**3GPP TSG-RAN WG2 Meeting #111-e *R2-200xxxx***

**Online, 17–28 August 2020**

**Agenda item: 6.3.2**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Report of [AT111e][505][NR-U] CR to 38.321 (Nokia)**

**Document for: Discussion and Agreement**

# 1 Introduction

This is to report the result of the following email discussion in RAN2#111-e Meeting.

* [AT111e][505][NR-U] CR to 38.321 (Nokia)
  + - Capture agreed changes from online session
    - Identify topics that need further discussions from papers in UP
    - Present agreeable CR in CB session

Deadline for providing comments:

* + - Companies input: Aug. 21th
    - Rapporteur summary: Aug. 24th

# 2 Discussion

## 2.1 CG confirmation MAC CE (R2-2007169)

[R2-2007169](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007169.zip) Corrections on CG operation for NR-U Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.1.0 0807 - F NR\_unlic-Core

First change from R2-2007169 proposed to stop *configuredGrantTimer* only if cg-RetransmissionTimer is not configured:

|  |
| --- |
| 3> else if PDCCH contents indicate configured grant Type 2 activation:  4> trigger configured uplink grant confirmation;  4> store the uplink grant for this Serving Cell and the associated HARQ information as configured uplink grant;  4> initialise or re-initialise the configured uplink grant for this Serving Cell to start in the associated PUSCH duration and to recur according to rules in clause 5.8.2;  4> if *cg-RetransmissionTimer* is not configured:  5> stop the *configuredGrantTimer* for the corresponding HARQ process, if running; |

During the online discussions, companies seemed to have different understanding of the previous agreement. It was agreed RAN2#109e that the UE always prioritize retransmission over new transmission without special handling for confirmation MAC CE. Thus, if all the processes have pending retransmissions, the UE would need to wait until one of them is available for new transmission, instead of stop *configuredGrantTimer* for one of the HARQ processes.

|  |
| --- |
| RAN2 #109e:  [R2-2002029](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002029.zip) NR-U UP Summary for CG and Others AI OPPO discussion Rel-16 NR\_unlic-Core  => Noted  [Offline discussion 502]  Summary: 15 companies out of 17 does not want to introduce special handling of the transmission delay for confirmation MAC CE due to the previous agreement that UE will prioritize the retransmission over new transmission.   1. No special handling of the transmission delay for confirmation MAC CE due to the previous agreement that UE prioritizes the retransmission over new transmission. (15/17)   **Agreements**   1. A new timer to consider the DFI as invalid is not introduced. 2. Repetitions across multiple CG configurations are not supported in this release. 3. It’s up to UE implementation on selecting retransmissions, no prioritization is introduced in this release. 4. When CG type 2 (re-)activation DCI is received, UE implementation selects a HARQ process (as agreed), and stops the CGRT and CGT associated with the selected HARQ process, if running. 5. Proposal 7: As already agreed, UE prioritizes retransmission over new transmission. No further optimizations dealing with the transmission of confirmation MAC CE will be considered. |

Q1: Based on above understanding, do companies agree with the proposed change?

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG |  | Nothing seems to be broken with the current text, not aligned with the agreement though. |
| OPPO | Disagree | Fail to see the intention why the change is needed |
| ZTE | Disagree | We also don’t understand why the change is needed |
| QC | Disagree | Stopping the CG timer as in current spec will allow new transmission which can be used for MAC CE. |
| Nokia | Agree | According to current specification, the UE always needs to select one of the HARQ process and stop the timers for it which does not align with the agreement of retransmission prioritized over new transmission. |
| ASUSTeK |  | Share the same view with LG. |
| Intel | Disagree | The text is implementing the Agreement 4 above. Hence we should not change the current text |
| Lenovo |  | We don’t see big motivation for change, even though agreement 4 and agreement 5 seem to contradict each other. |
| Samsunng | Disagree | We are not sure Agreement 5 implies the proposed change, and the current text works for all. |
| InterDigital | Disagree | Seems like two agreements are in conflict, but nothing wrong with the current text |
| MediaTek | Disagree | This is against the previous agreement in RAN2#109e:  4. When CG type 2 (re-)activation DCI is received, UE implementation selects a HARQ process (as agreed), and stops the CGRT and CGT associated with the selected HARQ process, if running.  The TB size of the Type 2 CG can change with re-activation, so the retransmission may not be possible to start with.  Moreover, the intention of the agreement “UE prioritizes the retransmission over new transmission” was for normal operation, but this is a special case where the resource for Type 2 CG is being updated. For the special case, we already agreed not to support autonomous retransmission as per agreement (4) above. We see no compelling reason to change the specifications. |
| Ericsson | Disagree | That agreement can not be taken out of context with the agreement just before where it clearly says that CGRT and CGT shall be stopped at (re)activation of type 2 CG:  When CG type 2 (re-)activation DCI is received, UE implementation selects a HARQ process (as agreed), and stops the CGRT and CGT associated with the selected HARQ process, if running.  Stopping CGT and CGRT implies a smart UE could send the confirmation MAC CE, for example if TBS changes. The proposed change stops a good UE implementation. |
| Huawei | Disagree | Don’t think the change is suitable implementation of online agreement 5. |
| vivo | Disagree | In RAN2#108, it was agreed that the processes with TB pending for retransmission shall be prioritized over the processes for new transmissions as already agreed for a single CG case. The agreement was confirmed in RAN2#109e as highlighted in yellow above. At the same time, for the type-2 CG re-activation case, agreement 4 above had been achieved.  Hence, in our understanding, agreement 4 should be applied in the type-2 CG re-activation case when agreement 4 is contradicted with agreement 5; otherwise, agreement 5 should be applied. Based on this, we think the current text is for type-2 CG re-activation case and aligned with agreement 4, we see no need for the modification. |

