**3GPP TSG-RAN WG2 Meeting #113 electronic *R2-210xxxx***

**Online, Jan 25th – Feb 5th, 2021**

Agenda Item: 6.5.3

Source: ASUSTeK

Title: Report of [AT113-e][024][IIOT] User Plane II (Asus)

Document for: Discussion and Agreement

 Introduction

This is to report the result of the following email discussion in RAN2#113-e Meeting [1]:

* [AT113-e][024][IIOT] User Plane II (Asus)

 Scope: Treat R2-2100713, R2-2100854, R2-2101529, R2-2101530, R2-2101744, R2-2101745, R2-2101746, R2-2101670

 Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs.

 Intended outcome: Report and Agreed CRs if any is agreeable.

 Deadline: Schedule A

2 Contact Information

|  |  |
| --- | --- |
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# 3 Discussion

## 3.1 Clarification of conditions for autonomous transmission

R2-2100713 Clarification of conditions for autonomous transmission Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.3.0 1020 - F NR\_IIOT-Core

This CR proposes to change “was not prioritized” to “was de-prioritized or the PUSCH of which could not be transmitted by the lower layers” to clarify that autonomous transmission is for cases where the previous grant was once considered to be prioritized (and therefore MAC PDU was generated), but then become de-prioritized due to collision with other transmission:

|  |
| --- |
| 3> else if this uplink grant is a configured grant configured with *autonomousTx*; and3> if the previous configured uplink grant, in the BWP, for this HARQ process was de-prioritized or the PUSCH of which could not be transmitted by the lower layers; and3> if a MAC PDU had already been obtained for this HARQ process; and3> if the uplink grant size matches with size of the obtained MAC PDU; and3> if none of PUSCH transmission(s) of the obtained MAC PDU has been completely performed:4> consider the MAC PDU has been obtained. |

**[Rapporteur’s remark]**

In Phase-1 discussion of [Offline-033][IIOT] MAC Corrections II (Samsung) of R2#111, one issue was pointed out by Lenovo as below that the MAC entity checks only the previous CG which may not be used due to the lack of processing time so Ericsson proposed to change the spec wording from “de-prioritized“ to “not prioritized“.



As for the change of “the PUSCH of which could not be transmitted by the lower layers“, the last condition check in the same place (i.e. if none of PUSCH transmission(s) of the obtained MAC PDU has been completely performed) seems to cover it.

Q1: Do you agree with the change(s) in R2-2100713?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Disagree | According to the CR , the issue is raised by ‘the term ‘not prioritized’ could be interpreted such that the previous configured grant was never considered as a prioritized grant’ We understand it is somewhat over-interpretation it just say that the priority handling procedure result of the previous configured grant is not prioritized and no matter what happened during that process. |
| Nokia | Agree | The problem with the current text is that: “*the grant was not prioritized*” could be interpreted as “*it has NEVER been a prioritized grant*”. However, it is possible that the previous CG initially used to be a prioritized grant, but then it was deprioritized by other conflicting transmission. For the conditions to trigger autonomous transmission, the previous CG of the same HARQ PID could be:1. Initially prioritized, but then de-prioritized, or
2. De-prioritized from the beginning; or
3. LCH-based prioritization is not processed at all because its PUSCH cannot be transmitted by the lower layer (due to e.g. processing time).

If the previous CG is in the condition (1) and if we follow the current text, HARQ entity will not consider this MAC PDU as obtained, and autonomous transmission will not occur.Therefore, we think the proposed text modification can better capture all these 3 conditions, as the current text fails to cover (1).Based on ZTE’s response, it seems companies could have different interpretation on the term “was not prioritized”. So why don’t we make it more clear to avoid misunderstanding ? |
| Ericsson | Disagree | For the case (1) above mentioned by Nokia, it is clear for me that it means the latest status of the grant, which is *de-prioritized*. I am afraid if RAN2 goes along this line of over-interpretation, then there can be many similar problems in the MAC spec, e.g., in 5.4.1, there is the following part: * if there is no overlapping PUSCH duration of a configured uplink grant which was not already de-prioritized, in the same BWP whose priority is higher than the priority of the uplink grant

Also, the CR change could introduce further ambiguity: * For case (1), it is only the partial of PUSCH can be transmitted. What does the new sentence mean exactly?
 |
| ASUSTeK | Agree with the intention | We understand the concern from Nokia that people (or newcomers in the future) may have different interpretations for the wording of “not prioritized”. Probably we can try to make the spec more readable with the following texts.3> else if this uplink grant is a configured grant configured with *autonomousTx*; and3> if the previous configured uplink grant, in the BWP, for this HARQ process was not prioritized after performing uplink grant prioritization; and3> if a MAC PDU had already been obtained for this HARQ process; and3> if the uplink grant size matches with size of the obtained MAC PDU; and3> if none of PUSCH transmission(s) of the obtained MAC PDU has been completely performed:4> consider the MAC PDU has been obtained. |
| CATT | Disagree | We agree with ZTE and Ericsson that interpreting “if the previous configured uplink grant, in the BWP, for this HARQ process was not prioritized" as if it was never prioritized, is incorrect because of "previous". So the condition is really about the "previous" CGO. We don’t see a problem. |
| LG | Disagree | It is already clear that the latest status is used. |
| OPPO | Disagree | We agree with Ericsson, it is somewhat over-interpretation. On the contrary, the CR will introduce new ambiguity issue e.g. in partial transmission case. |
| Sharp | Disagree | We also think it is somewhat over-interpretation. But if most companies think this should be clarified, may be we can change it as below to avoid the ambiguty:*if the previous configured uplink grant, in the BWP, for this HARQ process wasnot eventually prioritized.* |
| Xiaomi | Disagree | We share the same view as Ericsson. |
| Lenovo | Disagree | Same view as Ericsson.  |
| MediaTek | Disagree | Agree with Ericsson that we’re referring to the latest status of the grant. |
| Sony | Disagree | We should follow the latest event of the grant, prioritized grant 🡺 then deprioritized by other conflicting transmission. The latest event of this grant is deprioritized (i.e. not prioritized). So, the spec is clear. |
| Huawei | Disagree | In the current specs, the meaning of “*prioritized*”, “*de-prioritized*”, when the MAC entity is configured with lch-basedPrioritization, should be clear enough.  |
| Futurewei | Disagree | Same view as Ericsson. |
| Samsung | Disagree | Regarding ASUSTek’s TP, “performing uplink grant prioritization” is still unclear. The current MAC spec does not define “uplink grant prioritization”, but defines the procedural text.  |
| Apple | Disagree | Similar view as others, unfortunately the new change would introduce another ambiguity. On the other hand, we can understand the concern. |
| Intel | Disagree | We agree with Ericsson’s analysis. |
| Qualcomm | Disagree | Current text is clear and we don’t see risk of wrong interpretation. |
| Fujitsu | Agree with the intention | As Ericsson is commented, it means the latest status of the grant for the HARQ process. The problem with the current MAC text is mixture of the wording “previous” and “last”. Strictly speaking, “previous” includes any point of past time [0,…,t-1, t] but “last” is the only time [t]. Fujitsu suggests to make a simple change, which can address the concern from Nokia (1). However, such a change needs RAN2 consensus.3> if the last ~~previous~~ configured uplink grant, in the BWP, |

