**3GPP TSG RAN WG1 #106-e R1-210XXXX**

**e-Meeting, August 16th – 27th, 2021**

**Agenda item:** 7.2.5

**Source:** Moderator (Qualcomm)

**Title:** Summary of [106-e-NR-L1enh-URLLC-01]

**Document for:** Discussion and Decision

# Introduction

This document is created to facilitate the email discussion of “[106-e-NR-L1enh-URLLC-01] Issue#3: Correction on SRS resource configuration. This email thread is triggered by the following draft CR.

R1-2107318 Remaining issues on PDCCH enhancements for URLLC Qualcomm Incorporated

# Explanation of the problem

In the RAN1 #105\_e meeting, an agreement was made to restrict the RRCs parameters associated with the SRS resource set in *srs-ResourceSetToAddModListDCI-0-2* with usage equal to “*codebook*” or “*noncodebook*” to be the same as the RRC parameters associated with the SRS resource set configured in *srs-ResourceSetToAddModList* with the same usage. The purpose is to make sure that the SRS resource set configured by *srs-ResourceSetToAddModListDCI-0-2* only contain a subset of SRS resources that are configured by the SRS resources set in *srs-ResourceSetToAddModList*.

However, [1] argues that it is neither necessary nor correct to make all RRC parameters associated with the two SRS resource sets to be the same. For example, [1] suggests to remove the restrictions of same RRC configuration for the following parameters associated with an SRS resource set configuration.

* *srs-ResourceSetId*
* *srs-ResourceIdList*
* *aperiodicSRS-ResourceTrigger*
* *aperiodicSRS-ResourceTriggerList*

Furthermore, the following CR on TS 38.212 was proposed.

7.3.1.1.3 Format 0\_2

< Unchanged parts are omitted >

- SRS resource indicator –$ \left⌈log\_{2}\left(\sum\_{k=1}^{min\left\{L\_{max}, N\_{SRS,0\\_2}\right\}}\left(\begin{matrix}N\_{SRS,0\\_2}\\k\end{matrix}\right)\right)\right⌉ $or $\left⌈log\_{2}N\_{SRS, 0\\_2}\right⌉ $bits, where $N\_{SRS, 0\\_2}$ is the number of configured SRS resources in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModListDCI-0-2*, and associated with the higher layer parameter *usage* of value '*codeBook*' or '*nonCodeBook*', where the SRS resource set is composed of the first $N\_{SRS, 0\\_2}$ SRS resources together with other configurations in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModList*, if any, and associated with the higher layer parameter *usage* of value '*codeBook*' or '*nonCodeBook*', respectively, except for the higher layer parameters *‘srs-ResourceSetId’, ‘srs-ResourceIdList’, ‘aperiodicSRS-ResourceTrigger’,* and *‘aperiodicSRS-ResourceTriggerList’*

- $\left⌈log\_{2}\left(\sum\_{k=1}^{min\left\{L\_{max}, N\_{SRS,0\\_2}\right\}}\left(\begin{matrix}N\_{SRS,0\\_2}\\k\end{matrix}\right)\right)\right⌉$ bits according to Tables 7.3.1.1.2-28/29/30/31 if the higher layer parameter *txConfig = nonCodebook*, where $N\_{SRS, 0\\_2}$ is the number of configured SRS resources in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModListDCI-0-2*, and associated with the higher layer parameter *usage* of value '*nonCodeBook*', where the SRS resource set is composed of the first $N\_{SRS, 0\\_2}$ SRS resources together with other configurations in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModList*, if any, and associated with the higher layer parameter *usage* of value '*nonCodeBook*', except for the higher layer parameters *‘srs-ResourceSetId’, ‘srs-ResourceIdList’, ‘aperiodicSRS-ResourceTrigger’,* and *‘aperiodicSRS-ResourceTriggerList’,* and

- if UE supports operation with *maxMIMO-LayersDCI-0-2* and the higher layer parameter *maxMIMO-LayersDCI-0-2* of *PUSCH-ServingCellConfig* of the serving cell is configured, *Lmax* is given by that parameter

- otherwise, *Lmax* is given by the maximum number of layers for PUSCH supported by the UE for the serving cell for non-codebook based operation.

- $\left⌈log\_{2}N\_{SRS, 0\\_2}\right⌉ $bits according to Tables 7.3.1.1.2-32 if the higher layer parameter *txConfig = codebook*, where $N\_{SRS, 0\\_2}$ is the number of configured SRS resources in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModListDCI-0-2*, and associated with the higher layer parameter *usage* of value '*codeBook*', where the SRS resource set is composed of the first $N\_{SRS, 0\\_2}$ SRS resources together with other configurations in the SRS resource set configured by higher layer parameter *srs-ResourceSetToAddModList*, if any, and associated with the higher layer parameter *usage* of value '*codeBook*', except for the higher layer parameters *‘srs-ResourceSetId’, ‘srs-ResourceIdList’, ‘aperiodicSRS-ResourceTrigger’,* and *‘aperiodicSRS-ResourceTriggerList’*.

< Unchanged parts are omitted >

For your reference, the RRC configuration for SRS resource set in Rel-16 is provided below.



# Company views

Companies are encouraged to provide comments on the following questions.

**Q1: Do you agree with the intention of the CR described in Section 2 that the RRC parameters associated with the SRS resource set configured in *srs-ResourceSetToAddModListDCI-0-2* and *srs-ResourceSetToAddModList* with the same usage can not all be configured the same? If not, any justifications?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comment** |
| HW/HiSi | [No] | Tentative no support. In our view it does not seem needed to configure the parameters separately since the SRS resource set of 0\_2 is intended to be a sub-set of 0\_1. The specification is not broken, and this CR would be an optimization in our view. But we would like to hear the views from others. |
| Apple | [No] | We have a similar understanding as Huawei.  |
|  |  |  |
|  |  |  |
|  |  |  |

**Q2: If you answer to Q1 is yes, what are the RRC parameters that you think may or must be configured differently?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Q2: If you answer to Q1 is yes, any additional comments on the CR in Section 2?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes or No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# Conclusion

To be added after the discussion.

# References

1. R1-2107318, Remaining issues on PDCCH enhancements for URLLC, Qualcomm, 3GPP WG1 106-e, Aug 16-27, 2021.