# 1 Introduction

This offline discussion aims to address the remaining CP open issues and reach some agreements for topics in 8.5.3 as follows:

* **[AT116bis-e][504][IIoT] UCE open issues (vivo)**

Deadline for providing comments:

* + - Companies inputs – **January 20, 23:59 UTC**
		- Rapporteur summary – **January 21**
		- Final comments on Rapporteur summary – **January 24, 23:59 UTC**

# 2 High Priority Issues

## 2.1 Selection of HARQ processes with equal priority between retransmission and initial transmission

In RAN2#116-e, it is agreed,

**Agreements:**

1. If HARQ process ID selection is among the retransmissions whose HARQ processes are with equal priority, it is up to UE implementation to select the prioritized HARQ process ID.

2. If HARQ process ID selection is among the initial transmissions whose HARQ processes are with equal priority, it is up to UE implementation to select the prioritized HARQ process ID.

It is still unclear how to select the HARQ process for a CG when two HARQ processes(i.e. one for retransmission and the other for initial transmission) available for the CG have equal priority.

According to the papers submitted, there are three options to handle the issue:

* **Option 1**: Depending on the UE implementation to select the prioritized HARQ process ID.
* **Option 2**: The UE prioritizes retransmission, i.e. UE prioritizes a HARQ process for retransmission if the collision is between the retransmission and the initial transmission.
* **Option3**: Up to UE implementation to perform prioritization according to gNB configuration as follows:
	+ Prioritization among retransmissions only if Rel-16 baseline behaviour is configured
	+ Prioritization among initial transmissions and retransmissions if new Rel-17 behaviour of prioritizing high priority data is configured

The reasons for **Option1** are following：

* Homogeneous behaviour for all equal priority cases in R17: it was agreed that for HARQ process ID selection among the initial transmissions or among the retransmissions with equal priority, it depends on the UE implementation to select the prioritized HARQ process ID
* Similar rule as Rel-16 IIoT: i.e. when overlapping CGs have equal priority, it depends on the UE implementation to select one CG to perform transmission.

The reasons for **Option2** are following：

* Ensure the latency requirement: generally speaking, the retransmission is more urgent than the initial transmission given their priorities are same. Thus, retransmission should be prioritized to avoid potential data loss. And the same logic/mechanism has been applied in Rel-16 NR-U.
* Prioritize initial transmission leads to more HARQ process IDs waiting for re-transmission, while prioritize retransmission data allows the retransmission to be received in the gNB first and allows to reduce memory usage at the gNB.
* Prioritize retransmission is more resource efficiency: retransmission can only be performed with the same HARQ process on the same carrier as its initial transmission, while initial transmission can be performed on any carrier. If initial transmission is prioritized over retransmission for current CGO on carrier1, the retransmission can not be mapped to a next CGO if the next CGO is on a carrier other than carrier1, and the next CGO is wasted. The issue will not occur if retransmission is prioritized.

The reason for **Option3** is following：

* It was agreed in RAN2#115e: *When lch-basedPrioritization and cg-RetransmissionTimer are both configured, the gNB can configure the UE per MAC entity whether it follows Rel-16 baseline or whether it prioritizes high priority data when selecting HARQ PID for a CG (i.e. option 2 is configurable).* The straightforward extension to RAN2 #116e agreements is to also leave the HARQ ID with equal priority selection to UE implementation depending on the gNB configuration.

Based on the above summary, rapporteur would like to ask companies to provide inputs for the following question:

***Question 1: If HARQ process ID selection is between the retransmission and the initial transmission, which is your preferred option regarding HPI selection among HARQ processes with equal priority?***

* ***Option 1. Depending on the UE implementation to select the prioritized HARQ process ID.***
* ***Option 2. The UE prioritizes the HARQ process for retransmission over initial transmission***
* ***Option 3. Up to UE implementation to perform prioritization according to gNB configuration.***
* ***Option 4: Other (please explain)***

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| **Company** | **Preferred option(s)** | **Comments** |
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**Summary of answers to Q1**:

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| Tdoc Num | Involved Proposals | Source |
| [1] R2-2200183 | Proposal 1: For HARQ process ID selection for a CG between the retransmission and the initial transmission with the same data priority, the UE should fall back to Rel-16 behaviour and prioritize retransmission. | Nokia |
| [2] R2-2200321 | Proposal 1: If HARQ process ID selection is among initial transmission(s) and retransmission(s) with equal priority, it is up to UE implementation to select the prioritized HARQ process ID. | CATT |
| [3] R2-2200478 | Proposal 1: For HPID selection among initial transmission and retransmission with equal and highest priority, the UE prioritizes a HARQ process for retransmission. | Huawei, HiSilicon |
| [4] R2-2200927 | [Proposal 1 It is up to the UE implementation to choose the prioritized HPI when HARQ processes with equal priority are associated with the initial transmission and the retransmission.](#_Toc92803188) | OPPO |
| [5] R2-2200953 | [Proposal 1 When intraCG-Prioritization is configured, if the priorites of HARQ processes of retransmission and initial transmission are equal, HARQ Process ID of the retransmission is selected.](#_Toc92719644) | Ericsson |
| [6] R2-2201018 | Proposal 1: If HARQ process ID selection is among initial transmissions and retransmissions whose HARQ processes are with equal priority, it is up to UE implementation to perform prioritization according to gNB configuration as follows:* Prioritization among retransmissions only if Rel-16 baseline behaviour is configured.
* Prioritization among initial transmissions and retransmissions if new Rel-17 behaviour of prioritizing high priority data is configured.
 | Qualcomm  |
| [7] R2-2201226 | Proposal 1: For HPI selection for one CG occasion, if priority level of one candidate HPI for re-transmission is equal one candidate HPI for initial-transmission, the HPI for retransmission shall be selected for the upcoming CG occasion. | ZTE  |
| [8]R2-2201264 | Proposal1: UE prioritizes the HARQ process for retransmission when performing HARQ process ID selection among the HARQ processes with equal priority for initial transmission and retransmission. | vivo |
| [9]R2-2201285 | Proposal#1: When the HARQ process selection happen in different HARQ process collision with equal priority, the legacy behavior can support this issue and do not see any issue. | III |
| [10]R2-2201368 | Proposal 1. For HPI selection between initial transmission and retransmission with the highest priority in Intra-CG Prioritization, UE shall prioritize retransmission. | Samsung |
| [11]R2-2201460 | Proposal 3: If HARQ process ID selection is between the retransmission and the initial transmission among HARQ processes with equal priority, it is left to the UE implementation to select the prioritized HARQ process ID. | MediaTek  |

## 2.2 Deprioritized MAC PDU handling when AutoTx is not configured and CGRT is configured

In the RAN2#113e, we have reached the following agreement:

1. Option 1: AutoTx and CGRT are responsible for deprioritized MAC PDU and LBT-failed MAC PDU, respectively. If CGRT is not configured, LBT-failed MAC PDU is not retransmitted. If AutoTx is not configured, deprioritized MAC PDU is not retransmitted.

However, there are different understandings on whether the highlighted part in the above agreement also covers the case *cg-RetransmissionTimer* is configured and *AutonomousTx* is not configured. For the case, the following two options are on the table for further discussion according to the papers submitted.

If *cg-RetransmissionTimer* is configured and *AutonomousTx* is not configured:

* **Option 1**: a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behavior can still take place. RAN2 confirms no specification change is required.
* **Option 2**: keep the earlier agreement and a deprioritized MAC PDU is not autonomous (re)transmitted. RAN2 needs to consider how to reflect the changes to the specification.

The reasons for Option1 are following：

* More aligned with what we have discussed earlier in RAN2 that led to the above agreement we have made, i.e. the previous agreement did not cover the case where CGRT is configured.
* The current specification allows possible NR-U autonomous retransmission of deprioritized PDU upon expiry of CGRT, i.e. Option1 leads to minimum impact on the current MAC specification.
* If AutoTx is not configured, the IIoT behaviour regarding autonomous transmissions should be avoided, but the NR-U behaviour regarding autonomous retransmissions is still allowed.
* Autonomous retransmission of deprioritized PDUs should not be disabled, since the HARQ process ID of the deprioritized transmission is not known by gNB, so gNB can not recover the deprioritized MAC PDU by dynamic scheduling.

The reasons for **Option2** are following：

* Option 1 makes it impossible for the NW to disable the autonomous re-transmission of a deprioritized PDU.
* When *autonomousTx* is not configured, it means that the gNB is confident to recover the de-prioritized MAC PDU by itself even if the de-prioritized MAC PDU has never been completely transmitted.

Based on the above summary, rapporteur would like to ask companies to provide inputs for the following question:

***Question 2: When cg-RetransmissionTimer is configured but autonomousTx is not configured, which is your preferred option regarding the deprioritized MAC PDU handling?***

* ***Option 1: a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behaviour can still take place. RAN2 confirms no specification change is required.***
* ***Option 2: keep the earlier agreement and a deprioritized MAC PDU is not autonomous (re)transmitted. RAN2 needs to consider how to reflect the changes to the specification.***
* ***Option 3: Other (please explain)***

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| **Company** | **Preferred option(s)** | **Comments** |
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* **Summary of answers to Q2**:

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| Tdoc Num | Involved Proposals | Source |
| [1] R2-2200183 | Proposal 2: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, the UE does not autonomously (re-)transmit the de-prioritized MAC PDU. | Nokia |
| [2] R2-2200321 | Proposal 2: RAN2 confirms that a deprioritized grant shall not be autonomously retransmitted when autonomousTx is not configured. RAN2 considers the above TP for implementing this. | CATT |
| [3] R2-2200478 | Proposal 2: RAN2 to confirm that if cg-RetransmissionTimer is configured and AutonomousTx is not configured, a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behaviour can still take place. | Huawei, HiSilicon |
| [4] R2-2200927 | [Proposal 2 When cg-RetransmissionTimer is configured but autonomousTx is not configured, the deprioritized MAC PDU is not transmitted on the subsequent CG based on AutoTX mechanism but can be transmitted on the subsequent CG based on NRU autonomous retransmission mechanism.](#_Toc92803189) | OPPO |
| [6] R2-2201018 | Proposal 2: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, a deprioritized MAC PDU can be retransmitted via autonomous retransmission based on Rel-16 NR-U behaviour. No spec. change is needed. | Qualcomm  |
| [8]R2-2201264 | Proposal2: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behavior can still take place. | vivo |
| [9]R2-2201285 | Proposal#2: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, keep using the autonomous retransmission based on Rel-16 NR-U behavior can minimum specification impact. | III |
| [11]R2-2201460 | Proposal 1: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, a deprioritized MAC PDU is not transmitted in a subsequent CG occasion using the Rel-16 URLLC autonomous transmission mechanism. However, autonomous retransmission based on Rel-16 NR-U behaviour can still take place. RAN2 confirms no specification change is required. | MediaTek  |

## 2.3 CGRT handling for deprioritised UL grant when autoTx is not configured

In RAN2#113-e, it is agreed that CGRT is stopped when the associated uplink grant is deprioritized due to LCH-based prioritization.

3. the MAC entity stops cg-RetransmissionTimer when the CG resource associated with the timer is deprioritized due to LCH-based prioritization.

It was clear that the agreement is applied to the case where a*utonomousTx* is configured. But, there are different understandings on whether the above agreement can also be applied to the case where a*utonomousTx* is not configured. For the a*utonomousTx* not configured case, there are two options regarding the *cg-RetransmissionTimer* termination for the deprioritized CG on the table for further discussion according to the papers submitted.

* **Option 1**: *cg-RetransmissionTimer* should be stopped for the deprioritized CG.
* **Option 2**: *cg-RetransmissionTimer* should not be stopped for the deprioritized CG.

The reasons for Option1 are following：

* Not stopping CGRT brings no benefit but only needlessly delay the retransmission
* Align with the previous agreement

The reasons for Option2 are following：

* The Rel-16 NR-U autonomous retransmission behaviour should not be affected by deprioritization
* Compared with Option1, Option2 is simpler and has less specification impact
* Option2 allows the network flexibility on the retransmission schedule, e.g. the gNB may want to respond to the UE with a dynamic grant before the CGRT expiry if the HARQ process id can be determined by gNB
* With Option2, the network can configure *autonomousTx* if it wants to achieve the same UE behaviour as Option1

Based on the above summary, rapporteur would like to ask companies to provide inputs for the following question:

***Question 3: When cg-RetransmissionTimer is configured but autonomousTx is not configured, which is your preferred option regarding the cg-RetransmissionTimer termination for the deprioritized CG ?***

* ***Option 1: cg-RetransmissionTimer should be stopped for the deprioritized CG.***
* ***Option 2: cg-RetransmissionTimer should not be stopped for the deprioritized CG.***
* ***Option 3: Other (please explain)***

