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

Elbonia, 25 January – 05 February 2021

**Agenda item: 6.5.2**

**Source: Nokia, Nokia Shanghai Bell**

**Title: [DRAFT] Summary of Email Discussion [AT113-e][025][IIOT] RRC (Nokia)**

**WID/SID: NR\_IIOT-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This email discussion aims to collect company views on Rel-16 RRC corrections that have been proposed for NR IIoT in RAN2#113e. The scope of this email discussion is:

* [AT113-e][025][IIOT] RRC (Nokia)

 Scope: Treat [R2-2100712](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2100712.zip), [R2-2101340](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2101340.zip), [R2-2101941](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2101941.zip)

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

 Intended outcome: Agreed CRs if any is agreeable.

 Deadline: Schedule A

The papers to be considered in this email discussion are listed below:

|  |
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| [R2-2100712](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2100712.zip) Configuration of AutonomousTX and cg-retransmission timer Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.3.1 2349 - F NR\_IIOT-Core[R2-2101340](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2101340.zip) Correction on the configuration of Type 1 configured grant Huawei, HiSilicon CR Rel-16 38.331 16.3.1 2404 - F NR\_IIOT-Core[R2-2101941](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2101941.zip) LCP restriction for allowedCG-List and configuredGrantType1Allowed ASUSTeK CR Rel-16 38.331 16.3.1 2435 1 F NR\_IIOT-Core [R2-2101743](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_113-e%5CDocs%5CR2-2101743.zip) |

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# 2 Discussion

## 2.1 Joint Configuration of Autonomous Transmission and CG Retransmission Timer

R2-2100712 considers the following agreement made in RAN2 #112e during discussion of Rel-17 NR IIoT/URLLC:

|  |
| --- |
| **RAN2 #112e Agreement:*** The assumption for Rel-16 is that the network will not configure *autonomousTx and cg-RetransmissionTimer* simultaneously per cell.No optimizations will be pursued to allow the two features be configured together in Rel-16. No CR is needed for this for now.
 |

It was observed that, if these two features are configured together in Rel-16, it would lead to some undefined UE behaviour. Therefore, most companies do not think these will be jointly configured. In particular, when *autonomousTx* is configured, it was agreed that the configured grant timer should be stopped upon de-prioritization of a PUSCH; nevertheless, it creates some ambiguity for *cg-RetransmissionTimer*. As there is no intention for further optimization in Rel-16, it might be better to disallow the joint configuration in specification to avoid potential misconfiguration. On the other hand, in Rel-16 IIoT features including *autonomousTx* are typically used in licensed band, while the applicability of *cg-RetransmissionTimer* is restricted to unlicensed spectrum. Thus, it was proposed to have the following modification in the field description of *autonomousTx*:

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| --- |
| ***autonomousTx***If this field is present, the Configured Grant configuration is configured with autonomous transmission, see TS 38.321 [3]. This field is not configured when *cg-RetransmissionTimer* is configured in any Configured Grant configuration in the same serving cell. |

**Question 1: Do you agree modifying the field description of *autonomousTx* to ensure it is NOT jointly configured with *cg-RetransmissionTimer* in Rel-16 ?**

