**3GPP TSG RAN WG1 #117 R1-2405678**

**Fukuoka, Japan, May 20th – 24th, 2024**

**Agenda item:** 9.2.2

**Source:** Moderator (Samsung)

**Title:** Moderator Summary of Thursday 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

### 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

**Proposal 3.B.2**: For the Rel-19 aperiodic standalone CJT calibration reporting, when ReportQuantity is ‘cjtc-P’ (DL/UL phase offset), support >1 (sub-band reporting) as follows:

* A sub-band size is selected from {8,16} PRBs
	+ The sub-band size is NW-configured via higher-layer (RRC) signalling
* Denoting the number of sub-bands within the configured CSI reporting band as NSB-P, and the sub-bands are indexed as {0, 1, …, NSB-P –1}, decide, by RAN1#117, from the following reporting options:
	+ Opt1: {(n,, n), n=0, 1, …, NTRP – 1, n≠nref}, where n,is the phase offset corresponding to sub-band 0 and the phase offset for sub-band  can be calculated as n, + n
		- $Γ\_{n}\in \left\{0,\frac{2π}{M\_{Γ}}, ….,\frac{2π(M\_{Γ}-1)}{M\_{Γ}}\right\}$, where $M\_{Γ}$={64, 128}
	+ Opt2: = NSB-P, i.e. {(n,, n,, n,NSB-P), n=0, 1, …, NTRP – 1, n≠nref}
		- The alphabet for n, follows the previously agreed alphabet for =1, including the ‘invalid’ state
		- The maximum NSB-P is 4
	+ Note: For all the above reporting options, the UE performs measurement over the entire configured CSI reporting band
	+ Opt1 and Opt2 are separate UE capabilities
* FFS: Further restriction on CSI-RS (e.g. RE density)

**Support/fine (Opt1+2)**: ZTE, Qualcomm, CATT, Ericsson, Samsung, Fujitsu, NEC, TCL, Sony, KDDI, CMCC, NICT, Sharp, MediaTek, Huawei/HiSi, NTT DOCOMO, NewH3C

**Strong Concern**: vivo, Nokia/NSB, [Google], [Lenovo/MotM], [Intel], [IDC],

**Support only Opt1**:

**Strong Concern**: vivo, Samsung, Lenovo/MotM, CATT, Panasonic, Nokia/NSB,

**Support only Opt2**: Lenovo/MotM, Intel, Panasonic, Nokia/NSB, OPPO, Apple, Google

**Strong Concern**: vivo, Qualcomm, ZTE, Ericsson

**Proposal 3.E.2**: For the Rel-19 aperiodic standalone CJT calibration reporting, when ReportQuantity is ‘cjtc-Dd-F’ (joint Doffset+d and FO)

* Fully reuse timeline and active resource counting from Rel-18 TDCP reporting
* OCPU = 2X.NTRP where X≥1 is defined based on UE capabilities and determined by the UE for each CJT calibration report type

**Support/fine:** ZTE, Samsung, OPPO, CATT, NTT DOCOMO, vivo, TCL, Intel, Sony,

**Not support:** Huawei/HiSi

**Proposal 3.H.4**: For the Rel-19 aperiodic standalone CJT calibration reporting, regarding the applicable type(s) of the configured NTRP NZP CSI-RS resources/resource sets when ReportQuantity is ‘cjtc-P’ (DL/UL phase offset), 1 ‘CSI-RS for CSI’ resource set with NTRP resources is supported

* FFS: 1 CSI resource set with P$⋅$NTRP resources where P>1 is the number of CSI-RS resources per TRP

**Support/fine:** Samsung, OPPO, CATT, Huawei/HiSi, NTT DOCOMO, vivo, Qualcomm, Sony,

**Not support:**

# References