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| **Company** | **Preferred option(s)** | **Comments** |
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* **Summary of answers to Q3**:

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| Tdoc Num | Involved Proposals | Source |
| [1] R2-2200183 | Proposal 3: When autonomousTx is not configured, cg-RetransmissionTimer is not stopped upon de-prioritization of the MAC PDU. | Nokia |
| [4] R2-2200927 | [Proposal 3 The MAC entity does not stop cg-RetransmissionTimer for the deprioritized CG when cg-RetransmissionTimer is configured but autonomousTx is not configured.](#_Toc92803190) | OPPO |
| [5] R2-2200953 | Proposal 2 cg-RetransmissionTimer is not stopped for the de-prioritized CG when cg-RetransmissionTimer is configured but autonomousTx is not configured. | Ericsson |
| [6] R2-2201018 | Proposal 3: The earlier RAN2 agreement that the MAC entity stops cg-RetransmissionTimer when the CG resource associated with the timer is deprioritized due to LCH-based prioritization is confirmed. | Qualcomm  |
| [8]R2-2201264 | Proposal3: If cg-RetransmissionTimer is configured and autonomousTx is not configured, the cg-RetransmissionTimer is stopped when the associated CG is deprioritized, i.e. the previous agreement is kept. | vivo |
| [9]R2-2201285 | Proposal#3: If cg-RetransmissionTimer is configured and AutonomousTx is not configured, a deprioritized MAC PDU is transmitted in a subsequent CG occasion using the Rel-16 NR-U autonomous retransmission mechanism, the cg-RetransmissionTimer should not be stopped for the deprioritized CG. | III |
| [10]R2-2201368 | Proposal 2. cg-RetransmissionTimer is stopped when CG configured with *AutonomousTx* is de-prioritized. cg-RetransmissionTimer is not stopped when CG not configured with *AutonomousTx* is de-prioritized. | Samsung |
| [11]R2-2201460 | Proposal 2: RAN2 confirms the previous agreement that the MAC entity stops cg-RetransmissionTimer when the CG resource associated with the timer is deprioritized due to LCH-based prioritization, regardless of whether AutonomousTx is configured or not. | MediaTek  |

## 2.4 *configuredGrantTimer* handling when a CG for retransmission is deprioritized

[3] pointed that in the current MAC spec, if a CG is deprioritized, the associated *cg-retransmissionTimer* and *configuredGrantTimer* shall be stopped when *AutonomousTx* is configured for the CG configuration. For Rel-16 IIoT, a CG occasion can only be used for new transmission. It is fine to stop *configuredGrantTimer* if a CG is deprioritized. But when it comes to Rel-17 URLLC in UCE, CG occasions can also be used for retransmission. If the deprioritized uplink grant is a CG occasion for retransmission and if its associated *configuredGrantTimer* is running, it may cause unnecessary packet loss if we stop the *configuredGrantTimer*. To avoid packet loss explained above, two options are suggested according to the papers:

* **Option1**: if the *configuredGrantTimer* is running when a CG for retransmission is deprioritized, the associated *configuredGrantTimer* shall not be stopped.
* **Option2**: if the *configuredGrantTimer* is running when a CG for retransmission is deprioritized, both *configuredGrantTimer* and *cg-retransmissionTimer* are stopped, autonomous transmission is used to recover the deprioritized PDU and retransmit it.

Based on the above summary, rapporteur would like to ask companies to provide inputs for the following question:

***Question 4: When autonomousTx and cg-retransmissionTimer are configured, if an autonomous retransmission of a PDU is deprioritized with the HARQ not pending, which is your preferred option regarding recovery of the deprioritized PDU ?***

* ***Option 1: the configuredGrantTimer should not be stopped, to avoid potential packet loss***
* ***Option 2: both configuredGrantTimer and cg-retransmissionTimer are stopped, autonomous transmission is used to recover the deprioritized PDU, No change to CGT or CGRT operation is needed.***
* ***Option 3: Other (please explain)***

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| **Company** | **Preferred option(s)** | **Comments** |
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* **Summary of answers to Q4**:

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| Tdoc Num | Involved Proposals | Source |
| [3] R2-2200478 | Proposal 3: If *AutonomousTx* is configured and when a CG for retransmission is deprioritized, the associated *configuredGrantTimer* for the corresponding HARQ process shall not be stopped if it is running. | Huawei, HiSilicon |
| [6]R2-2201018 | Proposal 4: RAN2 to confirm that when autonomous Tx and CGRT are configured together and an autonomous retransmission of a PDU is deprioritized with the HARQ not pending, the current spec. allows autonomous transmission to take place to recover the deprioritized PDU being retransmitted. Proposal 5: RAN2 to confirm that when autonomous Tx and CGRT are configured together and an autonomous retransmission of a PDU is deprioritized with the HARQ not pending, autonomous transmission is used to recover the deprioritized PDU and retransmit it. No change to CGT or CGRT operation is needed.  | Qualcomm  |

## 2.5 Change of CG size in unlicensed spectrum

In IIOT, Autonomous Transmission is performed only if the size of the stored MAC PDU matches with CG. However, NR-U, change of the size is not assumed. A problematic case is pointed out[10]: if CGRT is not running, CGT is not running, HP is pending, and TBS changes, then NDI is not toggled for Autonomous Retransmission. However, the stored MAC PDU cannot be retransmitted due to the different size. In this case, the uplink transmission will be skipped due to the lack of the specified behaviour. It is proposed that autonomous retransmission is performed only if CG size does not change.

Rapporteur would like to ask companies to provide inputs for the following question:

***Question 5: whether it can be agreed that autonomous retransmission is performed only if CG size does not change in Rel-17.***

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| **Company** | **Yes/No** | **Comments** |
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* **Summary of answers to Q5**:

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| [10]R2-2201368 | Proposal 3. Autonomous retransmission (CGRT) is performed only if CG size does not change (i.e. MAC PDU size) | Samsung |

# 3 Low Priority Issues

The following issues are proposed by only one company and are optimizations or not essential. Therefore, the rapporteur suggests only to give a summary in the following without proposals for discussions. They may be postponed until high priority issues are resolved.

## 3.1 Impact of one-shot HARQ feedback on *drx-HARQ-RTT-TimerDL*

RAN1 has agreed to introduce 3 one-shot HARQ feedback mechanisms, i.e. Type 3 CB (codebook), enhanced Type 3 CB and one-shot HARQ-ACK re-transmission. [2] pointed that the three mechanisms have the same characteristics from RAN2 perspective and propose a unified solution should be applied to handle the impact to *drx-HARQ-RTT-TimerDL* when any one-shot HARQ feedback mechanism is triggered. And a related TP is provided.

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| Tdoc Num | Involved Proposals | Source |
| [12] R2-2200321 | Proposal 3: A unified solution should be applied to drx-HARQ-RTT-TimerDL when any type of one-shot HARQ-ACK transmission/retransmission is triggered.Proposal 4: UE should start drx-HARQ-RTT-TimerDL for the HARQ process(es) when HARQ-ACK feedback requested by DCI is received. RAN2 considers the above TP. | CATT |

## 3.2 Multi-TB scheduling in CG and without CGRT

In [5], it is proposed multi-TB scheduling for CG is not supported when *cg-retransmissionTimer* is not configured in unlicensed band, due to the potential impact on the current HARQ formula. In addition, [5] indicates that the benefits of *cg-nrofSlots/cg-nrofPUSCH-inSlot* can be achieved by configuring multiple CG configurations with high periodicities for the case when *cg-retransmissionTimer* is not configured, thus there is no need to do any modification of the HARQ formula.

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| Tdoc Num | Involved Proposals | Source |
| [5] R2-2200953 | [Proposal 3 In unlicensed band, multi-TB in CG is supported only when cg-retransmissionTimer is configured.](#_Toc92719646) | Ericsson |

## 3.3 R16 Intra-UE multiplexing for the transmission at the boundary of the UE FFP

Based on the RAN1 agreements, the UE can initiate the COT in a UE FFP by sending an initiated UL signal to NW, if the UL transmission is performed (i.e LBT is successful), the COT period in this UE FFP is available for the UE to perform UL transmission. However, the UL transmission to initiate COT in one UE FFP period can be deprioritized by another UL transmission with a higher priority. Thus, [7] proposes to prioritize the COT-initiated UL transmission if it collides with any other UL transmission not for initiating COT. [7] also proposes the LCH based priority rule shall be used for determining the prioritized COT-initiated UL transmission if both collided UL transmission is UL transmission for initiating COT.

