**3GPP TSG RAN WG1 Meeting #109-e R1-220xxxx**

**E-Meeting, May 9 – May 20, 2022**

**Agenda Item: 7.2.5**

**Source: Moderator (Huawei, HiSilicon)**

**Title: Summary of [109-e-R16-URLLC-04] Issue#6: Correction on SRS resource set with ‘*antennaSwitching*’**

**Document for: Discussion and Decision**

# Introduction

Following email thread is dedicated to discuss the Determination of SRS resource set with usage ‘*antennaSwitching*’. This issue has been raised in R1-2204905 [1].

[109-e-R16-URLLC-04] Issue#6: Correction on SRS resource set with '*antennaSwitching*' by May 13 – Thorsten (Huawei)

**Due to the short time available for discussion, please provide you input for the first round before May 10, 17:00 pm (UTC)**

**Background**

Follow up from the discussion under [108-e-R16-URLLC-04]. The remaining issue is on the note in the agreement "The need to make RAN1 specification change with regards to this agreement needs further discussion" [1].

# Discussion

## Round 1

The issue is raised in R1-2204905 [2]. In the RAN1#108-e meeting [3], the following agreement was achieved to clarify the number of configured SRS resource set(s) with usage ‘*antennaSwitching*’ configured *in srs-ResourceSetToAddModListDCI-0-2*.

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| Agreement  For the maximum number of SRS resource sets with *usage* ‘antennaSwitching’, adopt Option 2:   * Opt 2 – The SRS resource set(s) with usage=”*antennaswitching*” configured in *srs-ResourceSetToAddModListDCI-0-2* shall not be different from the SRS resource set(s) configured in *srs-ResourceSetToAddModListDCI* with the same usage   Note: The need to make RAN1 specification change with regards to this agreement needs further discussion. |

This approach avoids that the UE is configured with more SRS resource set(s) for '*antennaSwitchin*g' than what are possible compared to Rel-15. During the discussion in RAN1#108-e, it was pointed out that this would require a new UE capability and it is not feasible at this late stage. The remaining issue is the note in the agreement, i.e. whether it has spec impact or not.

In [2] a TP for 38.214 is suggested to avoid a misunderstanding between gNB and UE and to avoid that the UE becomes configured with more SRS resource sets that it can support. Otherwise, the specification is incomplete without the below TP.

**Text Proposal 1:**

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| 6.2 UE reference signal (RS) procedure  6.2.1 UE sounding procedure  The UE may be configured with one or more Sounding Reference Signal (SRS) resource sets as configured by the higher layer parameter *SRS-ResourceSet* or *SRS-PosResourceSet*. For each SRS resource set configured by *SRS-ResourceSet*, a UE may be configured with SRS resources (higher layer parameter *SRS-Resource*), where the maximum value of K is indicated by UE capability[13, 38.306]. When SRS resource set is configured with the higher layer parameter *SRS-PosResourceSet,* a UE may be configured with *K* ≥1 SRS resources (higher layer parameter *SRS-PosResource*), where the maximum value of K is 16. The SRS resource set applicability is configured by the higher layer parameter *usage* in *SRS-ResourceSet.* When the higher layer parameter *usage* is set to 'beamManagement'*,* only one SRS resource in each of multiple SRS resource sets may be transmitted at a given time instant, but the SRS resources in different SRS resource sets with the same time domain behaviour in the same BWP may be transmitted simultaneously.  When the higher layer parameter *usage* is set to '*antennaSwitching*', the SRS resource set(s) configured in *srs-ResourceSetToAddModListDCI-0-2* are either equal to or are a subset of the SRS resource set(s) with the same usage configured in *srs-ResourceSetToAddModList.*  For aperiodic SRS at least one state of the DCI field is used to select at least one out of the configured SRS resource set(s).  < Unchanged parts are omitted > |

**Q1: Companies are encouraged to share their view on the TP. If you do not support it, please also give your reason.**

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| Company | Comments |
| Moderator | From the specification point of view, there is currently no restriction how to configure SRS resource set(s) in *ResourceSetToAddModListDCI-0-2.* It seems not obvious that the resource set(s) in *ResourceSetToAddModListDCI-0-2,* cannot be different from the *resource set(s) configured in srs-ResourceSetToAddModList,* Therefore it would be good to clarify this in the specification. |
| Samsung | We still think that the agreement is sufficient without capturing it in the specification. However, if majority companies are fine with the proposed TP, we can live with that. Otherwise, it is not preferable to us.  We have a clarification question on the proposed TP. Actually, the agreement seems to say “the SRS resource set(s) configured in *srs-ResourceSetToAddModListDCI-0-2* are ~~either~~ equal to ~~or are a subset of~~ the SRS resource set(s) with the same usage configured in *srs-ResourceSetToAddModList.*”.  This is because “The SRS resource set(s) with usage=”*antennaswitching*” configured in *srs-ResourceSetToAddModListDCI-0-2* shall not be different from the SRS resource set(s) configured in *srs-ResourceSetToAddModListDCI* with the same usage”. If “a subset of” is considered, we think that it is not aligned with the agreement since it is different configuration. |
| vivo | We share the same view with Samsung. According to the agreement, the same SRS resource set(s) with usage=”*antennaswitching*” would be configured in both *srs-ResourceSetToAddModListDCI-0-2* and *srs-ResourceSetToAddModList.* |
| Nokia/NSB | We are fine of having this captured in the specifications.  And we do agree with the comments by Samsung, that capturing the available agreement does not include any notion of ‘a subset’ there and therefore the TP would need to adjusted accordingly. |

## Round 2

TBD.

# Outcome

TBD.

# References

1. R1-2203011 “Final Report of 3GPP TSG RAN WG1 #108-e v1.0.0”, section 7.2.5 e-Meeting, MCC Support
2. R1-2204905 “[Draft] CR Correction on SRS resource set with ‘*antennaSwitchin*g’”, RAN1#109-e, e-Meeting, May 9-20, 2022, Huawei, HiSilicon
3. R1-2202733 “Summary of [108-e-R16-URLLC-04] Issue#6: Discussion on determination of SRS resource set triggered by DCI format 2\_3”, RAN1#108-e, e-Meeting, February 21 – March 3, 2022, Huawei, HiSilicon