**3GPP TSG RAN WG1 #119 R1-2410756**

**Orlando, US, November 18th – 22nd, 2024**

**Agenda item:** 9.2.2

**Source:** Moderator (Samsung)

**Title:** Moderator Summary for 3rd offline on Rel-19 CSI enhancements

**Document for:** Discussion and Decision

## Introduction

The following proposals were discussed.

## Summary of proposals

### Issue 1 (WID objective 2a and 2b): Type-I and Type-II codebook refinement for up to 128 CSI-RS ports

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| 1.2 | **Proposal 1.B**: For the Rel-19 Type-I SP codebook refinement for 48, 64, and 128 CSI-RS ports, extend the agreed Scheme-A and Scheme-B to 16, 24, and 32 CSI-RS ports, for all applicable RI values with K=1 only, and without any further modification/enhancement of the sub-features pertinent to the Rel-19 Type-I SP design (including, e.g. the Rel-19 Type-I SP CBSR, soft scaling).* For the Rel-19 Type-I SP codebook, the support for 16, 24, and 32ports are 3 separate UE capabilities from the support for the previously agreed number of ports (48, 64, 128 ports)
* The Rel-18 SD NES schemes applicable to Rel-15 Type-I SP codebooks are also applicable to the extension of the Rel-19 Type-I SP codebook to 16, 24, and 32 ports
* FFS: whether to adopt the extended orthogonal set for the 2nd SD basis for Scheme-A, RI=2-4 and 16, 24, and 32 CSI-RS ports

**FL assessment**: This was discussed OFFLINE [1] as well as OFFLINE-2. We have tried the possibilities of extending only Scheme-A, but the number of companies raising concerns is very large. The same goes with only Scheme-B. FFS:* Yes: Nokia/NSB,
* No: NTT DOCOMO, NTT CORP, ZTE, Tejas, MediaTek,
 | **Support/fine:** ZTE, IDC, Samsung, Xiaomi, Nokia/NSB, NEC, Fujitsu, NTT DOCOMO, NTT CORP, Spreadtrum, UNISOC, CMCC, MediaTek, Ericsson, Apple, Google, IDC, Tejas, Sharp, Orange, Lenovo/MotM (ok, low priority), China Telecom, KDDI, Intel (ok), New H3C,**Strong concern:** vivo, CATT, OPPO |

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| 1.4. | **Proposal 1.D**: For the Rel-19 Type-I SP codebook refinement for P=48, 64, 128 CSI-RS ports, regarding Scheme-B, when the UE is configured to report wideband CSI on PUCCH:* For PUCCH format 2, one-part CSI is used
* For PUCCH formats 3 and 4, two-part CSI is used where SD basis selection is reported in CSI-part2
	+ CSI fields in CSI-part1 and part2 follows the legacy sub-band CSI

**FL assessment**: This proposal is scheme-B optimization for WB PUCCH reporting. Whether a two-part CSI is needed or not can be discussed, e.g. whether the difference in payload across RIs is enough to justify the use of two-part CSI on PUCCH F3/4 especially for WB.* From moderator perspective, **the difference in payload across RIs will be much larger when Nrep>1 is configured to be reported on the same PUCCH**.
	+ **[JD/Qualcomm] Nrep>1 on PUCCH is practical for CA, since only one (or optionally, two) cell can have PUCCH to convey all DL CCs’ CSI reports.**
* To minimize spec impact, PF2 is still kept 1-part (since 2-part isn’t supported for PF2 in legacy).
* Therefore, this proposal is technically sound
 | **Support/fine:** Qualcomm,Xiaomi (open), Fraunhofer IIS/HHHI (open), Samsung (ok), Tejas (open), vivo (open), Sharp, NTT DOCOMO, NTT CORP, Apple (open), TCL, **Not support:** Google, CMCC, Lenovo/MotM, OPPO, Fujitsu, ZTE, CATT, Spreadtrum, Intel, Huawei/HiSi, New H3C, |

### Issue 2 (WID objective 2c): CRI-based CSI for hybrid beamforming (HBF)

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### Issue 3 (WID objective 3): CJT calibration reporting for non-ideal synchronization and backhaul

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| 3.5.2 | **Proposal 3.E.2**: For the Rel-19 aperiodic standalone CJT calibration (CJTC) reporting, when linking CJTC Dd and Rel-18 eType-II CJT CSI reports is configured with two separate triggers, when at least one of the NTRP reported delay offset (DO) values in a linked CJTC Dd report is ‘out of range’, the UE does not perform DO compensation on the triggered Rel-18 eType-II CJT CSI associated with TRP(s) that are ‘out of range’**FL assessment**: Tuesday **OFFLINE** outcome in RAN1#118bis.  | **Support/fine**: Huawei/HiSi, Qualcomm, Samsung, Ericsson, Sony, Lenovo/MotM, Xiaomi, NEC, HONOR, OPPO, Google, NTT DOCOMO, NTT CORP, MediaTek, Spreadtrum, vivo (open), Sharp, Intel (ok), Sony, Apple, KDDI, New H3C, **Not support**: Nokia/NSB, ZTE, IDC, CATT, Fujitsu, Rakuten, TCL, |

# References