**3GPP TSG RAN WG1 #101 R1-200xxxx**

**e-Meeting, May 25th – June 5th, 2020**

Source: moderator (vivo)

Title: Feature lead summary#2 on [101-e-NR-unlic-NRU-CG-01]

Agenda Item: 7.2.2.2.4

Document for: Discussion and Decision

1. Introduction

Following is agreed in RAN1#101e

Agreement:

* Value range of the RRC parameter cg-COT-SharingList-r16 is 1709
* The value range of the RRC parameters *cg-StartingFullBW-InsideCOT-r16, cg-StartingFullBW-OutsideCOT-r16* is 7
  + cg-StartingFullBW-InsideCOT-r16  SEQUENCE (SIZE (1..7)) OF INTEGER (0..6)
  + cg-StartingFullBW-OutsideCOT-r16  SEQUENCE (SIZE (1..7)) OF INTEGER (0..6)
* The value range of the RRC parameter cg-COT-SharingOffset-r16 has been agreed in RAN1#100b-e, it is confirmed that the step size is 14 symbols.

Agreement:

The maximum configurable value for *cg-nrofPUSCH-InSlot-r16* can be set as 7

Agreement:

For a given shared COT, UE should provide consistent COT sharing information in multiple consecutive PUSCHs in the same UE-initiated COT.

Discuss TP(s) needed for above agreements and TPs for HARQ-ACK for CBG based PUSCH (Issue 8) until 6/3.

Further discuss TP for 3rd agreement above, and the two alternatives under issue#8.

1. Remaining issues
   1. Issue6

Proposal:

TP#1, for 38.212

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**6.3.2.1.3 CG-UCI**

For CG-UCI bits transmitted on a CG PUSCH, the CG-UCI bit sequence is determined as follows:

- set for and , where the CG-UCI bit sequence is given by Table 6.3.2.1.3-1, mapped in the order from upper part to lower part.

Table 6.3.2.1.3-1: Mapping order of CG-UCI fields

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| --- | --- |
| **Field** | **Bitwidth** |
| HARQ process number | 4 |
| Redundancy version | 2 |
| New data indicator | 1 |
| Channel Occupancy Time (COT) sharing information | if both higher layer parameter *ULtoDL-CO-SharingED-Threshold-r16* and higher layer parameter *cg-COT-SharingList-r16* are configured, where *C* is the number of combinations configured in *cg-COT-SharingList-r16;*  1 if higher layer parameter *ULtoDL-CO-SharingED-Threshold-r16* is not configured and higher layer parameter *cg-COT-SharingOffset-r16* is configured;  0 otherwise;  If a UE indicates COT sharing other than “no sharing” in a CG PUSCH within the UE's initiated COT, the UE should provide consistent COT sharing information in all the subsequent CG PUSCHs, if any, occurring within the same UE’s initiated COT such that the same DL starting point and duration are maintained. |

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| Company | Comments |
| Intel | We are Ok with the proposed TP, with the following minor edits:  For a given shared COT, a UE should provide consistent COT sharing information in multiple consecutive PUSCHs occurring within ~~in~~ the same UE’s initiated COT. |
| Huawei, HiSilicon | We agree with the proposed TP. Intel edits are also fine.  If it makes clearer, we suggest  multiple consecutive PUSCHs 🡪 multiple consecutive CG PUSCHs |
| Qualcomm | We are in general fine with the TP, but do we need to clarify what “consistent COT sharing information” means? For example, do we consider two COT sharing information, one in each CG-PUSCH, one says sharing, and one says not sharing as inconsistent? In our view, this can be considered as consistent while the CG-UCI says no sharing can simply mean COT sharing information not provided. Another example is if the later CG-UCI indicates the same starting point but longer sharing than the earlier CG-UCI, is this consistent? In SFI discussion in Rel.15, this is considered as consistent. Do we use the same interpretation? |
| Lenovo, Motorola Mobility | We agree with the proposed TP and also think Intel and Huawei’s addition can make the TP clearer. |
| LG | We are in general fine with the TP. But, as QC comments, the meaning of “consistent COT sharing information” is needed to be clarified. |
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* 1. Issue 8:

Proposal:

TP#2, for 38.213

================= Start of TP#1 for TS 38.213 ====================

For an initial PUSCH transmission configured by *ConfiguredGrantConfig*, if a UE is provided *PUSCH-CodeBlockGroupTransmission* for a serving cell, a value of HARQ-ACK information for a transport block of a corresponding HARQ process number in CG-DFI is ACK if HARQ-ACK for the transport block ~~all of CBGs for the PUSCH are~~ is ACK; otherwise, a value of HARQ-ACK information is NACK.

