3GPP TSG RAN WG1 #109-e R1-22xxxxx

e-Meeting, May 9th – 20th, 2022

**Agenda item: 7.1**

**Source: Moderator (Qualcomm)**

**Title: [109-e-NR-CRs-12] On parallel transmission of SRS and other channels**

**Document for: Discussion**

# Introduction

In [1], the issue of simultaneous transmission of SRS and other channels for intra-band non-contiguous CA was brought up.

In particular, the following two capabilities are mentioned:

| ***parallelTxSRS-PUCCH-PUSCH***Indicates whether the UE supports parallel transmission of SRS and PUCCH/ PUSCH across CCs in an inter-band CA band combination. | BC | No | N/A | N/A |
| --- | --- | --- | --- | --- |
| ***parallelTxPRACH-SRS-PUCCH-PUSCH***Indicates whether the UE supports parallel transmission of PRACH and SRS/PUCCH/PUSCH across CCs in an inter-band CA band combination. | BC | No | N/A | N/A |

And the following paragraph in TS 38.214:

In case of intra-band carrier aggregation or in inter-band CA band combination if simultaneous SRS and PUCCH/PUSCH transmissions are not supported by UE, the UE is not expected to be configured with SRS from a carrier and PUSCH/UL DM-RS/UL PT-RS/PUCCH formats from a different carrier in the same symbol.

In case of intra-band carrier aggregation or in inter-band CA band combination if simultaneous SRS and PRACH transmissions are not supported by UE, the UE shall not transmit simultaneously SRS resource(s) from a carrier and PRACH from a different carrier.

The issue discussed in [1] is whether intra-band non-contiguous should be treated as intra-band or inter-band. In [1], it is argued that intra-band non-contiguous CA may be similar to inter-band, since the signaling for a BC is by repeating the same band more than once, and also the UE may physically use multiple power amplifiers for the different carriers (unlike the intra-band contiguous, which is assumed to use a single power amplifier).

TPs for clarifying that the capability is applicable to intra-band non-contiguous CA are provided in [1] and presented in the appendix for completeness.

In line with the points above, the Feature Lead proposes the following two points for discussion:

# Email discussion

**Q1: Do you agree that a UE operating in intra-band non-contiguous CA should be able to indicate the capability for simultaneous SRS and PUCCH/PUSCH, or simultaneous PRACH and SRS/PUCCH/PUSCH across CCs?**

**NOTE: This feature is optional, i.e., if a UE does not support this capability for a given band combination, it can skip including it.**

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| --- | --- |
| **Company** | **Comment** |
| ZTE | Technically, yes. We are open to introduce a new UE feature group for Rel-17, but not for Rel-15 and 16. In tdoc R1-2204555, the following agreement (RAN1#93) is listedAgreements(RAN1#93):* The UE is not expected to be configured to transmit on the same OFDM symbol with an SRS resource and a PUCCH/PUSCH across different CCs in intra-band CA
	+ Note: no spec change is needed.

In the agreement, it is clear that intra-band CA include both contiguous and non-contiguous CCs.  |
| Qualcomm | Yes |

**Q2: If the answer to Q1 is “yes”, do you agree to clarify the above in TS 38.214 and TS 38.306? (and from which release)**

**NOTE: This would require an LS to RAN2 for the changes in TS 38.306**

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| **Company** | **Comment** |
| ZTE | We are OK to update TS 38.306 for Rel-17 only.  |
| Qualcomm | Yes, we agree. Regarding the release, we understand changing Rel-15 or 16 may be a bit too late, we are open to solving it in Rel-17.We would also like to note that we do not need to introduce a new feature group (or modify ASN.1) for this purpose, the legacy one can be used without interoperability issues (since the indication is per band combination). |

# References

[1] R1-2204973 On parallel transmission of SRS and other channels Qualcomm Incorporated

# Appendix – TPs from [1]

**=====================================TP1 38.306 ======================================**

| ***parallelTxSRS-PUCCH-PUSCH***Indicates whether the UE supports parallel transmission of SRS and PUCCH/ PUSCH across CCs in an inter-band or intra-band non-contiguous CA band combination. | BC | No | N/A | N/A |
| --- | --- | --- | --- | --- |
| ***parallelTxPRACH-SRS-PUCCH-PUSCH***Indicates whether the UE supports parallel transmission of PRACH and SRS/PUCCH/PUSCH across CCs in an inter-band or intra-band non-contiguous CA band combination. | BC | No | N/A | N/A |

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**=====================================TP2 38.214 ======================================**

In case of intra-band contiguous carrier aggregation, or in inter-band or intra-band non-contiguous CA band combination if simultaneous SRS and PUCCH/PUSCH transmissions are not supported by UE, the UE is not expected to be configured with SRS from a carrier and PUSCH/UL DM-RS/UL PT-RS/PUCCH formats from a different carrier in the same symbol.

In case of intra-band contiguous carrier aggregation, or in inter-band or intra-band non-contiguous CA band combination if simultaneous SRS and PRACH transmissions are not supported by UE, the UE shall not transmit simultaneously SRS resource(s) from a carrier and PRACH from a different carrier.

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