**Conclusion 1: TBD**

## 3.2 Clarification on HARQ process ID configuration

R2-2100854 Clarification on HARQ process ID configuration Apple discussion Rel-16 NR\_IIOT-Core

According to the current value range of parameters *nrofHARQ-Processes* and *harq-ProcID-Offset2*, since there are no restriction in the specification, it may be possible that a problematic configurations could be provided and HARQ process IDs may exceed the number of HARQ processes, and the UE behaviour will be uncertain in both MAC and PHY layers:

Parameter setting:

CG1: nrofHARQ-Processes = 8, harq-ProcID-Offset2 = 11

HARQ process allocation:

CG1: HARQ process 11, 12, 13, 14, 15, 16, 17, 18

Problematic config

This document provides following proposals and proposes to add restrictions in the specification to ensure that the HARQ Process ID is less than the respective maximum number of HARQ processes, for both UL and DL:

|  |
| --- |
| **Proposal 1: Configuration of *nrofHARQ-Processes,* *harq-ProcID-Offset2-r16* ensures that the HARQ Process ID is less than the respective maximum number of HARQ processes.****Proposal 2: A similar configuration restriction is required for NR-U and DL SPS when *harq-ProcID-Offset* is configured.****Proposal 3: The possible range in the calculation of the HARQ process ID needs to be corrected.** |

**[Rapporteur’s remark]**

The proposal 1 and 2 seem correct. The network should avoid providing such problematic configurations.

Q2-1: Do you agree with the proposals in R2-2100854?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Detailed Comments** |
| ZTE | Yes for proposal 1 and 2 | It can be guaranteed by the NW configuration, no modification is needed |
| Nokia | P1/P2: Yes; P3: No | We agree with P1 and P2 but we don’t think any correction is needed. As the rapporteur said, such misconfiguration should not happen if the network is properly implemented. |
| Ericsson | Yes for the intention in P1 and P2 | Agree with the intention. Not sure if we need to agree on such proposals, since it should be understood by default that the network shall only configure according to the UE capability (optionally indicated or the mandatory ones).  |
| ASUSTeK | Yes for proposal 1 and 2 |  |
| CATT | Agree with P1 | We think it belongs to NW to provide consistent configurations across layers (MAC/PHY). |
| LG | Yes for P1/P2No for P3 | Agree with P1/P2 but no change seems required. As indicated by Rapporteur, the network should avoid such configuration. |
| OPPO | Yes for the intention in P1 and P2 | We agree with that is should be assured that the HARQ Process ID is less than the maximum number of HARQ processes. But we think it depends on gNB implementation, and no CR is needed.  |
| Sharp | Agree with P1&P2 | We agree that network configuration should ensure no more than 16 HARQ processes in total according to the UE capability. |
| Xiaomi | No strong view | We think if the configured HARQ process ID exceeds the number of HARQ process supported by the UE. The UE would follow the section “5.3.5.8.2 Inability to comply with *RRCReconfiguration*” of the RRC specification. However if we can provide some guidance for the gNB implementation to avoid the wrong configuration, then we could also ensure more reliable specification. |
| Lenovo | Yes for the intention in P1 and P2 | We think this is network configuration issue. No change is required.  |
| MediaTek | Agree with P1 and P2 | We agree that NW configuration cannot exceed the UE’s capability. |
| Huawei | Yes for P1, P2 No for P3.  | Network implementation can handle P1 and P2. There is no need to specify anything in the specs.  |
| Futurewei | Yes for the intention in P1 and P2 | Agree with the intention of P1 and P2 but don’t see a need to specifying them for the NW side. |
| Samsung | Yes for P1/P2 | P1/P2 are obvious restriction but up to NW to handle this. Our understanding is that NW will never configure this case. |
| Intel | Yes for Proposal 1 and 2, No for Proposal 3 | We think network should provide sensible configuration. |
| Apple | Yes | As discussed in R2-2100854, the valid parameter range is currently not correctly set out in the specification. |
| Fujitsu | Yes for P1 and P2No for P3 | The network will avoid such a configuration. |

**Conclusion 2-1: TBD**

Q2-2: If the answer to Q2-1 is yes, do you agree the TP proposed in Annex of R2-2100854?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Disagree | No TP or CR is needed |
| Nokia | Disagree | We don’t think any change is needed |
| Ericsson | Disagree | See above |
| ASUSTeK | Agree with the intention | We are fine to clarify it in RRC. Given TP in RRC, TP in MAC seems not so necessary. |
| CATT | Disagree | Same view as above companies. |
| LG | Disagree |  |
| OPPO | Disagree | No change is needed. |
| Sharp | Disagree | We don’t think any change is needed. |
| Lenovo | Disagree |  |
| MediaTek | Agree partly | We agree with the clarification in RRC to avoid lousy NW implementations. With this clarification, the MAC changes are redundant. |
| Huawei | Disagree | No need for change.  |
| Futurewei | Disagree | No change is needed. |
| Samsung | Disagree |  |
| Intel | Disagree | Specification change is not needed. |
| Apple | Agree | We think that the specification should indicate correct boundary conditions, especially as there are different interpretations possible. |
| Qualcomm | Disagree | We can be ok with the RRC change (though we don’t see strong need for it). We disagree with the MAC correction. |
| Fujitsu | Disagree | Rely on NW implementation. |