**Proposal 1:**

## 2.2 Pending HARQ process (R2-2007169/R2-2007883)

[R2-2007169](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007169.zip) Corrections on CG operation for NR-U Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.1.0 0807 - F NR\_unlic-Core

[R2-2007883](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007883.zip) NR-U revision LG Electronics UK CR Rel-16 38.321 16.1.0 0846 - F NR\_unlic-Core

Second and third changes from R2-2007169 proposed to remove the pending/not pending text in the procedure and clarify in 5.2.2, and clarify the initial state of a process:

|  |
| --- |
| 5.2.1  5.2.2  When *cg-RetransmissionTimer* is configured and the HARQ entity obtains a MAC PDU to transmit and LBT failure indication is received from lower layer, the corresponding HARQ process is considered to be pending. For a configured uplink grant, configured with *cg-RetransmissionTimer*, each associated HARQ process is considered as not pending when:  - a transmission is performed on that HARQ process and LBT failure indication is not received from lower layers; or  - no MAC PDU has been obtained for the HARQ process for any configured uplink grant; or  - the HARQ buffer for this HARQ process is flushed. |

First change from R2-2007883 proposed to change the procedure part to cover only the pending case but not “not pending” part:

|  |
| --- |
| 5> if *cg-RetransmissionTimer* is configured for the identified HARQ process; and  5> if the transmission is performed and LBT failure indication is received from lower layers:  6> consider the identified HARQ process as pending. |

Q2: for the second changes from R2-2007169 and R2-2007883, which option do you prefer or any other suggestions?

|  |  |  |
| --- | --- | --- |
| Company | R2-2007169/ R2-2007883 | Detailed Comments |
| LG | 7883 | The pending/not pending text in the procedure gives information when the UE changes the HARQ status. Thus, we don’t want to remove whole part. However, for consistency between new and retransmission, we suggest only to remove the unnecessary text, i.e., cange from ‘not pending’ to ‘not pending’. |
| OPPO | 7169 with changes | We prefer to remove the following text since it’s redundant:  We fail to see why the following change is needed, we think the original text is aleady clear enough.  - no MAC PDU has been obtained for the HARQ process for any configured uplink grant; or |
| ZTE | 7169 | Since the text in 5.2.2 has clarified pending and not pending, the text in 5.4.1 may be removed.  In addition, the following in 5.2.1 should also be removed:  4> if the identified HARQ process is pending and the transmission is performed and LBT failure indication is not received from lower layers:  5> consider the identified HARQ process as not pending. |
| QC | 7883 | It is fine to have this deletion since it is already covered in 5.2.2. However, we don’t need to delete the initialization part. There was actually an online agreement to capture that. |
| Nokia | 7169 | Ok to also remove other parts of in the procedure about pending/not pending as proposed by OPPO and ZTE. |
| Intel | 7883 | We prefer not to remove the whole of 5.2.1. It is good to know when in the procedure a MAC PDU becomes pending. The first sentence in 5.2.2 may just need to update from pending to not pending as the initialization state. |
| Lenovo | 7883 | We agree with Intel that it’s good to keep 5.2.1 |
| Samsung | 7883 | Agree with proponents that it gives clarity, so the text should not be removed it. |
| Interdigital | 7883 | Agree with other to keep 5.2.1 for additional clarity |
| MediaTek | 7169 with changes | No strong opinion, however it might be good to have all cases for setting pending/not pending state in the HARQ process clause (5.4.2.2), as pending/not pending is an attribute of HARQ process.  Agree with ZTE that there is additional text in 5.4.2.1 for retransmission case. Perhaps it can be removed as well.  Agree with OPPO that the justification for the third change in 7169 (“no MAC PDU has been obtained…”) is unclear. |
| Ericsson | 7883 | There is now some overlap between the procedural text in 5.4.2.1 and the text in 5.4.2.2 where changes are proposed, but we prefer to keep the procedural text in 5.4.2.1 with the changes as LG prpose in 7883, and then remove the overlapping parts in 5.4.2.2 (see answer to next question). |
| Huawei | 7883 |  |
| vivo | 7883 | The proposed text makes the MAC spec easier to follow. |

**Proposal 2:**

Q3: Do you agree with third change from R2-2007169 on initial state of a HARQ process?