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| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Nokia | Yes | Although the agreement says that CR is not needed for now, on the safe side we think it is better to clarify at this stage to avoid further confusion. It does not harm at all to have such clarification, while providing a clearer guideline for the product implementation – the developers do not have to read through meeting notes to find the agreed assumptions. |
| Ericsson | No | The Rel-17 discussion did not conclude that any feature is broken when two are configured together. It points to the direction that, if some optimizations are needed after the Rel-17 discussion, then RAN2 does not need to go back and change the Rel-16 spec. For the particular example mentioned above, the UE behaviour is clear on when the cg-RetransmissionTimer is (re)-started or stopped, although it might not be optimal. On another general comment, Ericsson does not prefer adding unnecessary network configuration restrictions. It is up-to network implementation to judge and consider if a particular configuration makes sense or not and in the case of undefined UE behaviour, the understanding is that it is up-to UE implementation and the corresponding network implementation can handle all cases. For the network that choose not to handle all those cases, they can simply choose not to configure them together.  |
| Qualcomm | No | Agree with Ericsson that the feature is not broken in Rel-16 and there is no need to place a restriction in Rel-16. Our understanding of the agreement that says “no CR for now”, is that it means “no CR for Rel-16”. |
| OPPO | Yes (but, with the slight difference in CR details) | In RAN2#112e, it is already agreed this restriction exists, thus we support to capture this restriction in RRC spec, considering, 1) It is a bit against to RAN2 principle if nothing is captured. As what we did in usual, similar configuration restrictions are already be reflected in RAN2 spec. 2) Similar as Nokia said, on the safe side, it is better capture the restriction to avoid misunderstanding to the developers and potential discussion on the same issue in the future. 3) it is not against to current agreement, since it is just said the CR is not needed for now. Then, it can be reconsidered.We also provide the similar view in our papers ([R2-2100887](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100887.zip), [R2-210088)](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_113-e/Docs/R2-2100887.zip), although the details in our CR(i.e. the first change) is a bit different from Nokia’s version, considering CGRT is mandatory for unlicensed band in R16 and referring to the current way on capturing similar restriction for unlicensed band,Considering there is no essential difference between our version and Nokia’s version, we are also open to discuss which version is fine to everyone and can be captured finally. |
| ASUSTeK | Yes | The agreement is clear that network will not configure autonomousTx and cg-RetransmissionTimer simultaneously per cell for Rel-16. We are fine to merge this change somewhere. |
| ZTE | No | We have to respect the agreements achieved in Rel-17 room |
| Samsung | Yes | Since we have an explicit agreement, it would be better to clarify the spec. Rel-17 spec will be updated according to Rel-17 conclusion. No need to revisit Rel-16 spec. |
| Sharp | No | The agreement has already said CR is not needed. |
| Xiaomi | Yes | The agreement on “No CR is needed for this for now.” is actually to say that no specific UE behaviors need to be clarified in the specification according to our understanding. However it is better to exclude such simultaneous configuration in the RRC. |
| Huawei | No strong view | Can follow the majority |
| MediaTek | Yes | We agree with Nokia. It is important to capture restrictions so that the reader can understand the specifications without the need to trawl through meeting notes. |
| Futurewei | Yes with change | Change “This field is not configured when” to either “This field is not present when” or “Autonomous transmission is not configured when”. |
| Apple | Yes | The agreement on the R16 configuration restriction should be reflected in the spec to avoid the ambiguity.  |
| LG | No | We generally don’t specify whether different two features never be configured together or not unless a problematic case is shown. In this sense, I understand the last agreement says no CR is needed but network does it by itself. In the meanwhile, our baseline assumption behind the last agreement is that NR-U feature is not configured together with IIOT feature because it was not a scope in Rel-16. Thus, if we want to specify that *cg-RetransmissionTimer* and autonomousTx are not configure concurrently in the specification, it should be specified all the other parameters such as LCH-basedPrioritization that it is not configured together with *cg-RetransmissionTimer*. Otherwise, it becomes more complicated why we have it only for these two parameters. |
| Intel | Yes | We think it is better to capture the agreement for Rel-16. |

## 2.2 Configuration of Type-1 Configured Grant

R2-2101340 considers the following agreement made in RAN2 #109e:

* Two CGs of any type, one activated in UL and another activated in SUL, are not time-overlapping by the control of the network. This can be captured in the stage-2 spec.

Based on this agreement, configured grants can be configured in both SUL and NUL, as long as time-overlapping between these grants on SUL and NUL could be avoided via gNB scheduling. This is different to the current RRC specification, wherein it forbids simultaneous configuration of Type-1 configured grant on both SUL and NUL. Hence, the CR suggests that the field description of *rrc-ConfiguredUplinkGrant* should be modified as following by removing the sentence “*Type 1 configured grant may be configured for UL or SUL, but not for both simultaneously*”:

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| ***rrc-ConfiguredUplinkGrant***Configuration for “configured grant” transmission with fully RRC-configured UL grant (Type1). If this field is absent the UE uses UL grant configured by DCI addressed to CS-RNTI (Type2). ~~Type 1 configured grant may be configured for UL or SUL, but not for both simultaneously.~~ |

**Question 2: Do you agree modifying the field description of *rrc-ConfiguredUplinkGrant* to remove the restriction such that Type-1 CG cannot be configured in NUL and SUL simultaneously ?**