**Conclusion 2-2: TBD**

## 3.3 CR on the configuredGrantTimer for deprioritized UL grant

R2-2101529 CR on the configuredGrantTimer for deprioritized UL grant ZTE Corporation, Sanechips CR Rel-16 38.321 16.3.0 1043 - F NR\_IIOT-Core

This CR proposes to capture stopping of the *configuredGrantTimer* for the deprioritized configured UL grant in the collision cases that DG vs CG and SR vs CG and CG is deprioritized, while the current specification captures the stopping of the *configuredGrantTimer* only in the collision case when CG vs CG and one of the CG is deprioritized:

|  |
| --- |
| (5.4.1)1> if this uplink grant is addressed to CS-RNTI with NDI = 1 or C-RNTI:2> if there is no overlapping PUSCH duration of a configured uplink grant which was not already de-prioritized, in the same BWP whose priority is higher than the priority of the uplink grant; and2> if there is no overlapping PUCCH resource with an SR transmission which was not already de-prioritized and the priority of the logical channel that triggered the SR is higher than the priority of the uplink grant:3> consider this uplink grant as a prioritized uplink grant;3> consider the other overlapping uplink grant(s), if any, as a de-prioritized uplink grant(s);3> if the de-prioritized uplink grant(s) is a configured uplink grant configured with *autonomousTx* whose PUSCH has already started:4> stop the *configuredGrantTimer* for the corresponding HARQ process of the de-prioritized uplink grant(s).3> consider the other overlapping SR transmission(s), if any, as a de-prioritized SR transmission(s).(5.4.4)[…]4> consider the SR transmission as a prioritized SR transmission.4> consider the other overlapping uplink grant(s), if any, as a de-prioritized uplink grant(s);4> if the de-prioritized uplink grant(s) is a configured uplink grant configured with *autonomousTx* whose PUSCH has already started:5> stop the *configuredGrantTimer* for the corresponding HARQ process of the de-prioritized uplink grant(s) |

**[Rapporteur’s remark]**

In R2#112, the first proposed change for 5.4.1 was considered and added in the “ [DRAFT] R2-2011075 TS38.321 CR0997 [IIOT][043]“(V1). However, it was removed in V2 based on the comment from Zhe (OPPO)( Tue, 10 Nov 2020 16:58:51 +0000) in email [AT112-e][043][IIOT] MAC II (Nokia) that “ [...] for the following text in the CR, we are not sure whether we need this modification, since for DG vs. CG only one MAC PDU is delivered and only one transmission is allowed accordingly.“. Similar comments may be also valid for the second change for 5.4.4.

Q3: Do you agree with the change(s) in R2-2101529?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Seems the first change is not needed;Agree with the second change | Thanks to rapporteur for reminding us the first change is not needed. According to the RAN1 conclusion: DG with a higher priority cannot cancel the ongoing CG transmission with a lower priority. It seems the first change is not needed since the scenario is not existing.For the second change, RAN1 have clarified that the SR with a higher priority class can cancel the PUSCH transmission with lower priority class, as shown below:\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 38.213 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*If a UE would transmit the following channels that would overlap in time- a first PUCCH of larger priority index with SR and a second PUCCH or PUSCH of smaller priority index, or - <omit for short>the UE is expected to cancel the PUCCH/PUSCH transmissions of smaller priority index before the first symbol overlapping with the PUCCH/PUSCH transmission of larger priority index.\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 38.213 \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Therefore, there is a possibility where the ongoing CG retransmission would be canceled by the SR transmission, thus the corresponding CGRT shall be stopped. The second change is needed. |
| Nokia | Disagree with the change in 5.4.1Agree with the change in 5.4.4 | As pointed out by the rapporteur, we have discussed it before and we do not have the case of “CG PUSCH cancellation in middle of transmission” if it collides with DG, because this is not supported by RAN1. So we don’t think the change in 5.4.1 should be captured.For the SR part in 5.4.4, an on-going PUSCH can be cancelled by a SR-PUCCH if they have different L1-priority. Hence we think this change makes sense. |
| Ericsson | Disagree with the first but agree with the second  | Agree with above comments by Nokia and ZTE. |
| ASUSTeK | Agree | Share the same view with ZTE and Nokia. |
| CATT | Agree with the 2nd change | We share the Rapporteur’s understanding. |
| LG | Agree to the 2nd change only |  |
| OPPO | Disagree with the first changeAgree with the second change | Thanks to Rapporteur for listing the discussion trace in the past. We still think the first change is not needed, since the status between CG and DG is not change. Accordingly, there is no case existing to stop CGT.For the second on, we share the same view as companies above. |
| Sharp | Disagree with the change in 5.4.1Agree with the change in 5.4.4 | Agree with ZTE |
| Xiaomi | Agree with the second change | We share the same view with Nokia. |
| Lenovo | Agree with 2nd change | Agree with Nokia, ZTE |
| MediaTek | Agree with the second change | For the same reasons as ZTE and Nokia |
| Sony | Agree with the 2nd change |  |
| Huawei  | Disagree with the first changeAgree as it is with the second change | As remarked by the rapporteur, when DG overlaps with CG, only one uplink grant can be delivered to the PHY layer. Thus for a CG overlaps with DG, it the CG transmission is already ongoing and the associated configuredGrantTimer starts, the CG transmission will not be interrupted by DG and the associated configuredGrantTimer shall not be stopped.For the second change, the ongoing CG transmission can be terminated by an SR, thus the correction is essential. |
| Futurewei | Disagree with the first changeAgree with the second change  | It is correct that ongoing CG transmission can be cancelled by SR. |
| Samsung | Agree with 2nd change | Agree with Rapporteur, Nokia and others. |
| Apple | Agree with the second change |  |
| Intel | Agree to the 2nd change only | Agree with Rapporteur, Nokia, and ZTE. |
| Qualcomm | Agree 2nd change |   |
| Fujitsu | Agree with 2nd change only | Agree with Rapporteur, Nokia, and ZTE. |

