**3GPP TSG RAN WG1 Meeting #105-e R1-21xxxxx**

**E-meeting, May 10 – May 27, 2021**

**Agenda Item: 7.2.5**

**Source: Moderator (Huawei)**

**Title: Preparation phase email discussion for Rel-16 eURLLC**

**Document for: Discussion and Decision**

# Introduction

The paper summarizes the issues for preparation phase for contribution submitted to 7.2.5 on Rel-16 URLLC/IIoT.

# Recommendation for the scope of email threads

Per the guidance from Chairman, we will only have 5 email threads for Rel-16 URLLC/I-IoT for RAN1#104b-e.

## Draft recommendation for the scope of email threads

Based on discussion among feature leads, we made the draft recommendation on the issues to be discussed for this meeting as below. Note that once the issues to be discussed are set, we will further discuss among feature leads to see how to divide the issues to 5 email threads.

**Draft recommended issues to be discussed in RAN1#105-e**

PDCCH enhancements:

* **Issue #2**: Correction on relative SLIV reference for Type 1 HARQ codebook
* **Issue #4**: Remove DCI format 1\_1 indicating SCell dormancy in case of 1-bit C-DAI
* **Issue #6**: Correction on the number of SRS resource set configuration
* **Issue #3** (editor CR): Correction on RRC parameter in DCI formats when two HARQ-ACK codebooks are configured
* **Issue #5** (editor CR): Editorial correction on $V\_{DAI,m\_{last}}^{DL}$

UCI enhancements:

* **Issue #1**: Correction for sub-slot based PUCCH
* **Issue #2**: Conflict between the first PUCCH repetition and semi-static configuration
* **Issue #3**: Clarification on reference point of sub-slot based PUCCH resource
* **~~Issue #4~~**~~:~~ ~~SPS PDSCH release and SPS receptions with slot aggregation~~
* **Issue #5** (editor CR): Editorial correction on timing for secondary cell activation/deactivation

Scheduling & HARQ:

* **Issue #2:** Handling of collision between DL/SSB symbols and configured HP PUCCH and PUSCH
* **Issue #1:** Clarification on UE procedure for prioritization

eCG and intra-UE multiplexing:

* **Issue #1:** Intra-UE prioritization and multiplexing
	+ Discuss whether to confirm RAN2’s working assumption on UL skipping vs. LCH-based prioritization.
	+ Discuss PHY impacts/behavior on intra-UE prioritization and multiplexing.

SPS enhancements:

* **Issue #1**: SPS PDSCH release and SPS receptions with slot aggregation
* **Issue #3**: *CSI-PUCCH-ResourceList* where SPS HARQ-ACK multiplexed
* **~~Issue #4~~**~~: Interpretation of~~ *~~startingSymbolIndex~~* ~~when HARQ-ACK is multiplexed~~

**Companies are encouraged to indicate the priority (high or medium or low) of the remaining issues for this meeting. If the priority is high, please provide your reasons why it has to be discussed in this meeting.**

* Remaining issues for PDCCH enhancements

|  |  |  |
| --- | --- | --- |
| Company | Issue #1 | Comments |
| CATT | Low |  |
| DOCOMO | LowAgree with FL’s view. This can be discussed in the next meeting. |  |
| Vivo | LowAgree with FL’s view. |  |
| Samsung | Low |  |
| LG | Low |  |
| ZTE | High | We suggest to include this issue as a place holder in the email discussion for PDCCH. If the Rel-15 CR is rejected in preparation phase, we can discuss this issue in this meeting. Otherwise, we are fine to postpone to the next meeting. |
| Qualcomm | Low.  |  |
| Hw/HiSi | Low |  |
| ASUS | LowAgree with FL’s assessment |  |
| Nokia/NSB | Low | Agree with FL suggestion |
| Ericsson | Medium | We think this issue is limited to DCI format 1\_2 only for Rel-16. It can be addressed independent of the Rel-15 issue for fall back DCI. Suggest to include in email discussion. |

* Remaining issues for eCG enhancements and intra-UE multiplexing

|  |  |  |
| --- | --- | --- |
| Company | Issue #2 | Comments |
| CATT | Low |  |
| DOCOMO | LowAgree with FL that it can be deprioritized in this meeting |  |
| vivo | LowAgree with FL’s suggestion. |  |
| Samsung | Low |  |
| LG | MediumIt is simple fix and would not take a lot of time. |  |
| ZTE | Low |  |
| HW/HiSi | Low |  |
| Nokia, NSB  | Low  |  |
| Ericsson | Low |  |