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| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Nokia | Yes | It resolves the gap between agreement and RRC specification. |
| Ericsson | Yes | This was agreed in RAN2#109e. The impact on this field was simply missed in the RRC running CR discussion.  |
| Qualcomm | Yes | Given the restriction on time overlap is already captured in 38.300/10.3, it is okay to make the RRC change proposed. |
| OPPO | Yes | It can make stage-2 and stage-3 specs aligned. |
| ASUSTeK | Yes |  |
| Samsung | Yes |  |
| Sharp | Yes |  |
| Xiaomi | Yes |  |
| Huawei | Yes |  |
| MediaTek | Yes |  |
| Futurewei | Yes |  |
| Apple | Yes |  |
| LG | Yes |  |
| Intel | Yes |  |

## 2.3 Allowed CG List

R2-2101941 considers the issue of potential ambiguity caused by configurations of *configuredGrantType1Allowed* and *allowedCG-List*. For instance, the CR has identified two cases:

* If the field ***configuredGrantType1Allowed*** is present but there is no CG indicated in the sequence of *allowedCG-List* since it’s not present, UE may be confused whether all CG Type 1 configurations can be used for UL MAC SDUs from this logical channel since nothing is actually indicated in the sequence.
* If the field ***configuredGrantType1Allowed*** is not present, it’s true that this sequence does not include any configured grant type 1 configuration. But UE may be confused whether this configuration means all CG Type 2 configurations can be used for UL MAC SDUs from this logical channel, since the absence of allowedCG-List means all configured grant configurations are allowed for this logical channel.

Therefore, the CR proposes the following change in the field description of *allowedCG-List* :

|  |
| --- |
| ***allowedCG-List***This restriction applies only when the UL grant is a configured grant. If present, UL MAC SDUs from this logical channel can only be mapped to the indicated configured grant configuration. If the size of the sequence is zero, then UL MAC SDUs from this logical channel cannot be mapped to any configured grant configurations. If the field is not present, ignore the field configuredGrantType1Allowed and UL MAC SDUs from this logical channel can be mapped to any configured grant configurations. If the field configuredGrantType1Allowed is present, only those configured grant type 1 configuration indicated in this sequence are allowed for use by this logical channel; otherwise, this sequence shall not include any configured grant type 1 configuration. Corresponds to "allowedCG-List" as specified in TS 38.321 [3]. |

**Question 3: Do you agree modifying the field description of *allowedCG-List*** **such that the LCH should ignore the field of *configuredGrantType1Allowed* when *allowedCG-List* is not present ?**

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| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Nokia | No | We do not see any problem with current text. The two cases that the CR proponent has mentioned are indeed the intended behaviour:* If the field *configuredGrantType1Allowed* is present but there is no CG indicated in the sequence of *allowedCG-List* since it’s not present, the LCH can be mapped to all CGs that are configured, including Type-1 CGs.
* If the field *configuredGrantType1Allowed* is not present, the LCH can be mapped to all Type-2 CGs that are configured.

We are not sure what are the issues that this CR tries to resolve. In any case we believe proper gNB implementation can avoid any confusion at the UE side.  |
| Ericsson | No on this particular change; but there is a need for further clarifications and possible changes.  | In my understanding, UE shall meet all the LCP conditions in the subclause 5.4.3.1.2 of the MAC spec:

|  |
| --- |
| The MAC entity shall, when a new transmission is performed:1> select the logical channels for each UL grant that satisfy all the following conditions:2> the set of allowed Subcarrier Spacing index values in *allowedSCS-List*, if configured, includes the Subcarrier Spacing index associated to the UL grant; and2> *maxPUSCH-Duration*, if configured, is larger than or equal to the PUSCH transmission duration associated to the UL grant; and2> *configuredGrantType1Allowed*, if configured, is set to *true* in case the UL grant is a Configured Grant Type 1; and2> *allowedServingCells*, if configured, includes the Cell information associated to the UL grant. Does not apply to logical channels associated with a DRB configured with PDCP duplication within the same MAC entity (i.e. CA duplication) when CA duplication is deactivated for this DRB in this MAC entity; and2> *allowedCG-List*, if configured, includes the configured grant index associated to the UL grant; and2> *allowedPHY-PriorityIndex*, if configured, includes the priority index (as specified in clause 9 of TS 38.213 [6]) associated to the dynamic UL grant. |