**Conclusion 3: TBD**

## 3.4 Discussion on timer control when CG transmission is cancelled

R2-2101530 Discussion on timer control when configured grant transmission is canceled ZTE Corporation, OPPO discussion Rel-16 NR\_IIOT-Core

This document discusses when a CG transmission is cancelled (by CI-RNTI or by UCI transmission), there could be misalignment on timer status between UE and NW due to different interpretations on the wording “when a MAC PDU is transmitted”. The document has the following proposal to (re)start the bwp-InactivityTimer and sCellDeactivationTimer when the ongoing CG transmission is cancelled:

**Proposal 1: When the ongoing PUSCH transmission for a configured grant is canceled as specified in subclause 5.4.1, the *bwp-InactivityTimer and sCellDeactivationTimer* shall be (re)started.**

**[Rapportuer’s remark]**

It seems better to have an aligned behavior on whether to start the bwp-InactivityTimer and sCellDeactivationTimer when the corresponding transmission is not completely transmitted.

Q4-1: Do you agree with the proposal in R2-2101530?

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Detailed Comments |
| ZTE | Yes | We think this clarification is needed, as for whether to have a CR we can following majorities. |
| Nokia | No | In some sense we think PUSCH cancellation is bit similar to LBT failure. Currently, when there is a LBT failure, we do not start/restart these timers to avoid misalignment between UE and gNB. Similarly, we should not start/restart these timers upon PUSCH cancellation as well.  |
| Ericsson | Yes | At the time when this PUSCH transmission is started, UE is NOT aware of the later CI-RNTI or UCI transmission. It makes sense that the timer is (re)-started at that moment.  |
| ASUSTeK | Yes | Share the same view with Ericsson. |
| CATT | No | We agree with Nokia that LBT failure and deprioritization can be considered similar in that they delay the transmission. Since it was already agreed that an LBT failure would not result in (re)starting the timers, we think, for consistency, a deprioritized grant should have the same effect. And, similar to the LBT failure case, this could be clarified as follows (in both 5.9 and 5.15):2> if a MAC PDU is transmitted in a configured uplink grant and LBT failure indication is not received from lower layers and the configured uplink grant is not deprioritized during the transmission; or  |
| LG | No | The interpretation of ‘MAC PDU is transmitted’ should be that MAC performs transmission, i.e., deliver MAC PDU to PHY, and it does not take the transmission result into account. That is the reason why we intentionally use e.g., ‘cancelled’ or ‘transmission is completely performed’ if we want to indicate the result of MAC PDU transmission.We think, therefore, the UE starts the timers if it delivers a MAC PDU to a PHY and no LBT failure indication is received. With this understanding, if there is a misalignment, it is that the UE starts the timer but the network doesn’t, which seems not a big problem because the UE can be still scheduled. Furthermore, the deprioritized/cancelled grant will be transmitted on CG or DG soon, so the timers will be aligned.  |
| OPPO | Yes | The intention is to clarify the status of timer, since this issue is not discussed before but the ambiguity exists on timer status. |
| Sharp | No | We think “when a MAC PDU is transmitted” means the timers is (re-)start upon PUSCH transmission happens and does not relevant to whether the transmission is complete or not. |
| Xiaomi | No | For the LBT case, only a real transmission via PHY (i.e. ‘MAC PDU is transmitted’) can start/restart the timer. We think the same principle can be applied. It seems that the specification is already clear. |
| Lenovo | No | Same view as Nokia |
| MediaTek | No | Same view as Nokia |
| Huawei | Yes | Agree with rapporteur’s remark |
| Futurewei | Yes | Agree with Ericsson. |
| Samsung | No | Agree with Nokia |
| Apple | No | Same view as Nokia |
| Intel | No | Agree with Nokia. |
| Qualcomm | No | Agree with Nokia on the similarity with LBT |
| Fujitsu | No | Same view as Nokia |

**Conclusion 4-1: TBD**

Q4-2: If the answer to Q4-1 is yes, do you agree the TP proposed in Annex of R2-2101530?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Agree as is | We can follow the majorities. |
| Ericsson | Disagree | The above comment from Ericsson seems to be the common understanding, since there is a text added in the last meeting: 3> if the de-prioritized uplink grant(s) is a configured uplink grant configured with *autonomousTx* whose PUSCH has already started:4> stop the *configuredGrantTimer* for the corresponding HARQ process of the de-prioritized uplink grant(s).This means that the CGTimer is started when PUSCH starts to transmit. If later cancelled, then it is stopped. With this common understanding, the intended behaviour is already captured. On the other hand, it would be good to have a baseline understanding for all these timers, as these issues might pop up in the later Rel-17 NR-U/IIoT CG harmonization discussion.  |
| ASUSTeK | Agree with the intention | Since we did not define stopping both bwp-InactivityTimer and sCellDeactivationTimer upon reception of CI-RNTI or UCI, these two timers should be still running if they are started at the beginning of the first symbol of the PUSCH transmission as CGT and CGRT.We may specify one of the following:1. bwp-InactivityTimer and sCellDeactivationTimer are started at the beginning of the first symbol of the PUSCH transmission.
2. Adding a note (similar to ZTE’s proposal).
 |
| OPPO | Agree as is | We can follow the majorities. |
| Huawei | Disagree | We think a common understanding captured in the chairman notes would be sufficient. No need to introduce a note in the MAC spec. |
|  |  |  |

**Conclusion 4-2: TBD**

## 3.5 CG timer handling upon PUSCH cancellation for bundle case

R2-2101744 Configured grant timer handling upon PUSCH cancellation for bundle case ASUSTeK CR Rel-16 38.321 16.3.0 1047 - F NR\_IIOT-Core