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| LG | Partly agree | We think “and LBT failure indication is received from lower layer” is sufficient.  Regarding “no MAC PDU has been obtained for the HARQ process for any”, the legacy text seems clear as is. Note that we already have similar sentence, e.g., identify the HARQ process associated with this grant. |
| OPPO | No | We agree to add the following:  When *cg-RetransmissionTimer* is configured and the HARQ entity obtains a MAC PDU to transmit and LBT failure indication is received from lower layer, the  We fail to see why the following change is needed, we think the original text is aleady clear enough.  - no MAC PDU has been obtained for the HARQ process for any configured uplink grant; or |
| ZTE | Partly agree | We agree with LG |
| QC | No | See above |
| Nokia | Agree |  |
| ASUSTeK |  | Share the same view with LG and OPPO. |
| Intel | Yes/No | See above in our previous response. Just need to set the initialisation state to not pending in the first sentence. But we are fine to “and LBT failure indication is received from lower layer” if it makes it unambiguous.  As on the other change in the same section, we do not see the need of it. |
| Lenovo | No |  |
| Samsung | No |  |
| Interdigital | Partially agree | That is for adding “and LBT failure indication is received from lower layer,” |
| MediaTek | No | See above |
| Ericsson | No | We want to keep the procedural text and instead remove the overlap in 5.4.2.2 instead. We propose this chage:  ~~When~~ *~~cg-RetransmissionTimer~~* ~~is configured and the HARQ entity obtains a MAC PDU to transmit, the corresponding HARQ process is considered to be pending.~~ For a configured uplink grant, configured with *cg-RetransmissionTimer*, each associated HARQ process is considered as not pending when:  ~~- a transmission is performed on that HARQ process and LBT failure indication is not received from lower layers; or~~  - the configured uplink grant is initialised and this HARQ process is not associated with another active configured uplink grant; or  - the HARQ buffer for this HARQ process is flushed. |
| Huawei | No | Agree with LG and Oppo. Adding “and LBT failure indication is received from lower layer” is fine but not the change on the second bullet below. |
| vivo | No | If we adopt the proposed change, autonomous retransmission due to LBT failure for the pending HARQ process (e.g. a MAC PDU has been obtained) will be performed after type-2 CG re-activation. This leads to an open issue (i.e. whether the UE should rebuild the MAC PDU in this case) considering that type-2 CG re-activation may change the TBS corresponding to the CG configuration. We don’t think we have time to discuss this open issue.  Since there is nothing wrong with the current spec, we would like to keep the current spec text. |

**Proposal 3:**

## 2.3 Bundling (R2-2006658)

[R2-2006658](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2006658.zip) Clarification on operations in a bundle of UL grants Samsung CR Rel-16 38.321 16.1.0 0768 - F NR\_newRAT-Core, NR\_unlic-Core

- Ericsson thinks it is clear enough, but what we can add is initial transmission within a bundle. Lenovo has the same understanding and a small clarification would be enough.

=> can add a small clarification if needed and after seeing the rel-15 CR.

The following is proposed in R2-2006658 to clarify a bundle of retransmission case:

|  |
| --- |
| If *REPETITION\_NUMBER* > 1, and the initial transmission is performed within a bundle, *REPETITION\_NUMBER* – 1 HARQ retransmissions follow within the bundle after the initial transmission. If *REPETITION\_NUMBER* > 1, and the entire bundle is used for HARQ retransmissions (e.g. a bundle of dynamic UL grants for retransmission or a bundle of the configured uplink grants on shared spectrum for retransmissions (i.e. upon expiry of *cg-RetransmissionTimer*)), *REPETITION\_NUMBER* HARQ retransmissions are performed within the bundle. For both dynamic grant and configured uplink grant, bundling operation relies on the HARQ entity for invoking the same HARQ process for each transmission that is part of the same bundle. Within a bundle, HARQ retransmissions are triggered without waiting for feedback from previous transmission according to *REPETITION\_NUMBER* for a dynamic grant or configured uplink grant. Each transmission within a bundle is a separate uplink grant. When the first uplink grant within a bundle is delivered to the HARQ entity, all the subsequent uplink grants within the bundle for HARQ retransmissions are delivered to the HARQ entity. |

Similar clarification also proposed for Rel-15 in R2-2006657 and handled in email discussion [002]. We can follow the conclusion from Rel-15 discussion. Companies are welcome to provide comments if any specific to Rel-16.

Q4: Is there anything specific for Rel-16 to consider?

|  |  |  |
| --- | --- | --- |
| Company | Agree/Disagree | Detailed Comments |
| LG |  | It is okay to clarify as Samsung’s proposal, but we can wait for Rel-15 discussion. |
| OPPO | Agree | Good to align with the R15 discussion |
| ZTE |  | We can wait for Rel-15 discussion |
| QC |  | The current text is not incorrect but fine with the added clarification. Agree that this should be aligned with the outcome of other email discussion. |
| Nokia |  | Align with Rel-15. |
| ASUSTeK | Agree | It seems better not to describe too much after “e.g.” of the text proposal. |
| Intel |  | Agree with other companies to wait for Rel-15 discussion outcomes |
| Lenovo |  | Should be aligned with Rel-15. |
| Samsung | Agree | This can be discussed after next Monday when Rel-15 is decided, but from Rel-15 discussion, it seems majority is fine with the proposed TP. For Rel-16, perhaps we could remove "e.g." parts for the future maintenance. |
| Interdigital |  | Agree to align it with Rel-15 |
| MediaTek |  | Wait for Rel-15 discussion. |
| Ericsson | Disagree | There is a need to clarify this because in other places in 38.321 and in 38.214 “initial transmission” means the very fist transmission of a TB as indicated by the NDI, but we propose a much smaller changes:  The number of transmissions of a TB within a bundle of the dynamic grant or configured grant is given by *REPETITION\_NUMBER* as follows:  -    For a dynamic grant, *REPETITION\_NUMBER* is set to a value provided by lower layers, as specified in clause 6.1.2.1 of TS 38.214 [7];  -    For a configured grant, *REPETITION\_NUMBER* is set to a value provided by lower layers, as specified in clause 6.1.2.3 of TS 38.214 [7].  If *REPETITION\_NUMBER* > 1, after the ~~initial~~ first transmission in a bundle, *REPETITION\_NUMBER* – 1 HARQ retransmissions follow within a bundle. For both dynamic grant and configured uplink grant, bundling operation relies on the HARQ entity for invoking the same HARQ process for each transmission that is part of the same bundle. Within a bundle, HARQ retransmissions are triggered without waiting for feedback from previous transmission according to *REPETITION\_NUMBER* for a dynamic grant or configured uplink grant. Each transmission within a bundle is a separate uplink grant after the ~~initial~~ first uplink grant ~~with~~in a bundle is delivered to the HARQ entity.  For each transmission within a bundle of the dynamic grant, the sequence of redundancy versions is determined according to clause 6.1.2.1 of TS 38.214 [7]. For each transmission within a bundle of the configured uplink grant, the sequence of redundancy versions is determined according to clause 6.1.2.3 of TS 38.214 [7]. |
| Huawei | Agree |  |
| vivo | Agree | We are fine with the proposed text. |

