**3GPP TSG RAN WG1 #102e R1-** **20xxxxx**

**August 17th – 28th, 2020**

**Agenda item:** 7.2.5.4

**Source:** Moderator (Qualcomm)

**Title:** Summary #1 of [102-e-NR-L1enh-URLLC-Scheduling and HARQ-01]

**Document for:** Discussion and Decision

# 1 Introduction

This document summarizes the companies’ views and captures the agreements related to the following email discussion:

**[102-e-NR-L1enh-URLLC-Scheduling and HARQ-01] Prioritization order involving semi-static DL symbols, SSB and dynamic SFI – Kianoush (Qualcomm)**

* Processing order between semi-static TDD configuration and intra-UE prioritization
  + Order of intra-UE prioritization and cancellation due to collision with configured DL symbols and SSB
  + Clarification on the 3-step UE behavior and UE behavior in case there is collision after step 3.
* Processing order between dynamic SFI and intra-UE prioritization
  + Proposed agreement:
    - *UE behavior of handling intra-UE prioritization/multiplexing for overlapping UL transmissions on semi-static flexible symbols is not affected by UL cancellation due to dynamic SFI or DL grant.*
    - Note that the proposed agreement is to start the discussions.
* **Discussions/Agreements by 8/21, TPs by 8/28**

A summary of the companies’ proposals is captured in [1]. Companies are encouraged to share their views by Wednesday August 19th.

# 2 Issue#1: Processing order between semi-static TDD configuration and intra-UE prioritization

The following agreement was made during RAN1 #101e:

**Agreement#1:**

*After the UE determines the overlapping PUCCH or PUSCH for multiplexing/prioritization, the UE cancels the PUCCH or PUSCH that has overlapping with semi-static configured DL symbols or SSB symbols, and then the multiplexing/prioritization is performed among the non-cancelled overlapping transmissions*

### 2.1 Issue #1-1

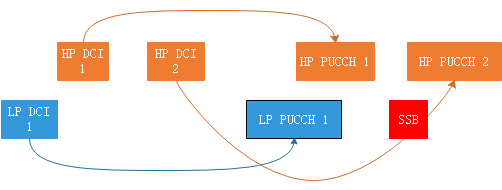
Huawei/HiSi in [2] considers the above mentioned agreement as well as the following agreement also made in RAN1#101e:

***Agreement #2:***

*If a UE is expected to cancel a scheduled low priority PUCCH/PUSCH due to a first DCI scheduling an overlapping high priority channel, the UE is not expected to transmit the scheduled low priority PUCCH/PUSCH due to a second DCI scheduling UCCH/PUSCH that is received after the first DCI.*

* *Note: The collision between HP PUSCH and LP PUSCH is not covered by this agreement.*

For scenarios such as the one illustrated in the figure below, [2] argues the following:



*“Considering the example above, according to Agreement #1, the collision handling is done based on the final DCI. This would mean that the overlap is determined among LP PUCCH 1, HP PUCCH 2 and SSB. It means when the UE receives the intermediate HP DCI 1 (i.e. it has not received HP DCI 2 yet), the UE will not resolve the collisions between HP PUCCH 1 and LP PUCCH1. Instead the UE will wait to receive the final DCI for the HP PUCCH, i.e. until the DCI scheduling the HP PUCCH 2, and then it will resolve any the collision based on HP PUCCH 2. Thus LP PUCCH 1 will be transmitted. On the other hand, following agreement #1, the UE will resolve the collision between the HP PUCCH 1 and LP PUCCH 1 when it receives HP DCI 1. It means the UE will not wait for any final DCI. Thus LP PUCCH 1 will be canceled.”*

**Comment from the FL: The two operations should be done separately. According to the current specification, one HP PUCCH1 is scheduled, LP PUCCH1 is dropped. Later, HP PUCCH1 may be overridden by a new DCI which requests a transmission on HP PUCCH2. At that time, the collision between HP PUCCH2 and SSB is resolved.**

**Question #1: Considering the example and the explanations above, is there any clarification needed for the UE’s operations based on Agreement#1 and Agreement#2? Please share your views in the table below.**

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| --- | --- |
| **Company** | **Comments** |
|  |  |

### 2.1 Issue #1-2

Qualcomm [3] refers to the following three steps:

* ***Step 1:*** *A UE follows Rel-15 behaviors for any intermediate procedure to determine the overlapping PUCCH or PUSCH for multiplexing/prioritization*
* ***Step 2:*** *UE cancels the ones that collides with semi-static DL symbols,*
* ***Step 3:*** *UE performs multiplexing/prioritization among the non-cancelled overlapping channels.*

and points out a remaining ambiguity in the UE behavior. As an example, after performing step 3, the final PUCCH resource to be used could be overlapping with the DL symbols. Hence, the UE has to perform a step 4 for final checking as well. If such an event happens, then one UE behavior could be to drop the final transmission completely. This might not be the best approach; instead, if the UE is allowed to remove all overlapping configured PUCCH/PUSCH resources colliding with the DL symbols or SSBs from the beginning, this issue will not happen.

**Question #2: For handling collisions between PUCCH/PUSCH and semi-static DL symbols/SSBs:**

1. **Should the UE remove all the configured PUCCH/PUSCH resources overlapping with semi-static DL symbols/SSBs?**
2. **If not, and after performing step #3, the final PUCCH/PUSCH overlaps with the semi-static DL symbols/SSBs, what is the expected UE’s behavior?**

**Please share your comments in the table below.**

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| **Company** | **Comments** |
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# 3 References

**[1] R1-200xxxx, “*Summary of the remaining issues on HARQ and scheduling enhancements for URLLC: preparation phase*,” Moderator (Qualcomm)**

**[2] R1-2006389, “*Corrections on operation of HARQ*,” Huawei, HiSi**

**[3] R1-2006777, *“Remaining issues on HARQ and scheduling for URLLC,”* Qualcomm**