In the previous meeting, it was agreed that a configured grant timer that has started should be stopped when a CG PUSCH configured with autonomous transmission with the corresponding HARQ process has been deprioritized or cancelled so that UE can directly use the next configured grant for autonomous transmission. However, if the cancelled PUSCH is a retransmission (e.g. bundle repetition) of configured grant and its previous PUSCH(s) of the same TB has been transmitted completely, configured grant timer would be still stopped. The TB may be directly replaced by another new data in the next configured grant opportunity (rather than sending the same TB by autonomousTx, since the TB has been transmitted completely), which is not desirable from gNB retransmission scheduling perspective:



On the other hand, if the cancelled PUSCH is the first transmission of configured grant (e.g. the first repetition within bundle) and its later PUSCH(s) of the same TB has been transmitted completely, configured grant timer is still kept stopped, and the TB will also be replaced in the next configured grant opportunity:



The CR proposes to:

1. Stop configured grant timer, if the corresponding PUSCH is cancelled/deprioritized and none of previous PUSCH transmission(s) of the TB has been completely performed:

|  |
| --- |
| (5.4.1)For the MAC entity configured with *lch-basedPrioritization*, if the corresponding PUSCH transmission of a configured uplink grant is cancelled by CI-RNTI as specified in clause 11.2A of TS 38.213 [6] or cancelled by a high PHY-priority PUCCH transmission as specified in clause 9 of TS 38.213 [6], this configured uplink grant is considered as a de-prioritized uplink grant. If this deprioritized uplink grant is configured with *autonomousTx* and none of PUSCH transmission(s) of the obtained MAC PDU has been completely performed, the *configuredGrantTimer* for the corresponding HARQ process of this de-prioritized uplink grant shall be stopped if it is running. |

1. Start configured grant timer, if a retransmission is performed and configured grant timer is not running:

|  |
| --- |
| 4> if the uplink grant is addressed to CS-RNTI; or4> if the uplink grant is addressed to C-RNTI, and the identified HARQ process is configured for a configured uplink grant; or4> if the *configuredGrantTimer* for the corresponding HARQ process is not running:5> start or restart the *configuredGrantTimer*, if configured, for the corresponding HARQ process when the transmission is performed if LBT failure indication is not received from lower layers. |

**[Rapporteur’s remark]**

The current specification on stopping the configuredGrantTimer upon UL transmission cancellation prohibits the (dynamic) retransmission opportunities of the TBs in the bundle case. The configured grant timer is not effective as expected.