The field description in RRC is more a clarification on each sub-condition and in this case the one related with *allowedCG-List.*The proposed CR has changed the intention in the MAC spec. For example, if *allowedCG-List* is not configured (i.e., not present), the legacy *configuredGrantType1Allowed* shall still be applied as shown in the MAC. Technically it is possible to configure both CG type 1 and type 2 in one BWP. Suppose *allowedCG-List* is not configured. If *configuredGrantType1Allowed* is configured, then the MAC spec tells that the LCH can be mapped to any Configured Grant (including type 2). If *configuredGrantType1Allowed* is not configured, then the MAC spec tells that the LCH can only be mapped to Configured Grant type 2. I believe this is the correct intention and also Nokia’s understanding.What is worthwhile to discuss is the below additional clarification text. The highlighted word “only” may be misunderstood as that type 2 is not allowed: * If the field configuredGrantType1Allowed is present, ~~only~~ those configured grant type 1 configuration indicated in this sequence are allowed for use by this logical channel; otherwise, this sequence shall not include any configured grant type 1 configuration.

My recollection is that this was added in the running CR discussion but was not carefully revised in the later revisions. It is also okay for Ericsson to remove completely this clarification part, as it is a description on *configuredGrantType1Allowed*. |
| Qualcomm | No | Agree with Nokia that the current spec captures the intended UE behavior correctly. Also, it is not a good idea to require the UE to ignore fields provided in the RRC configuration. Regarding Ericsson’s comment on “only”, we think the “only” should be kept and there is no potential for confusion with type 2. |
| OPPO | No | We also agree with companies that the current spec has already captured the intended UE behavior correctly. Regarding Ericsson’s comment on “only”, we are fine with the change to improve the readability.  |
| ASUSTeK | Yes | The intended behaviors are listed as below. The below texts marked in green and gray were added in the last meeting and it should be only applicable for the case of when allowedCG-List is present. However, unfortunately it also impacts the case of when allowedCG-List is NOT present.If the field (note: **allowedCG-List**) is **not present**, UL MAC SDUs from this logical channel can be mapped to **any** configured grant configurations.If the field **configuredGrantType1Allowed** is **present**, **only** those configured grant type 1 configuration **indicated in this sequence are allowed** for use by this logical channel; otherwise, this sequence shall not include any configured grant type 1 configuration. […]

|  |  |  |
| --- | --- | --- |
|  | allowedCG-List**Present** | allowedCG-List**Not present** |
| CGType1Allowed**Present** | No problem.Follow texts in green. | Green texts seems contradictory to yellow texts. According to green texts, it is specified that only those CG type 1 configuration indicated in this sequence are allowed. However, there is **no CG indicated in the list** so all CG Type 1 are NOT allowed to use in this case.In this case, network should expect UE to use all CG type1. When allowedCG-List is not present, CGType1Allowed should not affect anything regardless of its value. |
| CGType1Allowed**Not Present** | No problem.Follow texts in gray. | All CG Type 1 are NOT allowed.**Only all CG Type 2 are allowed?** |

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| ZTE | No | Share the same view with Ericsson |
| Samsung | No | Agree with Ericsson. |
| Sharp | No | Agree with Ericsson. |
| Xiaomi | No | Agree with Nokia |
| Huawei | No  | Agree with Nokia that the proper gNB implementation can avoid any confusion at the UE side.Plus we are fine with Ericsson’s comment on “only”. |
| MediaTek | No | Agree with Nokia |
| Futurewei | No  | Agree with Nokia |
| Apple | No | Agree with Ericsson. |
| LG | No | (Focusing only on CG Type1) If allowedCG-List is present but there is no CG Type 1 indicated in the sequence, it means no CG Type1 is to be used. In the meanwhile, if allowedCG-List is not present, it means all CG Type1 are to be used. Based on this, the following is our understanding.* If the field *configuredGrantType1Allowed* is present but *allowedCG-List* is not present, the LCH can be mapped to any CG Type1 that are configured.
* If the field *configuredGrantType1Allowed* is present but *allwedCG-List* is present with no CG Type1 indicated, the LCH cannot be mapped to any CG Type1.
* If the field *configuredGrantType1Allowed* is not present, the LCH cannot be mapped to any CG Type1 because *allowedCG-List* will not include any CG Type1.

The current specification seems already clear. |
| Intel | No | Agree with Nokia. |

# 3 Conclusion

[TBD]