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| Tdoc Num | Involved Proposals | Source |
| [7] R2-2201226 | Proposal 3: For the collision case involving UL transmission for initiating COT, if both collided UL transmission is UL transmission for initiating COT, the LCH based priority rule shall be used for determining the prioritized COT-initiated UL transmission.Proposal 4: For the collision case involving COT-initiated UL transmission, if there is only one collided UL transmission is a COT-initiated UL transmission, then this COT-initiated UL transmission shall be prioritized. | ZTE |

## 3.4 UE processing time restriction on the retransmission grant selection

In [12], it is pointed out that with some CG configurations, the interval between the previous transmission which is deprioritized and the autonomous transmission for the previous transmission is too short for UE to prepare for the autonomous transmission. Hence, it is proposed that the interval between the subsequent uplink grant for retransmission and the deprioritized autonomous retransmission grant should be larger than the PUSCH preparation time.

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| Tdoc Num | Involved Proposals | Source |
| [12] R2-2201374 | Proposal: The interval between the subsequent uplink grant for retransmission and the deprioritized autonomous retransmission grant should be larger than the PUSCH preparation time. | Xiaomi |

## 3.5 Prioritization between SR and UL-SCH

Currently, simultaneous PUCCH/PUSCH transmission is not allowed in NR according to TS38.321. However, RAN1 agreed to support the simultaneous PUCCH/PUSCH transmission for a few cases and other cases are still under discussion, as follows:

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| RAN1#102-eAgreements:Support simultaneous PUCCH/PUSCH transmissions on different cells at least for inter-band CA.RAN#104-eAgreements:Per UE with the capability of inter-band CA, simultaneous PUCCH/PUSCH transmission of different PHY priorities over different cells can be RRC configured within the same PUCCH groupRAN2#107-eConclusionThere is no consensus in RAN1 to support simultaneous PUCCH/PUSCH transmission of same priority over different cells in Rel-17.ConclusionThere is no consensus in RAN1 to support simultaneous PUCCH/PUSCH transmissions on different cells for intra-band CA in Rel-17. |

It will have impact to MAC which specifies prioritization/resource selection between SR (PUCCH) and UL-SCH (PUSCH). [10] proposes to revise prioritization between SR and UL-SCH (Rel-15 text and Rel-16 text) to support simultaneous PUCCH/PUSCH transmission. As the proposal is related to Rel-15 text and Rel-16 text, rapporteur thinks it can be handled in TEI.

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| Tdoc Num | Involved Proposals | Source |
| [10]R2-2201368 | Proposal 4. Prioritization between SR and UL-SCH (Rel-15 text and Rel-16 text) is revised to support simultaneous PUCCH/PUSCH transmission.Proposal 5. The following TP is adopted. | Samsung |

Companies are invited to provide comments on the following Question:

***Question 6: Which of the above issue(s) do you think is critical for further discussion?***

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| **Company** | **Issue Id: 3.1~3.5** | **Comments** |
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# 4 Conclusion

The summarized proposals are given below:

# 5 Contact information

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| Company | Name | email address |
| vivo | Boubacar Kimba | kimba@vivo.com |
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# References

[1] R2-2200183 Remaining Issues on Configured Grant for URLLC in Unlicensed Nokia, Nokia Shanghai Bell

[2] R2-2200321 Leftovers of UCE CATT

[3] R2-2200478 Remaining issues about uplink enhancements for URLLC in UCE Huawei, HiSilicon

[4] R2-2200927 Remaining issues on URLLC over NRU OPPO

[5] R2-2200953 Remaining issues in UL CG enhancements Ericsson

[6] R2-2201018 CG Harmonization for Unlicensed Controlled Environment Qualcomm Incorporated

[7] R2-2201226 Further Consideration on the Intra-UE multiplexing in UCE ZTE

[8] R2-2201264 Remaining Issues for UCE vivo

[9] R2-2201285 Remaining issues for IIoT in UCE III

[10] R2-2201368 Remaining Issues on CG Enhancement and Intra-UE Prioritization Samsung

[11] R2-2201460 Remaining issues for UCE MediaTek Inc.

[12] R2-2201374 UE processing time restriction on the retransmission grant selection Xiaomi Communications