For a PUSCH transmission scheduled by a DCI format, HARQ-ACK information for a transport block of a corresponding HARQ process number is valid if a first symbol of the PDCCH reception is after a last symbol of the PUSCH transmission or, if the PUSCH transmission is over multiple slots,

- after a last symbol of the PUSCH transmission in a first slot from the multiple slots by a number of symbols provided by *cg-minDFIDelay-r16*, if a value of the HARQ-ACK information is ACK.

- after a last symbol of the PUSCH transmission in a last slot from the multiple slots by a number of symbols provided by *cg-minDFIDelay-r16*, if a value of the HARQ-ACK information is NACK.

< Unchanged Texts Omitted >

======================== End of TP#1 for TS 38.213 =========================

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| Company | Comments |
| Intel | Our understanding is that for the TPs listed above, we should break the discussion as follows:   1. HARQ interpretation for CGB based retransmissions for DG PUSCH received over a DFI: for this topic we should down-select between the first correction in TP#1 and Alt2. Among them we prefer Alt2. 2. HARQ interpretation for an initial CBG-based CG PUSCH transmission: in this case we are OK with Alt1. |
| Huawei, HiSilicon | Agree with Intel that the down selection should not be between current Alt1 (2nd of TP#1 for CG) and Alt2 (TP#2 for DG).  For initial CBG-based transmission with CG, **we are OK with the current TP under Alt1 (2nd of TP#1 for CG)**  For DG-PUSCH, we should be down selecting between the 1st correction of current TP#1 (if at least one of CBGs for the PUSCH is ACK) and TP#2 under current Alt2 (if the transport block for all of CBGs for the PUSCH is ACK)   * We prefer the 1st correction of current TP#1 for the following reasons:   + Our understanding that transmitting TB-based feedback for DG-PUSCH in CG-DFI is meant for CWS adjustment only   + Our understanding that for CBG-based PUSCH, a UE can choose to apply TB-based only feedback for the purpose of CW adjustment as per the highlighted part of the agreement below. As such, imposing ‘All CBGs are ACK’ to send a TB-based ACK in the CG-DFI for a DG-PUSCH defeats the purpose of CBG-based transmission.   + Only the CBGs overlapping with the channel subject to the CWS adjustment are considered regardless of the UE choosing use the CBG-based feedback or TB-based feedback for CWS adjustment. This means that imposing ‘All CBGs are ACK’ to send a TB-based ACK in the CG-DFI for a DG-PUSCH would be incorrect since status of non-overlapping CBGs is involved   Agreement:  For CWS adjustment for an LBT sub-band when a single contention window is maintained per LBT subband, all CBGs (if any are present) and TBs that partially or fully overlap with that LBT sub-band are taken into account.   * CW is reset if “ACK” is received for at least 10 % of the CBGs or for at least one TB in the reference duration * Note: Other procedures for contention window adjustment within an LBT subband are also applicable * A UE can choose to apply feedback only based on TBs for CW adjustment |
| Qualcomm | Agree with Intel’s proposal on grouping the discussion.  For TP1 and Alt 2 of TP2, we prefer TP1 (the first TP in section 2.2). This is consistent with LTE LAA behavior where if there are 16 bits of HARQ ACK in DCI format 0A but multiple codeword is supported, OR is used to perform spatial bundling of the A/N of the same HARQ process.  For Alt 1 of TP2, we are fine with the TP |
| Ericsson | ~~We share the same view as other companies on the issue with TP#1.~~  ~~We are OK with TP#2 and TP#3.~~  We agree with HW and LG, that for DG-PUSCH, the HARQ feedback in DFI should be used for the sake of CWS adjustment. Therefore, we support TP#1 (and we don’t support TP#2). |
| Lenovo, Motorola Mobility | Firstly, we agree with Intel’s proposal on grouping the two alternatives.  Secondly, for CG PUSCH transmission, we are OK with Alt 1.  For the DG PUSCH transmission, we prefer Alt 2. |
| LG | I agree with Intel and HW that the down selection should not be between current Alt1 (2nd of TP#1 for CG) and Alt2 (TP#2 for DG).  As mentioned in email, we have strong concern on the TP#2 (generate ACK only if all CBGs are ACK). Because it is too conservative, the CWS can be increased unnecessarily and then the latency might be increased.  To determine how to generate the HARQ-ACK information for CBG-based DG-PUSCH, we should remind the following things:  1. CG-DFI can contain only TB-level HARQ-ACK information even if DG-PUSCH is transmitted based on CBG  2. The CWS can be reset if at least one HARQ-ACK feedback is 'ACK' for PUSCH(s) with transport block (TB) based transmissions or at least 10% of HARQ-ACK feedbacks is 'ACK' for PUSCH(s) with code block group (CBG) based transmissions  3. The 10% of ACK referred in the specification is evaluated by accounting for the whole CBG based feedbacks related to a reference duration, and not over a single PUSCH transmission.  Therefore, a value of HARQ-ACK information for a DG-PUSCH in CG-DFI is ACK if at least 10% of HARQ-ACK feedbacks is ‘ACK’ for the whole PUSCH(s) in a slot with CBG based transmissions.  Regarding CBG-based CG-PUSCH, if any of CBG(s) in the CG-PUSCH is identified as “NACK”, the gNB can indicate the retransmission only for NACKed CBG by using UL grant or induce the retransmission of the whole TB by generating 1-bit “NACK” for a corresponding HARQ process ID in the CG-DFI. |
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Proposal:

TP#3, for 37.213

=================== Start of TP for TS 37.213 =======================

\*\*\* Unchanged text is omitted \*\*\*

**4.2.2.2 Contention window adjustment procedures for UL transmissions scheduled/configured by gNB**

If a UE transmits transmissions using Type 1 channel access procedures that are associated with channel access priority class on a channel, the UE maintains the contention window value and adjusts for those transmissions before step 1 of the procedure described in subclause 4.2.1.1, using the following steps:

1) For every priority class , set ;

2) If HARQ-ACK feedback is available after the last update of , go to step 3. Otherwise, if the UE transmission after procedure described in subclause 4.2.1.1 does not include a retransmission or is transmitted within a duration from the end of the *reference duration* corresponding to the earliest UL transmission burst after the last update of transmitted after the procedures described in subclause 4.1.1, go to step 5; otherwise go to step 4.

3) The HARQ-ACK feedback(s) corresponding to PUSCH(s) in the *reference duration* for the latest UL transmission burst for which HARQ-ACK feedback is available is used as follows:

a. If at least one HARQ-ACK feedback is 'ACK' for PUSCH(s) with transport block (TB) based feedback or at least 10% of HARQ-ACK feedbacks is 'ACK' for PUSCH(s) with code block group (CBG) based feedback go to step 1; otherwise go to step 4.

4) Increase for every priority class to the next higher allowed value;

5) For every priority class , maintain as it is; go to step 2.

\*\*\* Unchanged text is omitted \*\*\*

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| Company | Comments |
| Qualcomm | The TP is ok for us. May not be necessary though. |

Proposal:

* Corresponding the reply LS from RAN2 following TP is proposed, note that this TP is correction over agreed in TP in RAN1#100b-e

TP#4, for 38.214, section 6.1.2.3.1

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<unchanged part omitted>

The procedures described in this clause apply to PUSCH transmissions of PUSCH repetition Type A with a Type 1 or Type 2 configured grant.

The higher layer parameter *repK-RV* defines the redundancy version pattern to be applied to the repetitions. If *cg-RetransmissionTimer* is provided, the redundancy version for uplink transmission with a configured grant is determined by the UE~~[, except for the redundancy version of the first repetition that is set to 0]~~ . If the parameter *repK-RV* is not provided in the *configuredGrantConfig* and *cg-RetransmissionTimer* is not provided, the redundancy version for uplink transmissions with a configured grant shall be set to 0. ~~Otherwise~~ If the parameter *repK-RV* is provided in the *configuredGrantConfig* and *cg-RetransmissionTimer* is not provided, for the *n*th transmission occasion among *K* repetitions, *n*=1, 2, …, *K*, it is associated with *(mod(n-1,4)+1)th* value in the configured RV sequence. If a configured grant configuration is configured with *Configuredgrantconfig-StartingfromRV0* set to *‘off’*, the initial transmission of a transport block may only start at the first transmission occasion of the *K* repetitions. Otherwise, the initial transmission of a transport block may start at

<unchanged part omitted>

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# References

[1] R1-2004796, “Feature lead summary on [101-e-NR-unlic-NRU-CG-01]”, vivo, RAN1#101e