**3GPP TSG RAN WG1 #117 R1-2404090**

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

**Agenda item:** 8.1

**Source:** Moderator (Samsung)

**Title:** Summary for Rel-18 MIMO CSI maintenance

**Document for:** Discussion and Decision

## Introduction

This contribution includes the summary for maintenance issues on Rel-18 CSI enhancements for MIMO Evolution.

## Summary of companies’ proposals and views

### Issue 1: Type-II codebook refinement for CJT

(none)

Table 1 Additional inputs: issue 1

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| --- | --- |
| **Company** | **Input** |
| Mod V0 | **none** |
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### Issue 2: Type-II codebook refinement for high/medium UE velocities (with time/Doppler-domain compression)

**Proposal 1.A**: For the Rel-18 Type-II codebook refinement for high/medium-speed, adopt the following TP for TS 38.214

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| --- |
| TS 38.214 |
| **Reason for change:** |
| In current specification, the value of w used for relaxing aperodic CSI reporting time for Rel-18 Type II codebook is not given. In addition, it is not clear how to obtain value of w. According to agreement on the UE feature achieved in RAN1#116-bis meeting, the value of w is equal to 14\*(KP–1)\*d or 14\*KP\*d symbols, where the value of K\_P∈{1,2,4} is indicated by UE capability, and d is is the periodicity of periodic or semi-persistent CSI-RS resource. The value of w is reported by UE capability indication. Such agreement should be caputured in current specification for clarification |
| **Summary of change:** |
| Clarify the value of w and how to obtain w in section 5.4.. |
| **Consequences if not approved:** |
| It is not unclear what is the value of w and how to obtain w.. |
| **Text proposal:** |
| 5.4 UE CSI computation time-------------------------------------------Unchanged parts are omitted-------------------------------------------….- $(Z\_{2},Z\_{2}^{'})$ or $(Z\_{2}+Z\_{2}^{'},2Z\_{2}^{'})$, according to UE reported capability, with $(Z\_{2},Z\_{2}^{'})$ of table 5.4-2, if *codebookType* is set to 'typeII-CJT-r18' or 'typeII-CJT-PortSelection-r18' and the corresponding *NZP-CSI-RS-ResourceSet* for channel measurement is configured with $1<N\_{TRP}\leq 4$ resources, or- $(Z\_{2}+14\left(K-1\right)m,Z\_{2}^{'})$, with $(Z\_{2},Z\_{2}^{'})$ of table 5.4-2, if the CSI report is configured with $N\_{4}=1$, *codebookType* is set to ‘typeII-Doppler-r18’ or ‘typeII-Doppler-PortSelection-r18’ and the corresponding *NZP-CSI-RS-ResourceSet* for channel measurement is aperiodic with $K$ CSI-RS resources, or- $(Z\_{2}+w,Z\_{2}^{'})$, with $(Z\_{2},Z\_{2}^{'})$ of table 5.4-2, where w=56.(*KP* –1) or 56.*KP* symbols, according to the reported UE capability, where the value of 𝐾𝑃 ∈{1,2,4} is indicated by UE capability, if the CSI report is configured with $N\_{4}=1$ , *codebookType* is set to ‘typeII-Doppler-r18’ or ‘typeII-Doppler-PortSelection-r18’ and the corresponding *NZP-CSI-RS-ResourceSet* for channel measurement is periodic or semi-persistent with a single CSI-RS resource, or- $(Z\_{2}+14\left(K-1\right)m,Z\_{2}^{'})$ or $(Z\_{2}+14\left(K-1\right)m+Z\_{2}^{'},2Z\_{2}^{'})$, according to UE reported capability, with $(Z\_{2},Z\_{2}^{'})$ of table 5.4-2, if the CSI report is configured with $N\_{4}>1$, *codebookType* is set to ‘typeII-Doppler-r18’ and the corresponding *NZP-CSI-RS-ResourceSet* for channel measurement is aperiodic with $K$ CSI-RS resources, or…-------------------------------------------Unchanged parts are omitted------------------------------------------- |
| **Support/fine**: Xiaomi**Not support**:**FL assessment**: This TP seems correct (based on RAN1#116bis agreement in UE feature session)  |

Table 2 Additional inputs: issue 2

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| **Company** | **Input** |
| Mod V0 | **Please share your inputs on each of the above proposals** |
| Lenovo/ MotM | We are fine with this TP |
| Samsung | We are fine with the TP in principle. It seems that the value of d = 4 is only agreed in UE feature session (checked the agreed modification on FG 40-3-2-11 in R1-2403703), we would like to suggest a modification to reflect this.where $w$=14.(KP–1).d or 14.KP.d symbols is reported by UE capability indication and d=4 is the minimum periodicity of periodic or semi-persistent CSI-RS resource |
| Google | OK, we slightly prefer the following modification. Since the value of w has already been defined in UE capability, we only need to specify w is based on the UE capability. We can also mention the UE capability name if necessary.where $w$~~=14.(K~~~~P~~~~–1).d or 14. K~~~~P~~~~.d symbols~~ is reported by UE capability ~~indication and d is the periodicity of periodic or semi-persistent CSI-RS resource~~ |
| Apple | We are fine with the proposal from Google, or we could replace d with 4, and align the Kp description with Section 5.2.1.6where $w$=56.(KP–1) or 56. KP symbols, according to UE reported capability, where the value of 𝐾𝑃∈{1,2,4} is indicated by UE capability. |
| ZTE | For readability, we are fine with either Samsung or Apple’s update. The original version is not sufficient due to the fact that the value of d is not defined in the corresponding paragraphs.  |
| vivo | We are fine with the update from Samsung or Apple to make the spec. clarity. |
| Mod Final | Seems the TP is agreeable. Taking into all the wording suggestions (agree with clarity from Samsung, minimizing duplicate description across specs from Google, and conciseness from Apple):Original Xiaomi’s wording:where $w$=14.(KP–1).d or 14. KP.d symbols is reported by UE capability indication and d is the periodicity of periodic or semi-persistent CSI-RS resourceRevised:where $w$=56.(KP –1) or 56.KP symbols, according to the reported UE capability, where the value of 𝐾𝑃∈{1,2,4} is indicated by UE capability. |

### Issue 3: TRS-based reporting of time-domain channel properties (TDCP)

(None)

Table 3 Additional inputs: issue 3

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| **Company** | **Input** |
| Mod V0 | **None** |
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# References

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| 1 | R1-2404977 | Draft CR on Rel-18 Type II Doppler codebook based CSI enhancement | Xiaomi |
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