3GPP TSG-RAN WG1 Meeting #112bis-e Tdoc R1-23xxxxx

e-Meeting, April 17th – April 26th, 2023

Agenda Item: 7.1

Source: Moderator (Ericsson)

Title: [112bis-e-AI7.1-06] NR Rel-15/16 maintenance on TBS determination of a PUSCH retransmission by April 21

Document for: Discussion, Decision

# 1 Introduction

In RAN1#112bis-e meeting, the following contribution is submitted. As guided by the Chairman, this contribution provides a summary to collect input from companies on this issue and the solutions.

R1-2302768 Draft CR on TBS determination of a PUSCH retransmission with initial PUSCH scheduled by RAR UL grant for CFRA Ericsson

# 2 Discussion

For contention free random access (CFRA), a MACCE UL grant can be sent in MSG2 to schedule an initial PUSCH transmission. For retransmission of this PUSCH scheduled by UL grant in MACCE, it is expected the retransmission transport block is the same as initial PUSCH. UE would consider it as an error case if the retransmission DCI content indicated a different transport block size.

To achieve a robust CFRA performance, we should make it possible to use the reserved MCS values in association with the retransmission of a PUSCH with initial PUSCH scheduled by RAR UL grant for CFRA.

Note that in LTE using reserved MCS values for RAR UL grant retransmission is already supported. However in NR similar functionality is not yet supported, as

## 2.1 First check point 1 ()

Reserved MCS values provides robustness and flexibility for scheduling a retransmission of PUSCH.

1. For CFRA, it is necessary to allow RAR UL grant retransmission using reserved MCS values.
2. In RAN1 specification, retransmission using reserved MCS values for a PUSCH retransmission with initial PUSCH scheduled by RAR UL grant is not supported.
3. It is preferred to support retransmission of a PUSCH with initial PUSCH scheduled by UL grant for CFRA.

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Optional questions:

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Additional comment(s) if any:

|  |  |
| --- | --- |
| **Company** | **Comment(s)** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## 2.2 Phase 2 (by UTC 4:59pm 21 April)

TBD

# Conclusion

In the previous sections we made the following observations:

**No table of figures entries found.**

Based on the discussion in the previous sections we propose the following:

No table of figures entries found.

# References

1. R1-2302768 Draft CR on TBS determination of a PUSCH retransmission with initial PUSCH scheduled by RAR UL grant for CFRA, Ericsson, RAN1#112bis-e

# Appendix A. TS 38.214

#### 6.1.4.2 Transport block size determination

For a PUSCH scheduled by RAR UL grant or

for a PUSCH scheduled by fallbackRAR UL grant or

for a PUSCH scheduled by a DCI format 0\_0 with CRC scrambled by C-RNTI, MCS-C-RNTI, TC-RNTI, CS-RNTI, or

for a PUSCH scheduled by a DCI format 0\_1 or DCI format 0\_2 with CRC scrambled by C-RNTI, MCS-C-RNTI, CS-RNTI, or

for a PUSCH transmission with configured grant, or

for a MsgA PUSCH transmission,

if

- and transform precoding is disabled and Table 5.1.3.1-2 is used, or

-  and transform precoding is disabled and a table other than Table 5.1.3.1-2 is used, or

-  and transform precoding is enabled, the UE shall first determine the TBS as specified below:

1. The UE shall first determine the number of REs (*NRE*) within the slot:

- A UE first determines the number of REs allocated for PUSCH within a PRB  by

- , where is the number of subcarriers in the frequency domain in a physical resource block,  $N\_{symb}^{slot}$is the number of symbols *L* of the PUSCH allocation according to Clause 6.1.2.1 for scheduled PUSCH or Clause 6.1.2.3 for configured PUSCH,  is the number of REs for DM-RS per PRB in the allocated duration including the overhead of the DM-RS CDM groups without data, as described for PUSCH with a configured grant in Clause 6.1.2.3 or as indicated by DCI format 0\_1 or DCI format 0\_2 or as described for DCI format 0\_0 in Clause 6.2.2, and  is the overhead configured by higher layer parameter *xOverhead* in *PUSCH-ServingCellConfig*. If the  is not configured (a value from 6, 12, or 18), the  is assumed to be 0. For Msg3 or MsgA PUSCH transmission the  is always set to 0. In case of PUSCH repetition Type B,  is determined assuming a nominal repetition with the duration of *L* symbols without segmentation.

- A UE determines the total number of REs allocated for PUSCH  by where  is the total number of allocated PRBs for the UE.

- Next, proceed with steps 2-4 as defined in Clause 5.1.3.2

- For a PUSCH scheduled by fallbackRAR UL grant, UE assumes the TB size determined by the UL grant in the fallbackRAR shall be the same as the TB size used in the corresponding MsgA PUSCH transmission.

else if

-  and transform precoding is disabled and Table 5.1.3.1-2 is used, or

-  and transform precoding is enabled,

- the TBS is assumed to be as determined from the DCI transported in the latest PDCCH for the same transport block using .If there is no PDCCH for the same transport block using , and if the initial PUSCH for the same transport block is transmitted with configured grant,

- the TBS shall be determined from *configuredGrantConfig* for a configured grant Type 1 PUSCH.

- the TBS shall be determined from the most recent PDCCH scheduling a configured grant Type 2 PUSCH.

else

- the TBS is assumed to be as determined from the DCI transported in the latest PDCCH for the same transport block using . If there is no PDCCH for the same transport block using , and if the initial PUSCH for the same transport block is transmitted with configured grant,

- the TBS shall be determined from *configuredGrantConfig* for a configured grant Type 1 PUSCH.

- the TBS shall be determined from the most recent PDCCH scheduling a configured grant Type 2 PUSCH.