**3GPP TSG RAN WG1 Meeting #101 R1-200xxx**

**e-Meeting, May 24th – June 6th, 2020**

**Source: Moderator (ZTE)**

**Title: FL summary #1 of multiple TB scheduling for NB-IoT**

**Agenda item: 6.2.2.3**

**Document for:** **Discussion/Decision**

# Introduction

After RAN1#100bis-e meeting, it has been declared all the Rel-16 RAN1-led WIs as finished from RAN1 perspective. In RAN1 100 e-meeting, contribution were submitted for maintenance of Rel-16 NB.

In this contribution, summary of the issues regarding multiple TB scheduling for NB-IoT was discussed.

# Discussions

## Issue#1 :RV cycling

Based on current specification, RV cycling is used for the first TB. But whether RV cycling is used and how to determine the RV for the second TB are not specified [1]. Therefore it is proposed to clarify this issue in the specification.

***Proposal 1: Clarify how to determine the RV for the second TB, adopt TP in Appendix 5.1.***

## Issue#2 : Corrections for DCI Format N1

Considering the support of multi-TB scheduling, the description for DCI format N1 in 36.212 should be modified and shown as following.

**<Unchanged parts are omitted>**

DCI format N1 is used for the scheduling of NPDSCH in one cell, random access procedure initiated by a NPDCCH order, notifying SC-MCCH change, and operation on preconfigured UL resources. The DCI corresponding to a NPDCCH order is carried by NPDCCH.

**<Unchanged parts are omitted>**

**<TP 1, TS 36.212, 6.4.3.2>**

***Proposal 2: Adopt the TP in section 2.2 for the description of DCI format N1 for TS 36.212.***

## Issue#3 : DCI size alignment

In legacy NB-IoT releases, the DCI size of format N1 is always less and equal than format N0. Therefore, the corresponding description in 36.212 is correct.

If the number of information bits in format N1 is less than that of format N0 and the format N1 CRC is not scrambled by G-RNTI, zeros shall be appended to format N1 until the payload size equals that of format N0.

However, since the resource reservation and multi-TB scheduling are introduced in Rel-16, if these two features are configured separately for UL and DL, the DCI size of format N1 will be larger than that of format N0. Therefore, the above text description is no longer correct, and we need to add the corresponding description for the case when the DCI size of N1 is larger than format N0. Based on the above analysis, we have the following text proposal:

**<Unchanged parts are omitted>**

If the number of information bits in format N1 is less than that of format N0 and the format N1 CRC is not scrambled by G-RNTI, zeros shall be appended to format N1 until the payload size equals that of format N0. If the number of information bits in format N1 is larger than that of format N0 and the format N1 CRC is not scrambled by G-RNTI, zeros shall be appended to format N0 until the payload size equals that of format N1.

**<Unchanged parts are omitted>**

**<TP 2, TS 36.212, 6.4.3.2>**

***Proposal 3: Adopt the TP in section 2.3 for aligning the DCI size of N0 and N1 for TS 36.212.***

##  Issue#4 : RRC parameter name correction

In [2], it is discussed that in current RAN1 specification, some RRC parameter names for multiple TB scheduling are not aligned with parameters used in RAN2. It is FL's observation that this problem is not only for multiple TB scheduling AI and also exists for other AI for NB-IoT and eMTC. This issue is editorial in nature.

It is noted that in AI 6.2.2.7 and AI 6.2.1.10 the rapporteur has started discussion for solving this issue. Therefore FL propose to discuss this RRC/L1 parameter name alignment issue for eMTC/NB-IoT together in one email thread.

***Proposal 4: Discuss RRC/L1 parameter name alignment issue for all eMTC/NB-IoT together in one combine email thread and leave the correction to the editor.***

# Conclusion

In this contribution, based on the previous discussion there are four proposals as follows:

***Proposal 1: Clarify how to determine the RV for the second TB, adopt TP in Appendix 5.1.***

***Proposal 2: Adopt the TP in section 2.2 for the description of DCI format N1 for TS 36.212.***

***Proposal 3: Adopt the TP in section 2.3 for aligning the DCI size of N0 and N1 for TS 36.212.***

***Proposal 4: Discuss RRC/L1 parameter name alignment issue for all eMTC/NB-IoT together in one combine email thread and leave the correction to the editor.***

# Reference

1. R1-2003537, ‘Corrections on scheduling of multiple DL/UL transport blocks’, Huawei, HiSilicon
2. R1-2003797, ‘Remaining issues on scheduling enhancement for NB-IoT’, ZTE

# Appendix

##

---------------------------------------------- Start of Text Proposal ------------------------------------------

-------------------------------------------- Unchanged parts omitted -----------------------------------------

16.5.1.2 Modulation order, redundancy version and transport block size determination

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-------------------------------------------- Unchanged parts omitted -----------------------------------------

NPUSCH associated with a TB is transmitted in *N* NB-IoT UL slots associated with the TB, *ni ,* *i=0,1,…,N-1*. For the NPUSCH transmission in *jt*h block of *B* consecutive NB-IoT UL slots associated with the TB *ni ,* , t associated with the TBis determined by, , where  if ,  otherwise. Portion of NPUSCH codeword with  associated with a TB as defined in clause 6.3.2 in [4] mapped to slot  of allocated  resource unit(s) is transmitted in NB-IoT UL slots associated with the TB *ni* for and  for 

-------------------------------------------- Unchanged parts omitted -----------------------------------------

----------------------------------------------- End of Text Proposal ------------------------------------------