**3GPP TSG RAN WG1 Meeting #106bis-e R1-210xxxx**

**e-Meeting, October 11th-19th, 2021**

**Agenda Item: 5**

**Source: Moderator (Huawei)**

**Title: [Draft] Summary#1 of email discussion [106bis-e-AI5-LSs-02] on reply LS to R1-2108704**

**Document for: Discussion and Decision**

# Introduction

A RAN4 LS [1] asks RAN1 three questions on beam information of PUCCH SCell during PUCCH SCell activation procedure, as copied below.

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| ***Overall Description:****RAN4 is currently discussing the requirements for PUCCH SCell activation. For unknown PUCCH SCell activation (known cell conditions as defined in TS 38133 clause 8.3.2), from RAN4 perspective, we observe that UE may have problems supporting the following cases under the current NR specification:** *unknown FR1 PUCCH SCell activation with a valid TA*
* *unknown FR2 PUCCH SCell activation with a valid TA*
* *unknown FR1 PUCCH SCell activation without a valid TA*
* *unknown FR2 PUCCH SCell activation without a valid TA*

*One issue among the above identified cases is the beam information cannot be reported to network via the PUCCH of target being-activated SCell during the PUCCH SCell activation procedure.* *From RAN4’s perspective, the beam information reporting may be needed for following purposes:**1. Determine the associated SSB in PDCCH order for CFRA for TA updating when TimeAlignmentTimer associated with the TAG containing the PUCCH SCell is not running.**2. Determine the TCI state for PDCCH and PDSCH(when applicable) on target being-activated SCell**3. Determine the UL spatial relation for PUCCH on target being-activated FR2 SCell**4. Determine the Rx beam for PUCCH of target being-activated SCell at network reception* *RAN4 sees benefits in supporting PUCCH SCell activation for the above cases in terms of network operation flexibility and UE power consumption. RAN4 would like RAN1 and RAN2 to answer the following questions:****Q1:*** *Whether UE can report CSI (e.g. L1-RSRP) of the target being-activated PUCCH SCell belonging to secondary PUCCH group by configuring CSI report setting (e.g. CSI-ReportConfig) on any active serving cells belonging to primary PUCCH group****Q2:*** *Whether the above observation is correct, i.e. the identified four cases are not supported by the current RAN1 and RAN2 specification****Q3:*** *Whether the above identified cases can be supported by RAN1 and RAN2 spec updates within Rel-17 timeframe.**RAN4 will further discuss whether/how to define requirements of PUCCH SCell activation for the above cases based on RAN1 and RAN2 reply to above questions.* |

As per chairman’s guidance, a reply LS is discussed and is expected to complete by October 18.

[106bis-e-AI5-LSs-02] Discuss incoming LS on beam information of PUCCH Scell in PUCCH SCell activation procedure for a possible reply LS by October 18 – Frank (Huawei)

# Discussions

## Q1: Whether UE can report CSI (e.g. L1-RSRP) of the target being-activated PUCCH SCell belonging to secondary PUCCH group by configuring CSI report setting (e.g. CSI-ReportConfig) on any active serving cells belonging to primary PUCCH group

Based on the contribution papers [2-8], companies have different views on the answer to the question.

In addition to provide your views on it, **it is appreciated if companies could provide detailed comments and reasoning, e.g. any specification text to quote, or any identified potential issue.**

### Question 1-1: In current RAN1 specification, whether has such cross-PUCCH-group CSI reporting been supported? Any specification text explicitly backs it up? If no, any identified potential issue?

Companies’ views are very welcome.

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### Question 1-2: If yes for the question 1-1, whether has UCI multiplexing on a PUSCH of primary PUCCH group been supported when the UCI contains CSI report from the secondary PUCCH group?

If the answer is yes for question 1-1, then the UCI containing the concerned CSI report may be multiplexed onto a PUSCH of primary PUCCH group, which involves a cross-PUCCH-group UCI multiplexing.

Companies’ views are very welcome.

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### Question 1-3: In addition to a reply LS, is it necessary to have any clarification in RAN1 specification or as a RAN1 conclusion to capture the outcome of the discussion on Q1?

Companies’ views are very welcome.

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## Q2: Whether the above observation is correct, i.e. the identified four cases are not supported by the current RAN1 and RAN2 specification

In the received RAN4 LS, the identified four cases refer to

* *unknown FR1 PUCCH SCell activation with a valid TA*
* *unknown FR2 PUCCH SCell activation with a valid TA*
* *unknown FR1 PUCCH SCell activation without a valid TA*
* *unknown FR2 PUCCH SCell activation without a valid TA*

Since the reply LS will provide a view of RAN1 only, the discussion here **can focus more on RAN1 specification.**

Companies’ views are very welcome.

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## Q3: Whether the above identified cases can be supported by RAN1 and RAN2 spec updates within Rel-17 timeframe.

### Question 3-1: Whether the above identified cases can be supported by RAN1 and RAN2 spec updates within Rel-17 timeframe?

Companies’ views are very welcome.

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### Question 3-2: If needed, any potential solution to support the identified cases? Any comments on the proposed solutions in [4] and [7] as copied below?

In [4], three alternatives are proposed,

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| * *UE transmits L1-RSRP report repetitively on different beams until the PUCCH SCell is activated successfully*
* *Allow UE to transmit the CSI report (e.g. L1-RSRP) on SpCell for target PUCCH SCell before the PUCCH SCell is activated*
* *Allow UE to perform CBRA RACH process on the PUCCH SCell*
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In [7], some analysis were provided for three alternatives below,

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| * *Option 2: CBRA on PUCCH SCell*
	+ *Based on the preferred SSB and associated PRACH, the common understanding on preferred beams can be established*
* *Option 3: BFR for PUCCH SCell using the primary PUCCH group when it is being activated*
	+ *The UE can inform preferred beam via MAC-CE on a PUSCH in the primary PUCCH group*
* *Option 4: L3 measurement based (no spec support)*
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Companies’ views are very welcome.

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## Issues that might be out of scope of this email thread

This email thread is about NR-CA. However, in [7], a proposal with respect to NR-DC is proposed, which is “***Clarify that “For NR-DC, CSI measured on a DL cell in a first cell-group is reported on a UL cell in a second cell-group” is not supported.***”

Since it is not relevant to the received RAN4 LS, the discussion on NR-DC is deprioritized. It may come back only if time permits. But if any companies have comment on it, it could be provided below.

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## Other Issues

Issues or comments that do not fit in any of the previous sections of this document can be provided in this section.

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# Conclusions

# References

1. R1-2108704 LS on beam information of PUCCH Scell in PUCCH SCell activation procedure RAN4, Huawei
2. R1-2108944 Draft Reply LS on beam information of PUCCH SCell in PUCCH SCell activation procedure vivo
3. R1-2109463 Draft Reply LS on beam information of PUCCH SCell in PUCCH SCell activation procedure Samsung
4. R1-2109550 Draft reply LS on beam information of PUCCH SCell in PUCCH SCell activation procedure MediaTek Inc.
5. R1-2109587 [Draft] Reply LS on beam information of PUCCH SCell in PUCCH SCell activation procedure ZTE
6. R1-2110009 Discussion on RAN4 LS R1-2108704 on beam information of PUCCH Scell in PUCCH SCell activation procedure Apple
7. R1-2110158 Discussion on LS on beam information of PUCCH SCell in PUCCH SCell activation procedure Qualcomm Incorporated
8. R1-2108775 Reply LS on beam information of PUCCH SCell in PUCCH SCell activation procedure Huawei, HiSilicon

# Appendix: