**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-03] Issue#3: Discussion on SRS configurations with usage of '*beamManagement*' in *srs-ResourceSetToAddModListDCI-0-2***

**Document for: Discussion and Decision**

# Introduction

Following email thread is dedicated to discuss the Determination of SRS resource set with usage ‘*beamManagement*’. This issue has been raised in R1-2203111 [1].

[109-e-R16-URLLC-03] Issue#5: Discussion on SRS configurations with usage of '*beamManagement*' in *srs-ResourceSetToAddModListDCI-0-2* 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**

In previous meetings the SRS configurations in srs-ResourceSetToAddModListDCI-0-2 with usage of value ‘*codebook*’, ’*nonCodebook*’ and ‘*antennaSwitching*’ were disucssed and addressed, however there is no disucssion/conclusion for the case of SRS resource set with usage set to '*beamManagement*' yet. Therefore, it seems further discussion/clarification is needed.

# Discussion

## Round 1

In Rel-15, the SRS resource set(s) configured in *srs-ResourceSetToAddModList* can be used for beam management. For SRS resource set(s) with *usage* set to ‘*beamManagement*’, FG 2-30 was introduced to let the UE report the maximum number of SRS resource sets and the maximum number of SRS resources per resource set that can be supported.

In Rel-16, independent from *srs-ResourceSetToAddModList* used for DCI format 0\_1/1\_1, *srs-ResourceSetToAddModListDCI-0-2* was introduced for DCI formats 0\_2/1\_2, and the SRS resource set(s) configured in *srs-ResourceSetToAddModListDCI-0-2* can be set to usage ‘*beamManagement*’.

In [1] it is suggested that similar to the previous discussions for the other usages of SRS resource sets, the maximum number of SRS resource sets configured with usage ‘*beamManagement*’ and the maximum number of SRS resource per set should not be increased compared to Rel-15, since this would need a new UE capability which is not reasonable for this functionality at this late stage.

To achieve that, it is proposed in [1] that the maximum value for the number of SRS resource set(s) reported in FG 2-30 shall be applicable regardless if SRS resource set(s) are configured in *srs-ResourceSetToAddModList* or in *srs-ResourceSetToAddModListDCI-0-2*. An approach similar to the agreement made last meeting for ‘*antennaSwitching*’ [2] is suggested, i.e. the SRS resource set(s) in *srs-ResourceSetToAddModListDCI-0-2* should be the same or a subset of the SRS resource set(s) in *srs-ResourceSetToAddModList*.

Additionally, it is suggested that the value reported for the maximum number of SRS resource per set shall be applicable to any SRS resource set with *usage* set to ‘*beamManagement*’, regardless is the SRS resource set is configured in *srs-ResourceSetToAddModList* or in *srs-ResourceSetToAddModListDCI-0-2*.

To reflect the above considerations, the following proposal is made.

***Proposal 1: In Rel-16, for SRS resource set(s) configured with usage ‘beamManagement’***

* ***The supported maximum number of SRS resource set(s) reported in FG 2-30 shall be applicable regardless of if SRS resource set(s) with usage set to 'beamManagement' are configured in srs-ResourceSetToAddModList or in srs-ResourceSetToAddModListDCI-0-2.***
* ***For usage ‘beamManagement’, the SRS resource set(s) in srs-ResourceSetToAddModListDCI-0-2 are the same or a subset of the SRS resource set(s) in srs-ResourceSetToAddModList.***
* ***The supported maximum number of SRS resources per set reported in FG 2-30 shall be applicable to any SRS resource set with usage set to 'beamManagement', regardless if the SRS resource set is configured in srs-ResourceSetToAddModList or in srs-ResourceSetToAddModListDCI-0-2.***

**Q1: Companies are encouraged to share their view whether they support Proposal 1. If disagree, please give also your reasons or come with comments for modification.**

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| --- | --- |
| Company | Comments |
| Nokia/NSB | **Initial input:** Our understanding here would be, that if we would agree to the 2nd bullet point there would not be any need for the 1st and 3rd bullet anymore. So would then actually the proposal for the 2nd bullet would be sufficient!?On the potential TP / CR, this should be coordinated with URLLC-04 discussions (also lead by Thorsten), as we then would not need the same description twice – i.e. the green parts could just be added on top of the TP in 04: When the higher layer parameter *usage* is set to '*antennaSwitching*' or ‘*beamManagement*’, 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.*[Moderator]: Thanks a lot for the comment. Please see my thinking in the moderator comment below |
| Apple | Thorsten’s proposal seems okay:The first and 3rd proposals seem necessary if it is allowed that the SRS resource set/resources are configured for 0\_2 but not for 0\_1. Klaus’ suggestion is a solution for that, so the configuration for 0\_1 should always there if the configuration for 0\_2 is present (then with the 2nd proposal it is a complete solution).[Moderator]: Thanks a lot for the comment. Please see my thinking in the moderator comment below |
| ZTE | We agree the intention that new UE capability should be avoided in this stage. Even without this proposal or the second bullet, the maximum number of SRS resource set reported shall be applicable for a cell regardless of configuration parameter of the SRS resource because FG 2-30 is per band capability. So we don’t think the first bullet or the last bullet is needed.For the second bullet, we agree the intention, which is similar as the SRS for ‘antennaswitching’ discussed in the last meeting. However, we slightly prefer to make a conclusion without spec impact.[Moderator]: Thanks a lot for the comment. Please see my thinking in the moderator comment below |
| Moderator | **@Nokia, Apple, ZTE:** I tend to agree to your thinking: if we would agree on the second bullet and apply the solution suggested by Klaus, then implicitly we could come to the conclusion that the first and third bullet are not needed. But to reach to this conclusion in an implicit manner could be a bit confusing and it would be better to directly spell it out I think. Please see below, how I am thinking:* In Rel-15, UE capability signalling is introduced for SRS resource sets with usage beam management. Both the maximum number of resource sets and the maximum number of SRS resources per set shall be reported as sequence. I copied the corresponding signalling as defined in 38.331 below:

|  |
| --- |
| uplinkBeamManagement SEQUENCE { maxNumberSRS-ResourcePerSet-BM ENUMERATED {n2, n4, n8, n16}, maxNumberSRS-ResourceSet INTEGER (1..8) } OPTIONAL, |

* Since the signalling has been introduced in Rel-15 it is applicable to *srs-ResourceSetToAddModList*. Since no further clarification is given in Rel16 for *srs-ResourceSetToAddModListDCI-0-2*, it can be assumed that the signalling only is applicable to *srs-ResourceSetToAddModList*. That is the reason why we suggest the 1st and 3rd bullet, to avoid misunderstanding and to make clear that the signalling in 38.331 applies to both SRS resource lists.
* However, given that we would agree on the second bullet (and maybe even capture it with the suggestion given by Klaus), the validity of the first and third bullet could be derived implicitly without actually agreeing on it, because
	+ If the gNB wants to configure a given SRS resource set with usage ‘*beamManagemen*t’ in *srs-ResourceSetToAddModListDCI-0-2*, the second bullet implies that the same SRS resource set also has to be configured in *srs-ResourceSetToAddModList.*
	+ For configuration of the given SRS resource set in *srs-ResourceSetToAddModList.*, the gNB has to follow the capabilities as they have been reported.
	+ Thus, indirectly, the capabilities reported for *ResourceSetToAddModList* also apply for *ResourceSetToAddModListDCI-0-2*

I think it is hard to follow these logical steps for bullet 1 and 3 and it would not harm to spell them out. Based on the comments above, would anyone have strong concern to agree on the second bullet and to capture the bullets 1 and 3 as notes for clarity?**Modified Proposal:*****Proposal 1: In Rel-16, for SRS resource set(s) configured with usage ‘beamManagement’*** * ***For usage ‘beamManagement’, the SRS resource set(s) in srs-ResourceSetToAddModListDCI-0-2 are the same or a subset of the SRS resource set(s) in srs-ResourceSetToAddModList.***

***Note, this implies that**** ***The supported maximum number of SRS resource set(s) reported in FG 2-30 shall be applicable regardless of if SRS resource set(s) with usage set to 'beamManagement' are configured in srs-ResourceSetToAddModList or in srs-ResourceSetToAddModListDCI-0-2.***
* ***~~For usage ‘beamManagement’, the SRS resource set(s) in srs-ResourceSetToAddModListDCI-0-2 are the same or a subset of the SRS resource set(s) in srs-ResourceSetToAddModList.~~***
* ***The supported maximum number of SRS resources per set reported in FG 2-30 shall be applicable to any SRS resource set with usage set to 'beamManagement', regardless if the SRS resource set is configured in srs-ResourceSetToAddModList or in srs-ResourceSetToAddModListDCI-0-2.***
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## Round 2

TBD.

# Outcome

TBD.

# References

1. R1-2203111 “Remaining issues on SRS”, RAN1#109-e, e-Meeting, May 9-20, 2022, Huawei, HiSilicon
2. R1-2203011 “Final Report of 3GPP TSG RAN WG1 #108-e v1.0.0”, section 7.2.5 e-Meeting, MCC Support