**3GPP TSG RAN WG1#116bis R1-24xxxxx**

**Changsha, China, April 15th – 29th, 2024**

Source: Moderator (Nokia)

Title: [116bis-Pre-R18-NR] Summary of maxRank configuration restriction with fullpowerMode1 and transform precoding ‘enabled’

Agenda Item: 7

Release: Release 16

WI code: NR\_eMIMO-core

Document for: Discussion and Decision

# Introduction

A question on contradicting specification in the Rel-16 TS 38.212 table headings 7.3.1.1.2-3A/5A and the corresponding Precoding information and number of layers -bitfields in DCI formats 0\_1 and 0\_2 are in contradiction.

* Table headings condition the usage of the tables to *fullpowerMode1*, and [{CP-OFDM with *maxRank* = 1}, or {transform precoding with any *maxRank*}]
* DCI format 0\_1/0\_2 bitfields condition the usage of the tables to *fullpowerMode1*, and *maxRank*=1

The *maxRank* configuration is common for CG-PUSCH and DG-PUSCH, while the waveform is configured separately for the two.

Furthermore, the table headings 7.3.1.1.2-3A/5A do not refer to the *maxRankDCI-0-2* that is the condition to be applied with DCI format 0\_2.

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| **Ref** | **Proposals** |
| [1, 2] | **Proposal 1:** When the PUSCH to be transmitted in response to a DCI format 0\_1 is transform precoded, *txConfig* = *codebook,* *ul-FullPowerTransmission* = *fullpowerMode1*, the tables 7.3.1.1.2-3A and 7.3.1.1.2-5A apply regardless of the configured value of *maxRank*.  **Proposal 2:** When the PUSCH to be transmitted in response to a DCI format 0\_2 is transform precoded, *txConfig* = *codebook,* *ul-FullPowerTransmission* = *fullpowerMode1*, the tables 7.3.1.1.2-3A and 7.3.1.1.2-5A apply regardless of the configured value of *maxRank* or *maxRankDCI-0-2*.  **Proposal 3:** Agree to the TP according to the accompanying draft CR [2] |

# References

1. R1-2403313, On maxRank configuration restriction with fullpowerMode1 and transform precoding ‘enabled’, Nokia
2. R1-2403314 Correction to maxRank configuration restriction with fullpowerMode1 and transform precoding ‘enabled’, Nokia

# Discussion

Based on the Monday morning online discussion, several companies saw the discrepancy as something to be fixed, while some concerns were raised on whether there is any unclarity with the specification.

**Question 1:** Are you fine with the general direction proposed in [1]. If you have a concern, please explain.

Please provide your comments on the proposals 1 and 2 to the table below

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| Company | Comments |
| Apple | We are fine with the proposed CR |
| MTK | We support the proposed CR.  As discussed during online session, considering DG and CG PUSCH, it is not reasonable to fix maxRank = 1 for transform precoding. |
| Nokia | As the proponent we obviously support the correction and the CR |
| OPPO | We are fine with the proposed CR. |
| Ericsson | We support the CR. This seems to be a wording error, and as Nokia points out, the text describing the table is inconsistent with the table heading itself.  The use case of DFT-S-OFDM CG + CP -OFDM DG is quite reasonable, and the proposed correction avoids confusion that it would not be supported. |
| ZTE | Fine with the proposed CR for the wording error modification. |
| Samsung | We support the proposed CR. As we mentioned on online session, the limitation for the CP-OFDM transmission taking into account rank can be solved through this CR. |
| CATT | Fine with the CR. |

**Question 2:** Do you have specific comments or revision proposals to the draft CR in [2]?

Please provide your comments on the proposals 1 and 2 to the table below

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| Company | Comments |
| CATT | If the headings of Table7.3.1.1.2-x are to be revised, there are other instances of *maxRank* and *codebookSubset* that shall be changed to *maxRank/maxRankDCI-0-2 and codebookSubset/* *codebookSubsetDCI-0-2, e.g.,* Table 7.3.1.1.2-2. |
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