**Proposal 4:**

## 2.4 SR cancellation (R2-2007188)

[R2-2007188](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007188.zip) Correction to LBT SR cancellation Nokia, Nokia Shanghai Bell CR Rel-16 38.321 16.1.0 0808 - F NR\_unlic-Core

- Samsung has a minor comment for the SPcell case. Ericsson, Nokia, ZTE agree

=> Make the fixes but ensure that all cases are properly captured after the deletion of the first line

It is proposed to remove the redundant condition for SR cancellation:

|  |
| --- |
| The MAC entity shall for each pending SR triggered by consistent LBT failure for a Serving Cell:  1> if all the triggered consistent LBT failures of that Serving Cell are cancelled (see clause 5.21):  2> cancel the pending SR and stop the corresponding *sr-ProhibitTimer*. |

Interdigital pointed out condition used in LBT section for LBT failure cancellation is a bit different since it has the condition of LBT failure indication is not received from lower layer, while SR is cancelled regardless of the LBT failure indication.

|  |
| --- |
| 5.21.2 LBT failure detection and recovery procedure 1> if a MAC PDU is transmitted and LBT failure indication is not received from lower layers and this PDU includes the LBT failure MAC CE:  2> cancel the triggered consistent LBT failure in SCell(s) for which consistent LBT failure was indicated in the transmitted LBT failure MAC CE. |

However, in case the LBT failure indication is received from lower layers the LBT failure remains pending. Even though the SR was cancelled, the pending LBT failure would immediately trigger it again in case the UE had no UL resources.

So the question would be do we allow earlier cancellation of SR also with LBT failures (keep the first condition) or SR is cancelled only when the triggered LBT failure is cancelled (remove the first condition).

Q5: do companies agree with the first change in R2-2007188 or any other suggestions?

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Disagree | For BFR, BFR cancellation condition is specified in BFR section while consequent SR cancellation is specified in SR section.  We would like to keep the consistency between BFR/LBT. Thus, one option is to remove all relavant SR cancellation conditions for BFR/LBT in SR section (Option 1) as they are already in BFR/LBT section. Another option is to add all relevant SR cancellation conditions for LBT in SR section (Option 2) similar to BFR structure.  Required change for Option 2 is given below:  The MAC entity shall for each pending SR triggered by consistent LBT failure:  1> if a MAC PDU is transmitted and LBT failure indication is not received from lower layers for this PDU, and the MAC PDU includes an LBT failure MAC CE that indicates consistent LBT failure for the Serving Cell that triggered this SR; or   1. if the Random Access procedure triggered by LBT failure is considered successfully completed in the SpCell; or   1> if *lbt-FailureRecoveryConfig* is reconfigured by upper layers for a Serving Cell;  :  2> cancel the pending SR and stop the corresponding *sr-ProhibitTimer*. |
| OPPO | Disagee | We don't agree the change, since SR cancellation and triggered consistent LBT failure cancellation are independent.  Please be noted that [024] has a discussion on aligning the SR cancellation, it’s better to keep alignment. |
| ZTE | Disagree |  |
| QC | Disagree | Don’t see the problem with triggering a new SR. The UE will need to send a new SR in both cases (assuming no UL resources). |
| Nokia | Agree | For BFR the situation is different as the *sr-ProhibitTimer* is not stopped upon SCell deactivation, for LBT SR case we stop it.  So this is just to simplify the specification without duplicating the same condition everywhere.  BTW, at the very minimum, we should be consistent with the normative text and fix all the places to “all triggered consistent LBT failure(s)” in the second condition. |
| Intel | Disagree |  |
| Lenovo | Disagree |  |
| Samsung | Agree | We are okay with proposed change. |
| Interdigital | Disagree |  |
| MediaTek | No strong opinion | Regardless of which option is selected, the end UE behaviour is that the SR transmission will stop only when LBT is successful for the MAC PDU with LBT failure MAC CE. |
| Ericsson | Disagree | We want to keep SR cancellation consistent between BSR/BFR and LBT. Please look at R2-2007713 handled in the [024] email discussion for a text proposal. Regarding LGs comment on SR cancelling, we think there is no SR cancelling in BFR nor LBT section. |
| Huawei | Agree |  |
| vivo | Agree with changes | The first condition in the current spec is not correct (i.e. LBT failure indication is not received from lower layers for this PDU is missing ). We are okay to remove the first condition. Besides, considering that all pending SRs triggered by a serving cell due to consistent LBT failure are associated with the same *sr-ProhibitTimer* , we propose the following:  The MAC entity shall for each pending SR triggered by consistent LBT failure for a Serving Cell:  1> if all the triggered consistent LBT failures of that Serving Cell are canceled (see clause 5.21):  2> cancel the pending SR and stop the corresponding *sr-ProhibitTimer*, if running. |

**Proposal 5:**

There is also some minor alignment proposed in R2-2007188:

|  |
| --- |
| * + 1. if a MAC PDU is transmitted and LBT failure indication is not received from lower layers and this PDU includes the LBT failure MAC CE:     2. cancel all the triggered consistent LBT failures in SCell(s) for which consistent LBT failure was indicated in the transmitted LBT failure MAC CE.     3. if consistent LBT failure is triggered and not cancelled in the SpCell; and     4. if the Random Access procedure is considered successfully completed (see clause 5.1) in the SpCell:     5. cancel all the triggered consistent LBT failure(s) in the SpCell.     6. if *lbt-FailureRecoveryConfig* is reconfigured by upper layers for a Serving Cell:   2> cancel all the triggered consistent LBT failure(s) in this Serving Cell. |

Q6: do companies agree with the second change in R2-2007188?