* SPS enhancements

|  |  |  |  |
| --- | --- | --- | --- |
| Company | Issue #2 | Issue #5 | comments |
| CATT | Low | Medium |  |
| DOCOMO | LowAgree with FL that it can be discussed after the decision on issue #1 | LowNo CR is necessary as spec is clear enough |  |
| vivo | Low | LowCurrent spec is clear and no CR is needed. |  |
| Samsung | Low | Low |  |
| LG | Low | Low |  |
| ZTE | Low | Low | Discuss issure #2 after the decision on issue #1 |
| Qualcomm | Agree that issue #2 can be discussed after a decision on #issue 1 is made. | Low |  |
| HW/HiSi | Low | Low |  |
| ASUS  | LowAgree with FL to discuss it after decision on issue #1.  | MediumWe view it as a simple fix to be quickly concluded in this meeting if possible. | On Issue#5, for companies expressing the spec is clear enough, it’s appreciated if you could provide which of interpretation 1 or interpretation 2 is correct understanding.Our understanding is that: 1. Spec does not specifies the concerned correspondence discussed in Issue#5
2. In all other DCI code point indication, the correspondence is specified clearly in the standard with some of them based on interpretation 1 (e.g. HARQ process number field for SPS release when deactivation list is not provided) while others of them based on interpretation 2 (e.g. TDRA field)
 |
| Nokia, NSB  | High  | Medium  | #2 – clearly the decision on #1 would be needed, but should also handle the specs accordingly (maybe we could start this on parallel already to get an idea on what changes could be there in the specs – final decision of course only after having clarity on issue #1)  #5: Should be an easy fix (no need to discuss about different understandings it is clearly interpretation #2). If companies don’t think this is essential, we could put this to the editor CR.   |
| Ericsson | High | Low | Issue #2: The spec change is necessary.Issue #5: The spec is clear enough. No change is necessary. |

## Status for the scope of email threads after first round email discussion

Based on the views shared in the first round email discussion, the status is summarized as below:

**For the issues on the current list to be discussed in the draft recommendation**

**All issues in the draft recommendation in section 2.1 are agreeable to be discussed in RAN1#105-e.**

**For the issues not on the current list to be discussed in the draft recommendation**

PDCCH enhancements:

* **Issue #1**:  Correction of UE PDSCH processing time for DCI format 1\_2
	+ Most companies propose low priority for this meeting, while ZTE and Ericsson propose high or medium priority. ZTE commented to put placeholder and if it is rejected in Rel-15 maintenance, it can be included.
	+ **Moderator recommendation**: Postpone to next meeting after there is clear understanding on Rel-15 behavior. Leaving place holder is a little bit complicated since it will depend on the progress of other agenda.

eCG enhancements:

* **Issue #2**:  PHR for multiple CGs in one serving cell
	+ All companies propose low priority while 1 company proposes medium priority.
	+ **Moderator recommendation**: Not to be included in the email scope this meeting.

SPS enhancements:

* **Issue #2**:  Capture the agreement on SPS release that is not supported
	+ 8 companies propose low priority while 2 companies (Nokia, Ericsson) propose high priority. The companies who propose low priority also agree issue # needs to be addressed also, just need to wait for the conclusion from issue #1.
	+ **Moderator recommendation**: Recommend to be included also, but deprioritize till there is conclusion/agreement on issue #1.
* **Issue #5**:  Clarification on “corresponding entry” for joint deactivation of SPS/CG
	+ 8 companies propose low priority since they think the spec is clear and no any CR needed, while 3 companies (CATT, Nokia, ASUS) propose medium priority to clarify.
	+ **Moderator recommendation**: Not to be included in the email scope this meeting. Based on the reply from LG and the comments, it seems most companies think it is clear that interpretation #2 is the understanding, please ASUS check and see if you also agree with interpretation #2 now. If ASUS still think better to discuss to clarify, we can consider to include this since anyway it is a simple clarification and good to achieve common understanding among companies.

