**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:

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| --- |
| 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.

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| 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?

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| --- | --- | --- |
| 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. |

**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:

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| --- |
| 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:

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| --- |
| 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?

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| --- | --- | --- |
| 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. |

**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 |

**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:

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| --- |
| 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?

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| --- | --- | --- |
| 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. |

**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:

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| --- |
| 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.

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| --- |
| 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?

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| --- | --- | --- |
| 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). |

**Proposal 5:**

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

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| --- |
| 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.  1> if consistent LBT failure is triggered and not cancelled in the SpCell; and  1> if the Random Access procedure is considered successfully completed (see clause 5.1) in the SpCell:  2> cancel all the triggered consistent LBT failure(s) in the SpCell.  1> 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?

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| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
| QC | 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:

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| **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?**

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| --- | --- | --- |
| 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. |

**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

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| 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.

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| 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?**

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| --- | --- | --- |
| 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 |

**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?**

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| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Disagree | 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. |

**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*:

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| 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:

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| --- |
| 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 |

**Proposal 10:**

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

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

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

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| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | Agree |  |
| ZTE | Agree |  |
| QC | 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:

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| 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?**

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| --- | --- | --- |
| Company | Agree/ Disagree | Detailed Comments |
| LG | Agree |  |
| OPPO | No strong view |  |
| ZTE | No strong view |  |
| QC | Agree | It is clearer |

**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:

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| 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?**

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| --- | --- | --- |
| 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. |

**Proposal 12:**

# 3 Conclusion

# 4 References

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

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