**3GPP TSG-RAN WG1 Meeting #106-eR1-210XXXX**

e-Meeting, August 16th – 27th, 2021

**Agenda item: 8.3**

**Source: Moderator (Nokia)**

**Title: [Post-106-e-Rel17-RRC-03] Enhanced IIoT and URLLC**

**Document for: Discussion and Decision**

# Introduction

As per chairman’s guidance, the email discussion

* [Post-106-e-Rel17-RRC-03] Enhanced IIoT and URLLC

is planned according to the following guidelines:

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| *As announced during RAN1#106-e, there will be a number of email threads on Rel-17 RRC parameters. For each Rel-17 work item, the work item rapporteur will kick off the email thread. The email discussions on RRC parameters will start from September 1 until September 10 (of course excluding the weekend). The purpose of these email discussions is to initiate our preparations to send the first LS to RAN2 on Rel-17 RRC parameters in October (e.g. tabulate agreed RRC parameters so far and identify ones that RAN1 should discuss whether or not to define).**Please note that RAN1 will NOT be making any decision with regards to the Rel-17 RRC parameters during the email discussions. Intention is to have the work item rapporteurs provide their initial assessment and collect company views if there are any. I am hoping that this discussion will help companies better prepare for RAN1#106bis-e. For each email thread, the rapporteur is to provide a tdoc collecting company views along with a draft list of RRC parameter at the end of the email discussion.* |

This document is there to support the RAN1 email discussion on the RRC parameter list for the Rel-17 URLLC/IIoT WI. Companies are encouraged to provide their comments on the latest version of the RRC parameter sheet in the respective AI specific drafts folder and the changes to the RRC parameter sheet will only be done by the AI moderator based on the received comments in each round or iteration of email discussions on this issue.

**This document is structured as follows:**

* Section 2 contains the email discussion for HARQ-ACK enhancements (AI 8.3.1.1)
* Section 3 contains the email discussion for CSI enhancements (AI 8.3.1.2)
* Section 4 contains the email discussion for NR-U enhancements (AI 8.3.2)
* Section 5 contains the email discussion for Intra-UE periodization enhancements (AI 8.3.3)
* Section 6 contains the email discussion for Other / Propagation delay compensation (AI 8.3.4)

# HARQ-ACK enhancements (AI 8.3.1.1)

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# CSI enhancements (AI 8.3.1.2)

* 1. 4-bits CQI

We agreed that for subband CQI reporting with more than 2 bits per subband, 4-bits CQI is supported. We further agreed that RRC can configure use of legacy 2-bits D-CQI or 4-bits CQI for each CSI report configuration, subject to UE capability.

### 1st Round

To implement the above agreement, it is proposed to introduce a new RRC parameter (cqi-BitsPerSubband) under reportFreqConfiguration. This parameter can take values {bits2,bits4} with default value bits2. The field is only present if cqi-FormatIndicator is set to subbandCQI and if the UE reported capability for 4-bits subband CQI reporting.

Please indicate if you agree and if something else may be missing.

Please provide your input to the table below:

|  |  |
| --- | --- |
| *Company* | *Comments* |
| Intel | Probably another alternative is to leave only {bits4}, while bits2 will be assumed when the optional parameter is not provided. |
| DOCOMO | Seems nothing is missing. We are OK with the listed parameter but prefer the alternative from Intel.Moderator: @Intel, DOCOMO: Fine with your suggestion – updating 002 accordingly. Yes, RAN2 prefers to avoid defining default values for parameters used in connected mode. |
| ZTE | For the proposed method, we understand the network should indicate the subband CQI reporting first, then further indicate 4-bits are used. So two parameters should be configured. We think another possible way is to extend the RRC parameter cqi-FormatIndicator to indicate 4-bits subband CQI reporting. This can be achieved by introducing the Rel-17 parameter cqi-FormatIndicator-v17 with the new value {4-bit-subbandCQI} indicating 4-bits subband CQI reporting. Similar as the other extended RRC parameter, if the field cqi-FormatIndicator-v17 is present, the UE shall ignore the value provided in cqi-FormatIndicator. So only the new parameter is configured. The value {subbandCQI} provided in cqi-FormatIndicator indicates the legacy subband CQI reporting, i.e., 2-bits subband CQI, if cqi-FormatIndicator-v17 is not configured. We believe either way can work but slightly prefer the latter one since it can save RRC signaling overhead when configuring 4-bits subband CQI reporting. |
| HW/HiSi | We think fine the updated 002 is fine. |
| Sony | Fine with version 002 of the RRC parameters spreadsheet. |
| LG | Fine with the update 002.  |
| Futurewei | Fine with the updated version 002. |
| Ericsson | OK with updated version 002 of Excel or ZTE suggestion.For Description in Excel sheet, suggest not to use “D-CQI” since acronym this does not exist any specification. For example: “Configures whether UE uses 2-bit subband differential CQI or 4-bit subband CQI. This field can only be present if cqi-FormatIndicator is set to subbandCQI and if the UE reported capability for 4-bit subband CQI reporting. If the field is not present, the UE uses 2-bit subband differential CQI.” |
| Quectel | Fine with the updated version 002. Support the updates by Ericsson to the description in Excel sheet.  |
| Moderator | @All: As majority of companies so far seem to prefer the approach used in v002, keeping this direction.@Ericsson: Thank you for your suggestion on the description, I agree – updating v003 accordingly. |
| OPPO | The following two sentences in description column seem not quite compatible to each other:* “This field can only be present if cqi-FormatIndicator is set to subbandCQI and if the UE reported capability for 4-bit sub-band CQI reporting.” *<== there are two conditions for “present”.*
* “If the field is not present, the UE uses 2-bit sub-band differential CQI.” *<== According to above, the filed may not be present because the UE is not configured with any sub-band CQI.*

A correction could be:Configures whether UE uses 2-bit sub-band differential CQI or 4-bit sub-band CQI. This field can only be present if cqi-FormatIndicator is set to subbandCQI and if the UE reported capability for 4-bit sub-band CQI reporting. If the field is not present and cqi-FormatIndicator is set to subbandCQI, the UE uses 2-bit sub-band differential CQI. |
| QC | We are fine with moderator’s proposal in v003.  |
| HwHiSi(2) | Agree with the observation from Oppo. There seems to be a slight contradiction in the two sentences. The first sentence describes the two conditions to operate with 4-bit sub-band CQI ( i) cqi-FormatIndicator is set to subbandCQI and ii) UE reported capability for 4-bit sub-band CQI reporting. The second sentence, on the other hand says that as soon the field is not present, the UE uses 2-bit sub-band differential CQI. In our understanding, this might not need to be the case all the time. The UE could also operate with wideband CQI in this situation. The correction suggested by Oppo seems to fix this ambiguity. |

1. NR-U Enhancements (AI 8.3.2)

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1. Intra-UE multiplexing & priorization enh. (AI 8.3.3)

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1. Propagation delay compensation (AI 8.3.4)

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