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
| QC | Agree |  |
| Nokia | Agree |  |
| ASUSTeK | Agree |  |
| Intel | Agree |  |
| Lenovo | Agree |  |
| Samsung | Agree |  |
| Interdigital | Agree |  |
| MediaTek | Partly agree | The first change is not needed because in an Scell there can only be a single consistent LBT failure as there is no autonomous BWP switching. The other changes are fine. |
| Ericsson | Partly agree | We agree with Mediatek, but are fine either way. |
| Huawei | Agree |  |
| vivo | Agree |  |

**Proposal 6:**

## 2.5 Configured grant timer (R2-2007880)

[R2-2007880](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007880.zip) Review of CG timers LG Electronics UK discussion Rel-16 NR\_unlic-Core

The following proposals are proposed in R2-2007880:

|  |
| --- |
| **Proposal 1: Adopt one of the TPs above to remove ambiguity in operation of *configuredGrantTimer* when it is configured.**  **Proposal 2: RAN2 discuss whether and how to allow immediate retransmission on a CG after a transmission on a CG.**  **Proposal 3: RAN2 discuss whether and how to allow continuous new transmission on every CG.** |

For proposal 1, clarification on the timer was covered by the agreed change from ASUSTek R2-2007730 where it was clarified the timer is absolute time. The rapporteur understood no further clarification is needed here.

Proposal 2 proposed to add value 0 to *cg-RetransmissionTimer* to allow immediate retransmission on a CG.

**Q7: do companies agree to add value 0 to *cg-RetransmissionTimer* to allow immediate retransmission on a CG?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree | We would like to first confirm how to interpret the value 1 for *configuredGrantTimer* or *cg-RetransmissionTimer*.  Our assumption is that if *configuredGrantTimer* is set to value 1, the UE shall skip one CG, which occurs at the next periodicity. Applying the same rule to *cg-RetransmissionTimer*, it seems that the immediate retransmission is not allowed with the current minimum value 1 for *cg-RetransmissionTimer.* |
| OPPO | Disagree | It’s not clear why value 0 is needed, without this value 0, CG resource would not be wasted since UE can be configerd with multiple HRAQ process, and the timer is maintained per HARQ process. |
| ZTE | Disagree | When *cg-RetransmissionTimer* is configured to 1, UE may perform a immediate retransmission on CG because TB has been generated. |
| QC | Disagree | Agree with ZTE. Similar also applie to CG timer. |
| Nokia | - | It would be good to allow immediate retransmission. Either with value 0 or some clarification that value 1 means next CG will be used for auto retx. Similar discussion also in Rel-17 for URLLC on NR-U. |
| ASUSTeK | Agree with the intention | Share the same view with LG and Nokia. |
| Intel | Disagree | Agree with ZTE. Maybe we just need to clarify that CGRT can be equal to CGT. |
| Lenovo |  | At least we should support retransmission on immediate next CG resource. Hence we need to clarify in the spec the meaning of value’1’ |
| Samsung | Disagree | We have same understanding as ZTE and QC: to set the value to 1 results every new transmission at every occasions, as the CGT (re)starts at the beginning of the transmission. |
| Interdigital | Agree | It should be clarified that immediate retransmission on the next CG occasion is possible when the CG retransmission timer is zero. This would simplify things for R17 CG harmonization as well. |
| MediaTek | Disagree | According to the MAC spec, the timer starts when MAC instructs PHY to perform the transmission. With the configuredGrantTimer value of 1, the timer will expire just before the next CG occasion. Therefore the next CG occasion will be usable for new transmission. Same principle applies to cg-RetransmissionTimer. In order to enable autonomous retransmission for every CG occasion, cg-RetransmissionTimer=1 and configuredGrantTimer=2 values can be used. |
| Ericsson | Disagree | We agree with LG and others that how to interpret the CGT and CGRT is needed.  First the CGRT issue:  To minimize delay of retransmission, when only one CG in the BWP is activated, we must allow a configuration where the first retransmission takes place after one HARQ RTT and after one periodicity.  To solve this, we need to define the interpretation of CGRT:   1. CGRT is started in the first symbol of the CG UL transmission (and thus ends in the last symbol before the next CG of the same CG config when initial CGRT=1).   With this definition, retransmissions are possible in the first CG opportunity of the same CG config when initial CGRT = 1. When multiple CG configs are active, premature retransmissions on a different CG config are prohibited because CGRT is running.   1. CGRT is started in the first symbol after the CG UL transmission (and thus ends after the last symbol in the next CG of the same CG config when initial CGRT=1).   With this definition we will need to allow initial CGRT = 0 to not have excess delay when periodicity is >= HARQ RTT. Drawback is that with multiple active CG configs we may get premature retransmissions using initial CGRT=0 or we get excess delays if using initial CGRT=1.  Thus we think the definition in 1 is the only reasonable interpretation.  Then for the CGT issue:  The CGT must be able to block using the same HARQ process for new transmissions during a time period.  To solve this, we need to define the interpretation of CGT:   1. CGT is started in the first symbol of the CG UL transmission (and thus ends in the last symbol before the next CG of the same CG config when initial CGT=1).   This works when the periodicity >= HARQ RTT, and when periodicity < HARQ RTT (then CGT may need to >1). If CGT=1 every CG opportunity will be a new transmission.   1. CGT is started in the first symbol after the CG UL transmission (and thus ends in the last symbol of the next CG of the same CG config when initial CGT=1).   This does not work for NR-U when the periodicity >= HARQ RTT as we can not have new transmissions in every CG (if wanted).  Thus, we think definition 3 is the only reasonable interpretation.  With 1 and 3 we can support Figure 5 by setting CGRT=1 and CGT=2. There is no need to change the values of the timers.  We think we shall allow CGRT to be optional to support Figure 6 configuration. |
| LG |  | It seems not desirable to give different meaning of value 0 to CGT and CGRT because their operation is quite similar. It would be complex if we use value 1 for nullifying CGRT while using value 0 for nullifying CGT. Thus,   * Option 1 would be to use value 1 for nullifying CGT and CGRT, as explained by Ericsson; or * Option 2 would be to use value 0 for nullifying CGT and CGRT by adding value 0 to CGRT.   As value 0 has already been used to nullifying other timers such as drx-InactivityTimer, we prefer option 2 but open to discuss.  Question to ZTE, QC, Intel, SS, MediaTek:   * Do you assume UE performs immediate new transmission on CG if CGT is configured to 1? If answer is NO, then, do you assume different interpretation of timer value for CGRT and CGT? (value 1 for CGT is to skip the next CG whereas value 1 for CGRT is to use the next CG)   Question to Ericsson:   * Do you assume that the UE behaviour with CGT=0 and not configured CGT are the same, which means the network can either configure a CGT=0 or not configure in order to nullify the CGT? |
| Huawei | Disagree |  |
| vivo | Disagree | Considering that *cg-RetransmissionTimer* is mandatory for NR-U CG, we think setting the value of 1 for *cg-RetransmissionTimer* means that immediate retransmission can be performed in the next available CG-PUSCH occasion.  Perhaps we can clarify this understanding in the chair notes. |
| Ericsson |  | To interpret CGT=0 as if new transmissions is allowed after one periodicity seems unnatural as this must also be used for a dynamic grant that can come at any point in time.  The interpretation (as in Ericsson’s first reply on this question) of CGT or CGRT equal to 1 means the timer runs for one periodicity (until the end of the last symbol before the next CG opportunity).  In the case that periodicity is equal to HARQ RTT, using CGT = 1 means any HARQ process (associated with a CG config) used in a dynamic grant will not be overridden by a CG before the gNB have had one chance to schedule a dynamic retransmission, thus our interpretation is not that CGT = 1 nullifies the timer, it means the UE waits one periodicity before allowing the use of that HP for CG transmissions. With our interpretation, using a value of 0 for CGT is equivalent to not configuring the timer.  Answer to LGs question for us above: Today the value range for CGT is 1..64 periodicities, but if we extend and allow CGT to be 0, then yes. |

**Proposal 7:**

Proposal 3 proposed to discuss whether and how to allow continuous new transmission on every CG. Two options are proposed in R2-2007880. Option 1 seems to be already supported in the specification

|  |
| --- |
| Option 1: to allow optionality in configuration of *configuredGrantTimer* in NR-U, i.e., together with *cg-RetransmissionTimer*. For example, for ‘continuous new transmission' mode, *configuredGrantTimer* is absent while *cg-RetransmissionTimer* is set to 0.  Option 2: add a value 0 to *configuredGrantTimer* |

However, according to current RRC and MAC specification, *configuredGrantTimer* is already optionally configured. It is also the case for Rel-15. If the timer is not configured, then the next CG can be immediately used for new transmission since the timer would not be started in MAC.

|  |
| --- |
| 38.331:  configuredGrantTimer INTEGER (1..64) OPTIONAL, -- Need R  38.321:  3> start or restart the *configuredGrantTimer* for the correponding HARQ process, if configured. |

**Q8: do companies think any change is needed to support immediate new transmission on CG?**

|  |  |  |
| --- | --- | --- |
| Company | Yes/ No | Detailed Comments |
| LG | Yes | True, *configuredGrantTimer* itself is optional. But, in NR-U, we have a restriction that *cg-RetransmissionTimer* should be less than *configuredGrantTimer.* We think this restriction forces to configure *configuredGrantTimer* in NR-U because *cg-RetransmissionTimer* is always configured in NR-U.  We may need to remove above restriction in NR-U, then *configuredGrantTimer* can be optional in NR-U. |
| OPPO | No | Current spec is already clear enough. |
| ZTE | No | Immediate new transmission may use other HARQ processes |
| QC | No | This can be achieved by setting both timers to 1. We can clarify in the field description of cg-RetransmissionTimer that it could be equal to CG timer.Q |
| Nokia | Yes | Could make cg-Retransmission timer optional as well and it is only present if *configuredGrantTimer* is configured. |
| Intel | No | Agree with ZTE. |
| Lenovo | Yes/No | In principle we agree with ZTE that new transmission could use a different HARQ process. However in order to be more flexible it would be good to either make cg-RetransmissionTimer optional or to allow to set CG-retransmissionTimer to the same value as configuredGrantTimer. |
| Samsung | No | Agree with QC. |
| Interdigital | Yes | Agree with Nokia |
| MediaTek | No | See above response for Q7 |
| Ericsson | Yes | With the interpretation of CGRT and CGT as we propose in Q7, we shall also support not configuring CGRT for flexibility. That is, to let CGRT be optional for NR-U (and CGT is mandatory when CGRT is present). |
| Huawei | Yes/No | We think making cg-RetransmissionTimer optional will bring more changes and we prefer to allow to set CG-retransmissionTimer to the same value as configuredGrantTimer. |
| vivo | No | Considering that there are multiple consecutive CG-PUSCH occasions within a slot in NR-U and the HARQ process is selected by UE implementation, immediate new transmission on CG is already supported by selecting different HARQ processes for the consecutive CG-PUSCH transmission.  We don’t see the need to introduce any new optimizations. |