Based on the above summary, the draft email threads are given as below:

**Email discussion #1**

Email discussion/approval on remaining issues on PDCCH enhancements – Chengyan (Huawei):

* **Issue #2**: Correction on relative SLIV reference for Type 1 HARQ codebook
* **Issue #4**: Remove DCI format 1\_1 indicating SCell dormancy in case of 1-bit C-DAI
* **Issue #6**: Correction on the number of SRS resource set configuration
* **Issue #3** (editor CR): Correction on RRC parameter in DCI formats when two HARQ-ACK codebooks are configured
* **Issue #5** (editor CR): Editorial correction on $V\_{DAI,m\_{last}}^{DL}$

**Email discussion #2**

Email discussion/approval on remaining issues on UCI enhancements – Jia (OPPO):

* **Issue #1**: Correction for sub-slot based PUCCH
* **Issue #2**: Conflict between the first PUCCH repetition and semi-static configuration
* **Issue #3**: Clarification on reference point of sub-slot based PUCCH resource
* **Issue #5** (editor CR): Editorial correction on timing for secondary cell activation/deactivation

**Email discussion #3**

Email discussion/approval on remaining issues on Scheduling & HARQ enhancements – Wei (Qualcomm):

* **Issue #2:** Handling of collision between DL/SSB symbols and configured HP PUCCH and PUSCH
* **Issue #1:** Clarification on UE procedure for prioritization

**Email discussion #4**

Email discussion/approval on remaining issues on intra-UE prioritization and multiplexing – Lihui (Vivo):

* Discuss whether to confirm RAN2’s working assumption on UL skipping vs. LCH-based prioritization.
* Discuss PHY impacts/behavior on intra-UE prioritization and multiplexing.

**Email discussion #5**

Email discussion/approval on remaining issues on SPS enhancements – Duckhyun (LG):

* **Issue #1**: SPS PDSCH release and SPS receptions with slot aggregation
* **Issue #3**: *CSI-PUCCH-ResourceList* where SPS HARQ-ACK multiplexed
* **Issue #2**: Capture the agreement on SPS release that is not supported (*to be discussed after decision made on issue #1*)

**Please comment if you have strong concern with the recommendations above.**

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| --- | --- |
| *Company* | *View* |
| Feature lead | For the ones highlight in Red above, if there is strong concern shared, we can remove it from the list.  @ ASUS On issue #5 under SPS, please check and see if you also agree with interpretation #2 now based on the interpretation from LG and comments from other companies.  |
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#  Summary of detailed issues

A brief summary of the issues are given in the following tables. Details can be found in the feature lead summaries uploaded to the draft folder.

**Table 1 Summary of issues for PDCCH enhancements**

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue**  | **Description** | **Source** | **Recommended handling**  |
| #1 | Correction of UE PDSCH processing time for DCI format 1\_2 | ZTE (R1-2104323)Spreadtrum (R1-2104410)OPPO (R1-2104799)Vivo (R1-2105465)Huawei, HiSilicon (R1-2105928) | Postpone to next meeting **Reason:***The rel-16 discussion depends on the outcome of the clarification of Rel-15 behavior. There is contribution submitted to Rel-15 maintenance section for the clarification of the Rel-15 behavior, therefore we can wait for the outcome there before starting to discuss Rel-16 behavior.*  |
| #2 | Correction on relative SLIV reference for Type 1 HARQ codebook | Ericsson (R1-2104215)Nokia (R1-2104312)CATT (R1-2104481)Samsung (R1-2105286)Vivo (R1-2105465)Huawei, HiSilicon (R1-2105928) | Included in the scope for email discussion **Reason:***Continue the discussion from last meeting and resolve the issue.*  |
| #3 | Correction on RRC parameter in DCI formats when two HARQ-ACK codebooks are configured | CATT (R1-2104481) | Included in the scope but go to editor CR. **Reason:***Correction on the RRC parameter and thus can go to editor CR following the rule in previous meeting. According the guidance from chairman, even editor CR needs to be agreed by the group first before providing to the editor.*  |
| #4 | Remove DCI format 1\_1 indicating SCell dormancy in case of 1-bit C-DAI | WILUS (R1-2105867) | Included in the scope for email discussion **Reason:***Critical correction, otherwise the spec is not correct* |
| #5 | Editorial correction on $V\_{DAI,m\_{last}}^{DL}$ | WILUS (R1-2105867) | Included in the scope but go to editor CR. **Reason:***Editorial correction which is caused by agreed alignment CR before. According the guidance from chairman, even editor CR needs to be agreed by the group first before providing to the editor.*  |
| #6 | Correction on the number of SRS resource set configuration  | Vivo (R1-2105468) | Included in the scope for email discussion **Reason:***Critical correction, otherwise the spec is not clear. Note that the paper was submitted to MIMO, and chairman brought it us since the issue originates from the introduction of DCI format 0\_2.* |

