**3GPP TSG-RAN WG4 Meeting #114 R4-2502862**

**Athens, Greece, 17th Feb 2025 – 21st Feb 2025**

**Title:** WF on 6Rx requirements

**Agenda Item:** 7.1.3

**Source:** AT&T

**Document for:** Approval

# Topic 1: SRS antenna switching and ΔTRxSRS

## Sub-topic 1-1: General considerations for SRS antenna switching and ΔTRxSRS

**Issue 1-1-1: Whether to consider a subset of available patterns for 3T6R AS-SRS**

**Agreement**: Consider all available patterns for 3T6R AS-SRS.

## Sub-topic 1-2: ΔTRxSRS values

**Issue 1-2-1: Proposed ∆TRxSRS values for t3r6, t1r6-t3r6, t2r6-t3r6, and t1r6-t2r6-t3r6**

**Agreement**: Use the values for ΔTRxSRS from the WF in R4-2420376 as shown in the table below.

Table: ΔTRxSRS values

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating Bands | ΔTRxSRS t3r6 (dB) | ΔTRxSRS t1r6-t3r6 (dB) | ΔTRxSRS t2r6-t3r6 (dB) | ΔTRxSRS t1r6-t2r6-t3r6 (dB) |
| Band n41, n77, n78 | 3.0 | 4.5 | 4.0 | 5.5 |
| Band n79 | 4.5 | 6.0 | 5.5 | 7.0 |
| Band n104 | 5.0 | 7.0 | 6.0 | 8.0 |

# Topic 2: MIMO layer evaluation for 6Rx UE

## Sub-topic 2-1: General considerations for MIMO layer evaluation for 6Rx UE

**Issue 2-1-4: Way forward for 6-layers support for handheld UE and FWA devices**

**Way Forward**:

- RAN4 Chair to take note of the following in the meeting report:

- “RAN4 unable to conclude on a common set of simulation assumptions to determine feasibility of 6 layer for handheld UE In Rel-19”

- 6-layer performance requirements will be only defined for FWA.

- 4-layer performance requirements will be defined and will apply to FWA and handheld UE devices.

- Differentiation of handheld UE supporting 4-layers and FWA supporting 6-layers will be explicitly captured at least in the RAN4 specifications.

**Issue 2-2-2: 6-layer Support as optional feature**

**Way Forward**: RAN4 to further discuss if 6-Layer support should be considered an optional feature per the following.

- Introduce 6 MIMO layers support as an optional feature.

# Topic 3: SRS IL imbalance issue

## Sub-topic 3-1: General considerations for SRS IL imbalance issue

**Issue 3-1-1: Whether to solve SRS IL imbalance issue in Rel-19**

**Way Forward**: RAN4 to further discuss the following options.

- Option 1: RAN4 should not continue the discussion on how to solve the SRS IL imbalance issue.

- Option 2: Continue to pursue a solution to the SRS IL imbalance issue based on the candidate solution framework with minimal impact to the specification and to indicate the specific impacts to RAN1, RAN2, and RAN4 specifications and performance gain based on the outcome of Issue 3-2-1.

**Issue 3-1-2: Initial Considerations for SRS IL imbalance issue**

**Way forward**: RAN4 to focus on refining the compromised solution framework in Issue 3-2-1.

## Sub-topic 3-2: SRS IL imbalance issue solutions

**Issue 3-2-1: Candidate solutions for the SRS IL imbalance issue**

**Way forward**: RAN4 to further discuss the candidate solution framework below and consider the additional proposals presented at RAN4#114 and their impact on the candidate solution framework. Companies are encouraged to provide expected benefit/performance gains and draftCRs so that the impacts to RAN1, RAN2, and RAN4 specifications (for RAN1 and RAN2, a description of the necessary changes is sufficient if draftCRs are not possible) can be further discussed.

Candidate solution framework:

- UE performs self-compensation of SRS IL up to its configured maximum output power.

- FFS on whether condition would introduce any additional RAN4 performance requirement. No RAN1 specification impact.

- UE provides assistance to the network on SRS IL compensation (semi-static and/or dynamic), e.g.

- Per SRS resource power headroom reporting

- Configured maximum output power per SRS resource reporting

- SRS insertion loss value reporting (per SRS resource or per UE)

- Other

- ΔPPowerClass reporting is proposed as a package with per SRS resource power headroom and configured maximum output power per SRS resource reporting.

- Others

- Details of SRS IL self-compensation and assistance framework are FFS

Proposals:

* Proposal 1: The self-compensation should be triggered only if the PCMAX,f,c with IL influence is smaller than the necessary SRS power.
* Proposal 2: UE should report whether supporting SRS IL self-compensation or not, and the compensation as well as reporting should all be activated by configuration.
* Proposal 3: Single digit optional capability to indicate self-compensation of SRS IL up to its maximum Tx power capabilities.
* Proposal 4: If UE reports statically, report the actual SRS insertion loss with no UE self-compensation.
* Proposal 5: If UE reports dynamically, UE report the difference value of each diversity branch output power to NW according to the SRS period (including periodic, semi-persistent and aperiodic) in real time.
* Proposal 6: Reporting power threshold needs to be considered for static reporting and dynamic reporting.
* Proposal 7: The granularity of reporting could be per SRS resource or per band.
* Proposal 8: If dynamic reporting for actual SRS IL reporting for each SRS-TxSwitch pattern is considered, several thresholds associated with capability class for the actual SRS IL reporting can be considered.
* Proposal 9: To keep the current UE implementation untouched and avoid RAN1&RAN4 specification impact to most extent, following solution can be considered in Rel-19:

- UE is allowed to indicate whether it enables self-compensation on the SRS IL once the network requests such information, which would benefit the network by adjusting expectation on the antenna switching SRS based PMI estimation.

- Proposal 10: Adjust the existing equations on PCMAX\_L,f,c so that UE applies compensation up to UE-specific SRS IL.

**PCMAX\_L,f,c = MIN {PEMAX,c– ∆TC,c, (PPowerClass – ΔPPowerClass + ΔPPowerBoost) – MAX(MAX(MPRc+∆MPRc, A-MPRc)+ ΔTIB,c + ∆TC,c +∆TRxSRS,UE, P-MPRc) }**

* Proposal 11: Introduce UE assistance signalling on the information on the UE SRS IL (∆TRxSRS,UE). Consider at least static reporting.
* Proposal 12: UE provides dynamic assistance to the network on SRS IL compensation.