**Proposal 8:**

## 2.6 Issues from other not treated contributions

[R2-2007548](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007548.zip) Clarification on the transmission of LBT failure MAC CE on SCells Google Inc. CR Rel-16 38.321 16.1.0 0830 - F NR\_unlic-Core

It is clarified that if consistent LBT failure has not been triggered for the active BWP of a serving cell, MAC entity can use UL-SCH resources to transmit LBT failure MAC CE in the active BWP.

|  |
| --- |
| 1> else if consistent LBT failure has been triggered, and not cancelled, in at least one SCell:  2> if UL-SCH resources are available for a new transmission in a Serving Cell for which consistent LBT failure has not been triggered for the active UL BWP and these UL-SCH resources can accommodate the LBT failure MAC CE plus its subheader as a result of logical channel prioritization:  3> instruct the Multiplexing and Assembly procedure to generate the LBT failure MAC CE.  2> else:  3> trigger a Scheduling Request for LBT failure MAC CE. |

**Rapporteur observation:** BWP switching would cancel the triggered LBT failure, thus when a serving cell has consistent LBT failure triggered is basically equivalent to the current active UL BWP has consistent LBT failure triggered. Thus, no change seems to be needed here.

**Q9: do companies agree with the rapporteur’s observation?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree with raporteur | LBT failure is detected only when MAC PDU is to be transmitted, and MAC PDU can be transmitted only on the active UL BWP. Thus, it seems straightforward that LBT failure is only triggered for an active UL BWP and further clarification is not necessary. |
| OPPO | Disagree | With this change, serving cell which has already triggered LBT failure can still be used for transmission LBT failure MAC CE, this is not aligned with what we have agreed. |
| ZTE | Agree with rapporteur |  |
| QC | Agree with rapporteur | The triggered LBT failure of course only applies to the current active BWP. |
| Nokia | Agree with rapporteur | No change needed. |
| Intel | Agree with rapporteur |  |
| Lenovo | Agree with rapporteur |  |
| Samsung | Agree with rapporteur |  |
| Interdigital | Agree with rapporteur |  |
| MediaTek | Disagree | Same view as rapporteur |
| Ericsson | Agree with rapporteur | No change needed. |
| Huawei | Agree with rapporteur | No change needed. |
| vivo | Agree with rapporteur |  |

**Proposal 9:**

[R2-2007883](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007883.zip) NR-U revision LG Electronics UK CR Rel-16 38.321 16.1.0 0846 - F NR\_unlic-Core

The second change on pending process was covered in 2.2.

The first change on *configuredGrantTimer* and *cg-RetransmissionTimer*:

|  |
| --- |
| 1> if the PUSCH duration of the configured uplink grant does not overlap with the PUSCH duration of an uplink grant received on the PDCCH or in a Random Access Response for this Serving Cell or with the PUSCH duration of a MSGA payload:  2> set the HARQ Process ID to the HARQ Process ID associated with this PUSCH duration;  2> if, for the corresponding HARQ process, the *configuredGrantTimer* is not configured or not running; and  2> if, for the corresponding HARQ process, *cg-RetransmissionTimer* is not configured (i.e. new transmission):  3> consider the NDI bit for the corresponding HARQ process to have been toggled;  3> deliver the configured uplink grant and the associated HARQ information to the HARQ entity. |

In the MAC specification, whenever the *configuredGrantTimer* is strarted/restarted, it is checked if it is configured. Thus it would not be running if not configured, the additional condition of “not configured” does not seem to be needed. Besides, “the *configuredGrantTimer* is not running” is used also in many other places which we do not refer to “if configured”. There is indeed one place for starting the timer missing “if configured” though which might worth adding:

|  |
| --- |
| 4> if the uplink grant is a configured uplink grant:  5> if the identified HARQ process is pending:  6> 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;  5> start or restart the *cg-RetransmissionTimer*, if configured, for the corresponding HARQ process when the transmission is performed if LBT failure indication is not received from lower layers. |

**Q10: do companies agree with the change from the rapporteur?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Disagree | We basically agree that if a timer is not configured, it is considered as not running.  However, for *cg-RetransmissionTimer*, we differentiated <not configured> and <configured but not running> intentionally. Thus, it becomes a bit confusing whether <not running> *configuredGrantTimer* only covers <configured but not running> or covers <not configured> as well.  Thus, the change from the rapporteur seems not resolve the confusion. |
| OPPO | Agree |  |
| ZTE | Agree |  |
| QC | Agree with the rapporteur | The same principle applies to all the timers in MAC and RRC |
| Nokia | Agree with the rapporteur | Otherwise if according to the proposal from R2-2007883, “if configured” would need to be added to many other occasions when talking about if running. |
| Intel | Agree with the rapporteur |  |
| Lenovo | Agree |  |
| Samsung | Agree with the rapporteur |  |
| Interdigital | Agree with the rapporteur | A timer cannot be running if it is not configured anyway |
| MediaTek | Agree |  |
| Ericsson | Agree with rapporteur |  |
| Huawei | Agree with rapporteur |  |
| vivo | Agree with the rapporteur |  |

