3GPP TSG RAN WG1 #104b-e R1-210xxxx

e-Meeting, April 12th – 20th, 2021

**Agenda item:** 7.1

**Source:** Moderator (Qualcomm Incorporated)

**Title:** [104b-e-NR-7.1CRs-06] Timelines for SRS carrier switching

**Document for:** Discussion and Decision

# Background

In RAN#104-e, the following conclusion was reached.

**Conclusion**

For the dropping rules for SRS carrier switching, at least for Rel-16, the UE may only be able to take into account

* the DCI(s) received *SRS-SwitchingTime* + *N2* before the SRS transmission and N2 before the conflicting channel transmission, and
* the SP-CSI and SP-SRS considered active *SRS-SwitchingTime* + *N2* before the SRS transmission and N2 before the conflicting channel transmission

N2 is the time interval corresponding to the smaller subcarrier spacing between the source and target CCs, and the corresponding scheduling cells.

Discuss in RAN1#104b-e whether and how to capture the above in the specification for Rel-16.

In R1-2103141, the following change is proposed to capture the above conclusion:

6.2.1.3 UE sounding procedure between component carriers

For an SRS transmission starting in symbol $N\_{c\_{1}}$ of a carrier $c\_{1}$ with slot formats comprised of DL and UL symbols, not configured for PUSCH/PUCCH transmission, and with $c\_{2}$ carrier the UE is configured to switch from according to higher layer parameters *srs-SwitchFromServCellIndex* and *srs-SwitchFromCarrier*, for a conflicting transmission in $c\_{2}$ starting in symbol$ N\_{c\_{2}}$ the UE shall apply the rules in the remaining of this subclause based on:

* DCI(s) for which the time interval between the last symbol of PDCCH and $N\_{c\_{1}}$ is at least$ N\_{2} $symbols and an additional time duration $T\_{SRS\_{CS}}$, and the time interval between the last symbol of PDCCH and $N\_{c\_{2}}$ is at least $ N\_{2}$ symbols*;* and
* semi-persistent CSI reports or SRS for which the HARQ-ACK information on PUCCH in response to the activation command would be transmitted in slot $n$, and $N\_{slot}$ being the first symbol of the first slot which is after slot $n+3N\_{slot}^{subframe,μ}$, and the time interval between $N\_{slot}$ and $N\_{c\_{1}}$ is at least $N\_{2}$ symbols and an additional time duration $T\_{SRS\_{CS}}$, and the time interval between $N\_{slot}$ and $N\_{c\_{2}}$ is at least $N\_{2}$ symbols, where $μ$ is the SCS configuration of the PUCCH.

where $T\_{SRS\_{CS}}=max⁡\{switchingTimeUL,switchingTimeDL\}$, and the time interval unit of OFDM symbol is counted based on the minimum subcarrier spacing given by $min⁡\{μ\_{PDCCH,c\_{1},} μ\_{SRS,c\_{1}},μ\_{PDCCH,c\_{2},} μ\_{UL,c\_{2}}\}$, with $μ\_{PDCCH,c\_{1},}$ the SCS configuration for the PDCCH carrying the triggering commands for the SRS in $c\_{1}$, $μ\_{SRS,c\_{1}}$ the SCS configuration for SRS in $c\_{1}$, $μ\_{PDCCH,c\_{2}}$ the SCS configuration for the PDCCH that schedules PUSCH in $c\_{2}$, and $μ\_{UL,c\_{2}}$ the SCS configuration for the PUSCH in $c\_{2}$.

1. Discussion

**Do you agree with the change in 3141? Please provide justification for your answer:**

|  |  |  |
| --- | --- | --- |
| Company | Agree with 3141? | Comments |
| FUTUREWEI | No | As we stated in previous meeting, gNB can handle the situation by proper implementation and the CR is not needed.  |
| ZTE | No | We also think the previous conclusion is enough. |
| Qualcomm | Yes | We are a bit puzzled by the comments that the conclusion is enough and/or gNB implementation can handle this issue.First, we think the conclusion cannot be reached based on the current specification (if this is not true, please let us know where we can find these timelines in current specification). Thus, we are creating a “parallel specification” in Chairman’s notes, which is definitely a bad practice.Second, the notion that the issue can be solved by “gNB implementation” is a bit misleading. The timelines specify how much time the UE has to perform a given action (in this case, to decide whether to transmit SRS or not). Without this definition, and based on a strict reading of current specification, a UE implementer will conclude that the UE has to perform dropping with timelines that are impossible to meet.In summary:1. Let’s not create parallel specification in Chairman’s notes.
2. We need to define the timelines, this can’t be solved by implementation.

We would encourage companies to consider the points above and start discussing the details of the CR. |
| Huawei | No | We also think that the conclusion is sufficient since gNB implementation will ensure proper gaps requested by above conclusion, to protect UE implementation and avoid defining further detailed rules during CR phase.  |
| MediaTek | Yes | We share similar view with Qualcomm and prefer to capture clear timeline for UE behavior check in spec. |
| Nokia, NSB | Possibly | The UE processing timelines are not something to be specified in the chairman’s notes. These timelines are missing and as long as the are not in the specs, the SRS carrier switching is undefined, or at best a proprietary design. So we can either specify the timeline determine what to do with an incompletely defined feature, e.g indicate in the UE capabilities that the feature is not supported in this release. |
| Ericsson | In principle | We agree a clearer timeline would be good to have. Candidly, the CR is still pretty hard to parse, so if the CR can be simplified, that would be helpful to implementers. |
| Samsung | Not essential | We don’t think that this CR is essential. UE can report UE capabilities for N2 (ProcessingParameters) and SRS switching time (SRS-SwitchingTimeNR) first and then, gNB can schedule UL signals (PUSCH, SRS) based on the reported UE capabilities (N2 and SRS switching time). In this manner, we cannot see the reason why gNB schedules UL signals with the problematic timeline. Therefore, we think this CR is not essential and the conclusion in the previous meeting (RAN1#104e) is enough. |