Q5: Do you agree with the changes in R2-2101744?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Agree with the change | Generally, we think the first change is needed, but the second change is not needed since the UE anyway will start/restart the configuredGrantTimer when retransmission is performed as shown below:3> else:4> deliver the uplink grant and the HARQ information (redundancy version) of the TB to the identified HARQ process;4> instruct the identified HARQ process to trigger a retransmission;4> if the uplink grant is addressed to CS-RNTI; or4> if the uplink grant is addressed to C-RNTI, and the identified HARQ process is configured for a configured uplink grant; ~~or~~~~4> if the~~ *~~configuredGrantTimer~~* ~~for the corresponding HARQ process is not running:~~5> start or restart the *configuredGrantTimer*, if configured, for the corresponding HARQ process when the transmission is performed if LBT failure indication is not received from lower layers.In addition to above changes, we think the following change is needed instead:1> else if this uplink grant is a configured uplink grant:2> if there is no overlapping PUSCH duration of another configured uplink grant which was not already de-prioritized, in the same BWP, whose priority is higher than the priority of the uplink grant; and2> if there is no overlapping PUSCH duration of an uplink grant addressed to CS-RNTI with NDI = 1 or C-RNTI which was not already de-prioritized, in the same BWP, whose priority is higher than or equal to the priority of the uplink grant; and2> if there is no overlapping PUCCH resource with an SR transmission which was not already de-prioritized and the priority of the logical channel that triggered the SR is higher than the priority of the uplink grant:3> consider this uplink grant as a prioritized uplink grant;3> consider the other overlapping uplink grant(s), if any, as a de-prioritized uplink grant(s);3> if the de-prioritized uplink grant(s) is a configured uplink grant configured with *autonomousTx* whose PUSCH has already started and none of PUSCH transmission(s) of the obtained MAC PDU has been completely performed :4> stop the *configuredGrantTimer* for the corresponding HARQ process of the de-prioritized uplink grant(s).3> consider the other overlapping SR transmission(s), if any, as a de-prioritized SR transmission(s).  |
| Nokia | Agree with changes in (1)Disagree (2) | We agree with the intention of the first change. We should only stop the CG timer when the MAC PDU in the de-prioritized CG has never been fully transmitted. Otherwise, this is no longer a MAC PDU that is unknown to gNB and in this case autonomous transmission is no longer needed. However, we propose the alternative wording:… If this deprioritized uplink grant is configured with *autonomousTx* and the MAC PDU obtained for this deprioritized uplink grant, if any, has not been completely transmitted, the *configuredGrantTimer* for the corresponding HARQ process of this de-prioritized uplink grant shall be stopped if it is running.For the second change, we do not see the need. The CG timer will restart or start anyway regardless whether it is currently running or not. |
| Ericsson | No  | The modelling of the UL bundle is very tricky in the MAC spec. In my understanding, for the Rel-15 baseline, the bundled grants are delivered all together to the HARQ entity. If this were not true, then the initial transmission would start the CG Timer and subsequently blocks the rest of the bundled transmissions as the CG timer is running. Per the above understanding, the issue shown in the paper does not exist. [ASUSTeK]: In our understanding, each bundle grant should be still restricted to uplink grant prioritization as specified in 5.4.1 (UL Grant reception). If the initial transmission starts CG timer, each bundle grant would not be blocked since it’s for re-transmission.Additionally, UE triggers autonomously tx in the second bundle, as long as any one of the grants in the first bundle is cancelled/deprioritized. This UE behaviour is acceptable in our view, since the network configures the bundle with the expectation it needs all bundles to decode. Network, after receiving one of the grants within the bundle, can choose to send a dynamic retransmission grant or wait for the autonomous tx (as the form of the second bundle). [ASUSTeK]: In our understanding, if UE has completely transmitted any grant within the bundle, autonomous tx for the same TB in the next bundle is not possible according to the current spec. The second bundle would be always another new TB. |
| ASUSTeK | Yes | Please see the response to Ericsson’s commentsFor the second change, according to ZTE’s comment, UE would start configuredGrantTimer (CGT) for retransmission. However, in our understanding, CGT would not be started or restarted for retransmission via configured grant according to the current spec. That’s reason why the second change proposes to start CGT in this case. |
| CATT | No but | We think *autonomousTx* should not be configured on bundled CGs. Indeed the proposed changes end-up preventing subsequent “repetitions” grants to be used for autonomous transmission of prior deprioritized CGO instance(s) of the bundle. Meaning the changes end-up deactivating the autonomous transmission if it is configured. We also agree with Ericsson that it is not 100% clear if such “repetition” grants go through the intra-UE prioritization procedure of 5.4.1 in first place. But if they don't, they are neither tagged as prioritized nor deprioritized which then results in issues in 5.4.2.1. So, also given we don’t see much motivation in configuring *autonomousTx* on CG bundles (if at least one CGO in the bundle is received at the gNB, it can scheduled a retransmission) we would prefer to simply disallow such configuration. |
| LG | Suggest to postpone | For bundling, the specification clearly specifies where the DRX timers start/stop. However, it seems that RAN2 have not discussed how to start/stop *configuredGrantTimer* for bundling, which needs to be first checked/confirmed. In the current specification, each transmission within a bundle is modelled as a separate uplink grant in HARQ procedure. In the meanwhile, the MAC may be able to handle all grants in a bundle together in UL grant reception procedure (as pointed by Ericsson). Thus, it seems not clear how the CGT operate for bundle. In our view, it may not sufficient only to confirm the start/stop of CGT for bundle because- if CGT is assumed to start at the first transmission within the bundle, it would block using the remaining grants within the bundle;- if CGT is assumed to start at the last transmission within the bundle, it would trigger a new TB transmission on the remaining grants within the bundle. As it is also related to CGRT, we would like to discuss them all in TEI16 in the next meeting. |
| OPPO | No | As we understood, the bundled grants are delivered together to the HARQ entity, and the CGT is only started for the initial transmission. For the case mentioned, even though CGT is stopped due to de-prioritization, the subsequent repetitions are still valid for retx since there are parts of a bundle and the MAC PDU has been obtained for this bundle. |
| Sharp | No | Agree with Ericsson. |
| Xiaomi | Postpone | We tended agree with the issue raised in the paper. However the changes are little bit too vague. We probably need more time to check whether all cases are covered by the proposed changes. |
| Lenovo |  | We probably need more time to check. In our understanding is depends on how bundling operation is modelled.  |
| MediaTek | Agree  | Also agree with the additional change suggested by ZTE  |
| Huawei | Disagree | Agree with Ericsson. We shall be careful with “bundled transmission”, for which we think network implementation can resolve any problems through e.g. dynamic retransmission scheduling.  |
| Futurewei | Disagree | Agree with Ericsson. |
| Samsung | Disagree | We tend to agree the problem. The problem is that the stopped CGT mandates a new transmission in the very next CG with the same HPI, which gives a restriction to gNB scheduler for retransmission timing.But we think there is no other critical problems foreseen. Still gNB controls the UL scheduling, although the restriction is added. We also agree with CATT that gNB can avoid this situation by not configuring them together. |
| Intel | Postpone | We tend to agree with LG and this issue can be discussed in next meeting. |
| Qualcomm | Postpone | Several issues have been raised in the proposal and the comments in this thread. Some more time for checking could be useful. |
| Fujitsu | Postpone | As suggested by LGE. |
| Apple | Agree with the intention for (1) but open to postpone; disagree (2). | In our understanding, *autonomousTx* can be used together with TB repetition once a MAC PDU has been generated and is stored in the HARQ buffer. Each TB within a bundle is modelled as a separate UL grant and we tend to agree with the intention for the first change. However, some update to the wording may be required. Based on other companies’ preference, we are also fine to postpone this to next meeting to allow time for a more thorough check. For the second change we do not see a need since this is already covered by other parts in the specification. |

**Conclusion 5: TBD**

## 3.6 Corrections for NR IIOT CG confirmation

R2-2101745 MAC Corrections for NR IIOT CG confirmation ASUSTeK CR Rel-16 38.321 16.3.0 1048 - F NR\_IIOT-Core

This CR proposes to

1. Revise bullets to cancel all triggered configured grant confirmation for Multiple Entry Configured Grant Confirmation MAC CE, and cancel a triggered configured grant confirmation for “Single Entry” Configured Grant Confirmation MAC CE:

|  |
| --- |
| 2> if, in this MAC entity, at least one configured uplink grant is configured by *configuredGrantConfigToAddModList*:3> instruct the Multiplexing and Assembly procedure to generate a Multiple Entry Configured Grant Confirmation MAC CE as defined in clause 6.1.3.31.3> cancel all triggered configured uplink grant confirmation(s).2> else:3> instruct the Multiplexing and Assembly procedure to generate a Configured Grant Confirmation MAC CE as defined in clause 6.1.3.7.23> cancel the triggered configured uplink grant confirmation(s). |

1. To solve ambiguity in setting value for the corresponding CG fields, revise description for CG field in Multiple Entry Configured Grant Confirmation MAC CE to set the CG fields according to triggered and not cancelled configured grant confirmation(s) for a configured uplink grant:
2. Revise decription for when the UE sets the CG field value to 0 for better readability:

|  |
| --- |
| - CGi: This field indicates whether PDCCH indicating activation or deactivation of configured uplink grant with *ConfiguredGrantConfigIndexMAC* i has been received. The CGi field is set to 1 to indicate that PDCCH the configured uplink grant confirmation with *ConfiguredGrantConfigIndexMAC* i has been triggered and not cancelled; otherwise the CGi field is set to 0. |

**[Rapporteur’s remark]**

For the first change, the „single-entry“ CG confirmation MAC CE should not cancel CG confirmation of other carriers, as in Rel-15 behavior, while only a „multiple-entry“ CG confirmation MAC CE can cancel all CG confirmations.