**Proposal 10:**

The 3rd change propose to change the parameter name for LBT failure recovery:

|  |
| --- |
| 2> if *lbt-FailureRecoveryConfig* is configured: |

**Q11: do companies agree with the above change?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
| QC | Agree |  |
| Nokia | Agree |  |
| ASUSTeK | Agree |  |
| Intel | Agree |  |
| Lenovo | Agree |  |
| Samsung | Agree |  |
| Interdigital | Agree |  |
| MediaTek | Agree |  |
| Ericsson | Agree |  |
| Huawei | Agree |  |
| vivo | Agree |  |

**Proposal 11:**

The 4th change propose to add change “consistent LBT failure” to “consistent LBT failure recovery procedure” for all the instance in LBT section:

|  |
| --- |
| 2> if *LBT\_COUNTER* >= *lbt-FailureInstanceMaxCount*:  3> trigger consistent LBT failure recovery procedure for the active UL BWP in this Serving Cell;  3> if this Serving Cell is the SpCell:  4> if consistent LBT failure recovery procedure has been triggered in all UL BWPs configured with PRACH occasions on same carrier in this Serving Cell:  5> indicate consistent LBT failure to upper layers.  … |

Note that the same wording of “consistent LBT failure” has been used in other sections as well, with the proposed addition it would not be consistent.

**Q11: do companies agree with the 4th change from R2-2007883?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | No strong view |  |
| ZTE | No strong view |  |
| QC | Agree | It is clearer |
| Nokia | Disagree | Similar is used for BFR where we only say “trigger BFR”. If which this change, we would need to also change it for SR/BWP sections as well to align. |
| ASUSTeK | Agree | We also agree with Nokia that other sections need to be changed as well if this change is agreed. |
| Intel | No strong view |  |
| Lenovo | Agree |  |
| Samsung | Agree |  |
| Interdigital | Disagree | It’s the fiailure that is triggered (like RLF) and cancelled, not the recovery. |
| MediaTek | Disagree | We think the existing text is clear. |
| Ericsson | Disagree | The changes are not needed as the whole section contains the procedure and not just the individual lines, also makes it harder to read. |
| Huawei | Disagree | Same view as Interdigital, that “consistent LBT failure” is regarded as the condition as in “Consistent LBT failure is detected per UL BWP by counting LBT failure indications, …” |
| vivo | Agree | It makes the MAC spec more precise. |

**Proposal 11:**

[R2-2007892](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_111-e/Docs/R2-2007892.zip) The operation of drx-RetransmissionTimerUL ASUSTeK CR Rel-16 38.321 16.1.0 0847 - F NR\_unlic-Core

It was proposed to add HARQ feedback to DRX section to stop the DRX retx timer, similar to LTE:

|  |
| --- |
| 2> if the PDCCH indicates a new transmission (DL or UL) on a Serving Cell in this DRX group:  3> start or restart *drx-InactivityTimer* for this DRX group in the first symbol after the end of the PDCCH reception.  2> if a HARQ process receives downlink feedback information and acknowledgement is indicated:  3> stop the *drx-RetransmissionTimerUL* for the corresponding HARQ process. |

**Q12: do companies agree with the proposed change from R2-2007892?**

|  |  |  |
| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree | It is reasonable behaviour, which we already have in LTE. |
| OPPO | Agree |  |
| ZTE | No strong view |  |
| QC | Agree | Yes, this is needed. |
| Nokia | Agree |  |
| ASUSTeK | Agree |  |
| Intel | Agree |  |
| Lenovo | Agree |  |
| Samsung | - | tend to agree, but it is an optimization. Can follow the majority view. |
| Interdigital | Agree |  |
| MediaTek | Agree |  |
| Lenovo | Agree |  |
| Ericsson | Agree |  |
| Huawei | Agree | This is needed |
| vivo | No strong view |  |

**Proposal 12:**

# 3 Conclusion

# 4 References

[1] Session notes\_NR-U\_PowSav\_2sRA and Rel-17 Small data\_IIoT (Diana)\_Aug 17-15\_30

# Contact information

|  |  |
| --- | --- |
| Company | Delegate contact |
| COMPANY\_NAME | NAME ([email@address.com](mailto:email@address.com)) |
| LG | SunYoung LEE (ssunyoung.lee@lge.com) |
| OPPO | Shi Cong (shicong@oppo.com) |
| ZTE | Eswar Vutukuri (eswar.vutukuri@zte.com.cn) |
| Qualcomm | Ozcan Ozturk (oozturk@qti.qualcomm.com) |
| Nokia | Chunli Wu (Chunli.wu@nokia-sbell.com) |
| ASUSTeK | Xinra Kung (Xinra\_Kung@asus.com) |
| Intel | Seau Sian (seau.s.lim@intel.com) |
| Samsung | Jaehyuk Jang (jack.jang@samsung.com) |
| Interdigital | Faris Alfarhan (faris.alfarhan@interdigital.com) |
| MediaTek | Mehmet Kunt (mehmet.kunt@mediatek.com) |
| Ericsson | robert.s.karlsson AT ericsson.com |
| vivo | Stephen Mo (yitao.mo@vivo.com) |