**Table 2 Summary of issues for UCI enhancements**

|  |  |  |
| --- | --- | --- |
| Issue#1 | Correction for sub-slot based PUCCH | Nokia [1], CATT [2], vivo [3] |
| Issue#2 | Conflict between the first PUCCH repetition and semi-static configuration  | Nokia [1], CATT [2], vivo [3], Huawei [4] |
| Issue#3 | Clarification on reference point of sub-slot based PUCCH resource | CATT [2], vivo [3], Huawei [4], R1-2104801 OPPO, R1-2105418 LG |
| ~~Issue#4~~ | ~~SPS PDSCH release and SPS receptions with slot aggregation~~ | ~~vivo [3]~~ |
| Issue#5 | Editorial correction on timing for secondary cell activation/deactivation | CATT [2] |

**Table 3 Summary of issues for scheduling & HARQ**

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| --- | --- | --- |
| **Topic** | **Companies supporting the discussion in RAN1 #104e** | **FL Comment** |
| **Issue #1:** UE procedure for prioritization | Ericsson [1], OPPO [3], Apple [4] | Please refer to the FL comments in Section 2 in the summary “*R1-210xxxx Summary of HARQ and scheduling*”. From FL’s point of view, the specification is clear; it does not introduce **multiplexing of HP channels** in every intermediate steps. If RAN1 prefers it to have this also as a conclusion to conclude this discussion, it should be fine.  |
| **Issue #2:** Handling of collision between DL/SSB symbols and configured HP PUCCH and PUSCH  | Nokia/NSB [2], DCM [5] | Discuss during the meeting |

**Table 4 Summary of issues for** **eCG and intra-UE multiplexing**

|  |  |
| --- | --- |
| **Topic** | **FL Comment** |
| **Issue #1:** Intra-UE prioritization and multiplexing* Discuss whether to confirm RAN2’s working assumption on UL skipping vs. LCH-based prioritization.
* Discuss PHY impacts/behavior on intra-UE prioritization and multiplexing.
 | Discuss in this meeting.  |
| **Issue #2:** PHR for multiple CGs in one serving cell.* Discuss which CG should be used for PH calculation if multiple CG PUSCHs with same starting symbol in one cell overlap with a PUSCH carrying the PHR in the other cell.
 | Deprioritize the discussion in this meeting. |

**Table 5 Summary of issues for others**

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue #** | **Description** | **Source** | **Recommended handling** |
| 1 | SPS PDSCH release and SPS receptions with slot aggregation | R1-2104312, R1-2104321, R1-2105418, R1-2105531, [R1-2105466](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_105%5CDocs%5CR1-2105466.zip) | Include in the email scope |
| 2 | Capture the agreement on SPS release that is not supported.  | R1-2104215, R1-2104312 | Discuss after the decision on issue #1 |
| 3 | CSI-PUCCH-ResourceList where SPS HARQ-ACK multiplexed | R1-2104801, R1-2105418, R1-2105531 | Include in the email scope |
| ~~4~~ | ~~Interpretation of~~ *~~startingSymbolIndex~~* ~~when HARQ-ACK is multiplexed~~ | ~~R1-2104801, R1-2105418~~ | ~~Include in the email scope~~ |
| 5 | Clarification on “corresponding entry” for joint deactivation of SPS/CG | R1-2105851, | Hear more views during preparation phase |

# References

1. R1-21xxxxx Summary of PDCCH enhancements Huawei, HiSilicon
2. R1-21xxxxx Summary of HARQ and Scheduling Qualcomm
3. R1-21xxxxx Summary of intra-UE multiplexing and eCG Vivo
4. R1-21xxxxx Summary of other aspects for URLLC and IIoT LG
5. R1-21xxxxx Summary of R16 UCI enhancements OPPO