For the second change, it is ambiguous for the UE to decide whether a (de)activation PDCCH „has been received“ for a configured uplink grant, thus leading to ambiguity in setting value for the corresponding CG fields. It would be clearer to set the field based on triggered and not cancelled CG confirmations, as it’s the similar behavior in setting the C field for LBT failure MAC CE.

Q6: Do you agree with the changes in R2-2101745?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Disagree | The current spec is clear, no more clarification is needed. |
| Nokia | Disagree | We feel the current text are already very clear, the proposed changes are not necessary. The sentence “*cancel all triggered configured uplink grant confirmation(s)”* cover both single-entry and multi-entry cases well.Also, we don’t see anything wrong with the current MAC CE description. |
| Ericsson | Disagree on the first and agree on the second | On the first change, the spec is clear. On the second change, the wording “has been received” can be misunderstood as going backwards in time to the start of the RRC configuration of the configured grants. The intention is that it should cover backwards to the time when the last confirmation MAC CE is transmitted (i.e., the triggered confirmation was cancelled). It is also better to align with other MAC CEs, such as the LBT failure MAC CE. |
| ASUSTeK | Agree | For the first change, different CGs may be configured by configuredGrantConfig on different BWP of different serving cells (as Rel-15). Each confirmation of different CGs should be independent from each other, which means that one “Single Entry” CG Confirmation MAC CE should cancel only one triggered configured uplink grant confirmation. Otherwise, other triggered CG confirmations may be wrongly cancelled by one “Single Entry” Configured Grant Confirmation MAC CE. For the second change, we share the same view with Ericsson. Besides, we also give an example in the CR as below. Of course, this is not a new issue so we may just align with LBT failure MAC CE.t1: UE receives a PDCCH activating configured grant CG1.t2: UE generates a confirmation MAC CE with CG1 = 1 and CG2 = 0.t3: UE receives a PDCCH activating configured grant CG2.t4: UE generates a second confirmation MAC CE with CG2 = 1, but how to set the value for CG1 is ambiguous. |
| CATT | Disagree | On the first change, the spec is clear (plus this has already been discussed in previous meetings). For the second change, given the triggered configured uplink grant confirmation(s) are cancelled right after instructing the Multiplexing and Assembly procedure to generate a (Multiple Entry) Configured Grant Confirmation MAC CE, the case where such MAC CE is generated and the associated configured uplink grant confirmation is not cancelled does not exist in our view. The current text is clear enough.  |
| LG | Disagree on the 1st changeAgree on the 2nd change | 1st change: The current spec is clear. There is no case that Single Entry and Multiple Entry are used together. 2nd change: it seems unclear from which time point the UE checks ‘has been received’, and the suggested text is fine, which seems to be aligned with the original agreement. |
| OPPO | Disagree | The current spec is clear to us. |
| Sharp | Disagree | We think the current spec is clear, no clarification is needed. |
| Xiaomi | Disagree | Agree with Nokia. |
| Lenovo | Disagree | Same understanding as Nokia |
| MediaTek | Agree with the 2nd change | The suggested text for the second change looks correct.Regarding the first change, the current spec is clear to us. The text states that if the MAC entity has ‘at least one configured uplink grant is configured by *configuredGrantConfigToAddModList*’, only the multiple entry MAC CE is sent. So the case raised by the proponent does not exist – as the single entry MAC CE will never be sent. |
| Huawei | Disagree | The current spec is clear enough and no change is needed on this.  |
| Futurewei | Disagree | Agree that the current spec is clear enough. |
| Samsung | Agree with the 2nd change | Agree with MediaTek and Ericsson. There may be a misunderstanding, but no strong view. |
| Intel | Disagree | Current specification is clear. |
| Qualcomm | Disagree on 1st change.No strong view on 2nd change. | The second change seems technically correct, though we are not sure how essential the change is. |
| Fujitsu | Disagree on the 1st changeAgree on the 2nd change | 1st change: The current spec is very clear.2nd change: Correctly reflects the intention. |
| Apple | Disagree | Same understanding as CATT. |

**Conclusion 6: TBD**

## 3.7 Corrections for NR IIOT intra-UE prioritization

R2-2101746 MAC Corrections for NR IIOT intra-UE prioritization ASUSTeK CR Rel-16 38.321 16.3.0 1049 - F NR\_IIOT-Core\

This CR discusses an error case when an uplink grant was a prioritized grant when generating a MAC PDU, but is deprioritized afterwards. The UE will falsely deliver the deprioritized MAC PDU to the HARQ process for transmission, and revises condition of the UE prioritizing UL transmissions to match the same condition of obtaining MAC PDUs to avoid exceptional cases:

|  |
| --- |
| (5.4.2)3> else if the MAC entity is not configured with *lch-basedPrioritization*; or3> if this uplink grant is a prioritized uplink grant:4> obtain the MAC PDU to transmit from the Multiplexing and assembly entity, if any;3> if a MAC PDU to transmit has been obtained:4> if the MAC entity is not configured with *lch-basedPrioritization*; or4> if the uplink grant is a prioritized uplink grant:5> deliver the MAC PDU and the uplink grant and the HARQ information of the TB to the identified HARQ process; |

**[Rapporteur’s remark]**

If **a MAC entity configured with lch-basedPrioritization** has an dynamic uplink grant that is not a configured grant configured with autonomousTx, and **the uplink grant was a prioritized grant when the MAC PDU is generated but is deprioritized afterwards** (e.g. by a latter overlapping UL configured grant with higher priority data), the UE will falsely deliver the deprioritized MAC PDU to the HARQ process for transmission, according to the current specification.

Q7: Do you agree with the changes in R2-2101746?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Disagree | We cannot understand the intention of this CR.Our understanding is that: if a grant is prioritized once and the relevant MAC PDU have been generated in MAC, MAC already have delivered the MAC PDU into HARQ process and instructed the identified HARQ process to trigger a new transmission no matter whether this grant is deprioritized finally or not.Furthermore, whether to transmit the generated MAC PDU is up to PHY layer, thus the current spec is OK, no change is needed. |
| Nokia | Disagree | Currently we do not have the case where an on-going dynamic grant can be cancelled by a configured grant – This is not supported by RAN1. So we don’t have the problematic scenario mentioned in the CR. |
| Ericsson | Disagree | Agreed with Nokia.  |
| ASUSTeK |  | We are wondering if it’s possible that the MAC PDU by DG has been obtained and not delivered yet but it was deprioritized (by CI-RNTI or something else). In this case, the MAC PDU should not be delivered. If people think this case does not happen. We may not need this change. |
| CATT | Disagree | Agree with Nokia |
| LG | Disagree | I think the case is that transmission on DG is not yet on-going over the air but PDU has been generated early by UE implementation. In our view, for overlapping case, a UE can wait until the last point allowing MAC PDU generation for a grant (CG/DG) so that there is no case that the UE revisits the prioritization procedure for the same grants. If the UE performs prioritization procedure and determines which is prioritized/deprioritized, it seems very strange that the UE revisit the prioritization procedure for the same grants, as explained by ZTE.  |
| OPPO | Disagree | In our understanding, the DG case mentioned does not exist, since DG will not be cancelled by another CG, or there is no requirement to avoid DG delivered to PHY layer if it is cancelled by SR or CI-RNTI. |
| Sharp | Disagree | Agree with Nokia. |
| Xiaomi | Disagree | Agree with Nokia |
| Lenovo | Disagree |  |
| MediaTek | Disagree | Agree with Nokia |
| Sony | Disagree |  |
| Huawei | Disagree | For the example proposed by the rapporteur, we think CG cannot terminate a DG transmission based on the latest RAN1 agreement in Rel-16. The current spec text is fine, and no change is needed. |
| Futurewei | Disagree | Agreed with Nokia. |
| Samsung | Disagree | Agree with Nokia. The problematic case does not exist in this release. |
| Intel | Disagree | Agree with Nokia. |
| Qualcomm | Disagree | Agree with LG |
| Fujitsu | Disagree | Agree with Nokia. |
| Apple | Disagree | Agree with Nokia. |

**Conclusion 7: TBD**

## 3.8 Corrections on the EHC reset

R2-2101670 Corrections on the EHC reset Beijing Xiaomi Mobile Software CR Rel-16 38.323 16.2.0 0065 - F NR\_IIOT-Core

The CR proposes to specify behaviour of EHC protocol reset for UL and DL in PDCP entity re-establishment with discarding the compression context to avoid decompression failure:

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| --- |
| (5.1.2)- for UM DRBs and AM DRBs, reset the EHC protocol by discarding the compression context for uplink if *drb-ContinueEHC-UL* is not configured in TS 38.331 [3];[…]- for UM DRBs and AM DRBs, reset the EHC protocol by discarding the decompression context for downlink if *drb-ContinueEHC-DL* is not configured in TS 38.331 [3]; |

Q8: Do you agree with the changes in R2-2101670?

|  |  |  |
| --- | --- | --- |
| Company | Agree as is;Agree with changes;Disagree | Detailed Comments |
| ZTE | Agree as is | We are fine to capture a more clear definition of resetting the EHC protocol. |
| Nokia | Disagree | In our view the meaning of EHC reset is obvious i.e. to reset and start from afresh, so we don’t think further detailed clarification is needed. |
| Ericsson | Agree with changes | Although some may argue that it is obvious what EHC reset means, this is not clearly written. A lousy UE implementation can do whatever it is convenient and might not discard the context. For network, it must implement scheduler algorithms to deal with these types of UEs. As these operations are very simple for UE, Ericsson believes there is a benefit to make it clear.Additionally, at PDCP re-establishment, it does not make sense to submit this EHC feedback to lowers layers (as it is in current standards) for transmission after the PDCP re-establishment. On the contrary, EHC feedback generated before the EHC reset at PDCP re-establishment in the decompressor, if received after the PDCP re-establishment with EHC reset in the compressor, would lead to context mismatch. EHC feedback generation/submission should thus be avoided during PDCP re-establishment, which can be achieved by clarifying that EHC reset at PDCP re-establishment also means that EHC feedback is discarded (i.e. not submitted).  |
| CATT | Agree as is | Agree with Ericsson. |
| LG | Disagree | Already discussed in R2-2010056 and majority companies think that the current text is clear enough. |
| OPPO | Disagree | Current spec is clear. |
| Xiaomi | Agree as is | We think that a clear UE behaviour would stop companies keep bringing the same issue again. As mentioned by Ericsson, the specification is causing the IoT issue.  |
| Lenovo | Agree as is  | Same view as Ericsson |
| MediaTek | Disagree | Agree with LG that this was discussed earlier. We do not need further clarifications. |
| Huawei | Disagree | Similar issue discussed in the last RAN2 meeting, but no conclusion. We think the UE behaviour of “EHC reset at PDCP re-establishment” is clear, no need to clarify in the spec.  |
| Futurewei | Agree with changes | Unlike RoHC, EHC is defined by us. So, a little bit more clarity won’t hurt. However, in Annex A.1, we define “EHC context” as one term for both the compressor and decompressor. We should use the same term in both changes (as below), to be consistent with A.1. by discarding the ~~compression~~ EHC context for uplinkby discarding the ~~decompression~~ EHC context for downlinkTogether with “the transmitting PDCP entity shall:” and “the receiving PDCP entity shall:”, it should be clear which EHC context are being referred in these two places, respectively.Otherwise, we need to define what compression context and decompression context are in Annex A.1.  |
| Samsung | Disagree | Agree with LG and Nokia.  |
| Intel | Disagree | Agree with LG. |
| Qualcomm | Agree | Clarification is not critical, but can be helpful. We prefer the original CR working, and not the Futurewei wording, as compressor and decompressor are well defined in the Annex. |
| Fujitsu | Disagree | Agree with LG and Nokia. |
| Apple | Disagree | If the EHC protocol is reset, then the UE follows the reset procedure. The change in the CR seems not the right place to specify further conditions of a reset, and as pointed out by LG, the EHC reset was already discussed in RAN2#112e email discussion [044] (R2-2011006). |

**Conclusion 8: TBD**

# Conclusion

# Reference

[1] 3GPP RAN2#113-e meeting chairman note