**3GPP TSG RAN WG1 #108-e R1-220xxxx**

**e-Meeting, February 21th – March 3rd, 2022**

**Agenda item:** 7.2.6

**Source:** Moderator (Samsung)

**Title:** Summary for Rel.16 NR eMIMO maintenance

**Document for:** Discussion and Decision

1. Introduction

The moderator summary of the maintenance-related issues raised in the submitted contributions for Rel.16 NR\_eMIMO maintenance is given below. The listed maintenance issues are under the usual designations:

* LP: low-PAPR RS
* MB: Multi-beam operation
* MT: Multi-TRP
* MU: Type-II enhancement for MU-CSI
* UL: UL full power transmission
* O: Other

An initial assessment on each of the issues is given (but can be revised based on the outcome of the discussion during the preparation week). The assessment will be used as a basis to select four issues (per chairman instruction) for further discussion in the upcoming weeks.

* *High priority (H):* this includes high-priority item (essential, pending issues, broken spec components) and proposed editorial changes that either enhance the clarity of the specs or correct mistakes
* *Non-essential (N)*: this includes all other purposes such as spec optimization and low priority issues
* *Editorial (E)*: this includes editorial issues that will be handled as editorial CRs (to be communicated to the editors/chairs) and thereby not counted toward the four-thread quota

1. Maintenance issues

The issues are summarized in the following table:

**Table 1 Summary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Issue (summary of CR proposal)** | **Companies** | **Initial assessment** | **Company inputs (if any)** |
| MT.1 |  |  |  |  |
|  |  |  |  |  |
|  | | | | |
| MU.1 | Correction on eType-II PMI indexing and reporting (R1-2201327)  TS 38.214 section 5.2.3  For Type II CSI feedback, Part 1 contains RI (if reported), CQI, and an indication of the number of non-zero wideband amplitude coefficients per layer for the Type II CSI (see Clause 5.2.2.2.3). The fields of Part 1 – RI (if reported), CQI, and the indication of the number of non-zero wideband amplitude coefficients for each layer – are separately encoded. Part 2 contains the PMI and LI (if reported) of the Type II CSI. The elements of , (if reported) and (if reported) are reported in the increasing order of their indices, , where the element of the lowest index is mapped to the most significant bits and the element of the highest index is mapped to the least significant bits. Part 1 and 2 are separately encoded  ...   * Group 0 includes indices (if reported), (if reported) and ().   FL: Proposed CR is correct and editorial in nature | CATT | E |  |
| MU.2 | Correction on eType-II freq granularity (R1-2201993)  Adding the following in TS 38.214 section 5.2.1.4 (based on Rel-17 agreement of new condition for wideband reporting, the following is proposed for Rel-16 eType-II)  reportQuantity is set to 'cri-RI-PMI-CQI', or 'cri-RI-LI-PMI-CQI', codebookType is set to 'typeII -r16' or 'typeII-PortSelection-r16' with M\_υ=1 and cqi-FormatIndicator is set to 'widebandCQI', or  FL: Not essential and could cause some late implementation change. Since this was proposed in past meeting(s) and some **conclusion is needed** – either without or after email discussion) | Samsung | N |  |
| MU.3 | Coefficient partitioning for eType-II (R1-2202121)  Proposal to change coefficient partitioning for eType-II based on agreement for Rel-17 Type-II codebook  Proposal: For Rel-16 Enhanced Type II and Enhanced Type II port-selection, clarify that UCI Group 1 includes the max(0,⌈K^NZ/2⌉-υ) highest priority elements of i\_(2,4,l) and the max(0,⌈K^NZ/2⌉-υ) highest priority elements of i\_(2,5,l) (l=1,…,υ). UCI Group 2 includes the min(K^NZ-v,⌊K^NZ/2⌋) lowest priority elements of i\_(2,4,l) and the min(K^NZ-v,⌊K^NZ/2⌋) lowest priority elements of i\_(2,5,l) (l=1,…,υ)  Need some change in TS 38.212 and 214.  FL: Not essential and could cause some late implementation change. | Qualcomm | N |  |
| MU.4 | Correction on # NZCs in group 1 and 2 (R1-2202314/2315)  Issue: The number of nonzero coefficient amplitudes and phases mapped in Group 1 and Group 2 for eType II CSI is incorrect in a small number of cases, when ν≤K^NZ≤2(ν-1), i.e., for reported rank ν=2 and K^NZ=2, rank ν=3 and K^NZ=3,4, rank ν=4 and K^NZ=4,5,6. For these cases the current formula for Group 1, ⌈K^NZ/2⌉-υ, yields a negative value whereas the formula for Group 2, ⌊K^NZ/2⌋, yields a number larger than the total number, K^NZ-ν, of reported coefficients.  Corrections are proposed in TS 38.212 (sec 6.3.2.1.2) and 214 (section 5.2.3):   * Changing to * Changing to   FL: The proposal seems correct although the identified problems could be corner cases. This benefits from some discussion and **needs some conclusion**. | Nokia/NSB | H |  |
|  | | | | |

1. Discussion and proposal

From the inputs shared by participating companies during the preparation phase, the following **observation** can be made:

* The following issues can be handled as E (a part of editorial CR):
* The following issues can be designated as H (requiring discussion and additional agreements/conclusions):

# References

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | R1-2201327 | Draft CR on Type II and enhanced Type II CSI feedback | CATT |
| 2 | R1-2201631 | Draft CR on indicated TCI states for single-DCI based MTRP schemes | vivo |
| 3 | R1-2201632 | Draft CR on indicated TCI states for single-DCI based MTRP schemes | vivo |
| 4 | R1-2201993 | Correction on frequency granularity of CSI based on Rel.16 Type II codebooks | Samsung |
| 5 | R1-2202121 | Discussion on coefficients partition in eT2 CSI | Qualcomm Incorporated |
| 6 | R1-2202314 | Correction in the number of NZC mapped in Group 1 and 2, 38.212 | Nokia, Nokia Shanghai Bell |
| 7 | R1-2202315 | Correction in the number of NZC mapped in Group 1 and 2, 38.214 | Nokia, Nokia Shanghai Bell |