**3GPP TSG RAN WG1 #118bis R1-2409061**

**Hefei, China, October 14th – 18th, 2024**

**Agenda item:** 9.2.2

**Source:** Moderator (Samsung)

**Title:** Moderator Summary for 1st 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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| 1.5 | **Proposal 1.E**: 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 the legacy number of CSI-RS ports (i.e. 4, 8, 12, 16, 24, and 32 ports) for all applicable RI values (1, …, min(PCSI-RS,8)) 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).* [The following of Rel-19 Type-I SP are four separate UE features: (1) Scheme-A >32port; (2) Scheme-B >32port; (3) Scheme-A ≤32port; (4) Scheme-B ≤32 port.]

**FL assessment**: This proposal is sound for the completeness of Rel-19 Type-I SP codebook. Note that this doesn’t impact the legacy Rel-15 Type-I SP design.Re whether this is OOS or not, the WID says “… supporting **up to a total of 128 CSI-RS ports** across all resources, assuming **legacy CSI-RS resources (with up to 32 CSI-RS ports per resource)**, …” which, strictly speaking, doesn’t preclude <=32 ports. So this extension proposal is not OOS. | **Support/fine:** ZTE, Lenovo/MotM, IDC, Samsung (ok), Xiaomi, Nokia/NSB, NEC, Fujitsu, Intel (FFS capability), NTT DOCOMO, CATT (only Scheme-B, no scheme-A), Spreadtrum, CMCC, MediaTek (ok with bullet), **Not support:** Google (OOS),OPPO,Huawei/HiSi, vivo, HONOR, Apple, TCL, Fraunhofer IIS/HHI, Tejas,  |

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

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| 2.1.1 | **Proposal 2.A.1**: Amend the agreement on Monday online session as follows:**Agreement**: For the Rel-19 CRI-based CSI refinement for up to 128 CSI-RS ports, regarding priority 0 (G0)/wideband in CSI part 2, the UCI packing order is as follows:* The G0 for the 1st configured CMR among the non-reported MR CRIs;
* …
* The G0 for the last configured CMR among the non-reported MR CRIs;
* The G0 for the 1st reported CRI;
* …
* The G0 for the (M- MR)-th reported CRI;

The entire G0 is either reported or dropped entirely, following the legacy principle.**FL assessment**: This amendment is needed to capture the behaviour for wideband part in CSI part 2 |  |
| 2.2.2 | **Proposal 2.A.2**: For the Rel-19 CRI-based CSI refinement for up to 128 CSI-RS ports, regarding periodic wideband CQI/PMI reporting, the UCI packing order is as follows:* The wideband CQI/PMI for the 1st reported CRI;
* …
* The wideband CQI/PMI for the M-th reported CRI;

**FL assessment**: This proposal addresses only P-CSI reporting  | **Support/fine**: Huawei/HiSi, Tejas, ZTE, CATT, HONOR, Lenovo/MotM, IDC, New H3C, Google, Samsung, Qualcomm, NTT DOCOMO, Ericsson, OPPO, Xiaomi, Nokia/NSB, NEC, Fujitsu, HONOR, Sharp, Intel, Apple, Spreadtrum, CMCC, Huawei/HiSi, MediaTek, Tejas, **Not support**: |

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

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| 3.3.12 | **Question 3.C.12**: 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, please share your view, if any, on the following FFS: “Details on signalling design for the indicator including whether it is per CSI-RS resource/Dd value and the associated UE behaviour(s)”* Alt1. The indicator indicates whether the linked Dd report is successfully decoded or not (i.e. ACK/NACK)
* Alt2. The indicator indicates whether the Rel-18 eType-II CJT CSI is calculated assuming the latest linked CJTC Dd report
* …

**FL assessment**: This issue pertains to the interpretation of the indicator. Note that Alt1 and Alt2 do not exclude each other. The following issues will be discussed in later rounds: 1) detailed hypotheses for the second trigger, 2) whether to include the indicator as a part of trigger state, or elsewhere (without introducing a new DCI field), 3) whether it is per CSI-RS resource or for all resources (TRPs) |
| 3.3.5 | **[118] Agreement**For the Rel-19 aperiodic standalone CJT calibration (CJTC) reporting, to facilitate UE-specific delay offset pre-compensation on PDSCH by the NW, support configuring a UE (via RRC signalling) to perform PMI calculation for the Rel-18 eType-II CJT CSI report assuming pre-compensation using the UE-reported delay offset (when ReportQuantity is ‘cjtc-Dd’). * The two separately configured reports (i.e. Rel-18 eType-II CJT CSI report and the CJTC delay offset report) can be separately or jointly triggered [and carried on a same PUSCH (hence on a same slot)] following legacy joint triggering mechanism
	+ (Working Assumption) When separately triggered, the delay offset value to be compensated is the latest reported delay offset (DO) whose reporting instance’s last symbol is before the first symbol of DCI triggering of the CJT CSI reporting
		- FFS: whether some expiration time interval is needed

**Proposal 3.C.5**: 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, introduce a UE capability for an expiration timer for a CJTC Dd report* The UE capability is used to inform the NW on the maximum duration for the latest CJTC Dd report, measured from the reception of the trigger for a Rel-18 eType-II CJT CSI

**FL assessment**: This issue was briefly mentioned discussed OFFLINE [2]. Its resolution may help confirming the WA for separate triggering (issue 3.3.1 proposal 3.C.1). This is intended to avoid stale Dd report from being utilized. However, it can be argued that this can be handled via NW implementation. | **Support/fine**: Lenovo/MotM, ZTE, Samsung (but no timer in RAN1 spec), Qualcomm (same as SS), vivo (same as SS), Ericsson (same as SS), OPPO (same as SS), Xiaomi, Nokia/NSB, Huawei/HiSi, NEC, HONOR, Sharp, KDDI, MediaTek, **Not support**: Google, Spreadtrum, NTT DOCOMO, Intel, Apple, CATT, Sony, TCL, Spreadtrum,  |

# References