**3GPP TSG- RAN WG1 Meeting #105-e R1-21xxxxx**

**e-Meeting, May 10th - 27th, 2021**

Agenda Item: 7.2.6

Source: Moderator (Apple Inc.)

Title: Summary of [105-e-NR-eMIMO-02] Email Discussion

Document for: Discussion/Decision

# Introduction

In this contribution, we provide a summary on 105-e-NR-eMIMO-02.

# MB.5 (E)

In R1-2105537, Huawei/HiSilicon propose a TP to avoid inconsistency between 38.331 and 38.214 with regard to time domain measurement restriction.

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| ***Reason for change:*** | The current specification has defined UE behavior for measurement restriction for L1-SINR. There is a conflict between the descriptions in TS 38.214 and 38.331. Specifically,  - In 38.214, the higher layer parameters *timeRestrictionForChannelMeasurements* and *timeRestrictionForInterferenceMeasurements* are considered as optional. Whether to apply measurement restriction for L1-SINR is determined based on whether the associated higher layer parameter is configured or not.  - In 38.331, the higher layer parameters *timeRestrictionForChannelMeasurements* and *timeRestrictionForInterferenceMeasurements* are mandatory to be present. The candidate values for the two parameters are ‘configured’ and ‘notConfigured’.  When *timeRestrictionForChannelMeasurements* or *timeRestrictionForInterferenceMeasurements* is configuredas “notConfigured”, if the UE determines whether to apply measurement restriction according to the description in 38.214, it may still be mist-interpreted as that the UE should apply measurement restriction, although the true intention of gNB is to disable measurement restriction. |
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| ***Summary of change:*** | Update the operating conditions for applying measurement restriction for L1-SINR in 38.214 to be aligned with signalling design in 38.331, i.e., from “is not configured with” to “the value of … is configured as ‘notConfigured’”, and from “is configured with” to “the value of … is configured as ‘configured’”. |
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| ***Consequences if not approved:*** | Inconsistency between 38.214 and 38.331. |

***Text Proposal for 38.214***

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| **5.2.1.4.4 L1-SINR Reporting**  < Unchanged parts are omitted >  When one or two resource settings are configured for L1-SINR measurement  - If the value of higher layer parameter *timeRestrictionForChannelMeasurements* in *CSI-ReportConfig* is configured as ‘notConfigured’, the UE shall derive the channel measurements for computing L1-SINR reported in uplink slot n based on only the SSB or NZP CSI-RS, no later than the CSI reference resource, (defined in TS 38.211[4]) associated with the CSI resource setting.  - If the value of higher layer parameter *timeRestrictionForChannelMeasurements* in *CSI-ReportConfig* is configured as ‘configured’, the UE shall derive the channel measurements for computing L1-SINR reported in uplink slot n based on only the most recent, no later than the CSI reference resource, occasion of SSB or NZP CSI-RS (defined in [4, TS 38.211]) associated with the CSI resource setting.  - If the value of higher layer parameter *timeRestrictionForInterferenceMeasurements* in *CSI-ReportConfig* is configured as ‘notConfigured’, the UE shall derive the interference measurements for computing L1-SINR reported in uplink slot n based on only the CSI-IM or NZP CSI-RS for interference measurement (defined in [4, TS 38.211]) or NZP CSI-RS for channel and interference measurement no later than the CSI reference resource associated with the CSI resource setting.  - If the value of higher layer parameter *timeRestrictionForInterferenceMeasurements* in *CSI-ReportConfig* is configured as ‘configured’, the UE shall derive the interference measurements for computing the L1-SINR reported in uplink slot n based on the most recent, no later than the CSI reference resource, occasion of CSI-IM or NZP CSI-RS for interference measurement (defined in [4, TS 38.211]) or NZP CSI-RS for channel and interference measurement associated with the CSI resource setting.  < Unchanged parts are omitted > |

**Companies’ view and comments**

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| Company | Comments |
| vivo | Fine with the alignment. |
| ZTE | Support |

# MB.4 (ND)

In R1-2104582, ZTE proposes to update CORESETPoolIndex after BFR.

***Justification***

The QCL assumption of all CORESETs on a beam failure SCell is determined according to *qnew* reported by the UE. Consequently, in such case, all CORESETs on the beam failure SCell(s) can only be transmitted by a single TRP, and it is straightforward that M-TRP transmission with two *CORESETPoolIndex* values does NOT work after BFR procedure is completed. Therefore, a fall back mechanism from M-TRP to S-TRP for SCell is required in Rel-16 based on the following analysis.

* After SCell-BFR is completed, there is no need for UE to keep tracking two *CORESETPoolIndex* values, and the UE power consumption can be saved significantly.
* Otherwise, if going with current spec, both features of SCell BFR and mDCI-mTRP can NOT be performed well in a given UE. In other words, it may reduce the motivation/possibility of both gNB and UE vendors to deploy these two useful features together.

To achieve this, a straightforward solution is to set *CORESETPoolIndex* of all CORESETs of the failed SCell(s) as 0 by default in the spec.

***Text Proposal for 38.213***

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| **<Unchanged part is omitted>**  A UE can be provided, by *schedulingRequestID-BFR-SCell-r16*, a configuration for PUCCH transmission with a link recovery request (LRR) as described in Clause 9.2.4. The UE can transmit in a first PUSCH MAC CE providing index(es) for at least corresponding SCell(s) with radio link quality worse than Qout,LR, indication(s) of presence of for corresponding SCell(s), and index(es) for a periodic CSI-RS configuration or for a SS/PBCH block provided by higher layers, as described in [11, TS 38.321], if any, for corresponding SCell(s). After 28 symbols from a last symbol of a PDCCH reception with a DCI format scheduling a PUSCH transmission with a same HARQ process number as for the transmission of the first PUSCH and having a toggled NDI field value, the UE  - monitors PDCCH in all CORESETs on the SCell(s) indicated by the MAC CE using the same antenna port quasi co-location parameters as the ones associated with the corresponding index(es) , if any, and assumes the *CORESETPoolIndex*, if configured, of all CORESETs on the SCell(s) as 0.  **<Unchanged part is omitted>** |

***FL proposal***

As the discussion is to make a conclusion (ND issue), a conclusion is expected. From companies’ comments from the preparation phase, the following alternatives are provided. There are some comments that this is an optimization, and other comments that BFR+mTRP should be a Rel-17 feature. In addition, I added original proposal as Alt1, but I am not sure whether Alt1 is still valid since this is a ND issue.

**Possible conclusion**

* **Alt1: For mDCI based mTRP, UE automatically update *CORESETPoolIndex* to be 0 after 28 symbols after receiving beam failure recovery response** 
  + **Endorse the TP in R1-2104582**
* **Alt2: For mDCI based mTRP, UE does not automatically update *CORESETPoolIndex* after receiving beam failure recovery response** 
  + **No spec change is needed**
* **Alt3: Rel-16 does not support concurrent configuration of BFR and mDCI based mTRP in the same BWP**
* **Alt4: Other (Please provide details)**

**Companies’ view and comments**

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| Company | Comments |
| vivo | Alt3 seems the cleanest solution.  Alt1 might be too late to introduce.  We are also ok with Alt2 with network implementation to handle the issue. |
| ZTE | Alt-1 is preferred, considering that it is only an efficient scheme for configuring both BFR and mDCI based mTRP. |

# MT.8

In R1-2104651, Qualcomm proposes to update the default PDSCH beam.

**Reason for change:** In current spec, there is no way for UE and gNB to communicate with default beam after BFR in the case of single-DCI based mTRP.

**Summary of change:** Resetting the default beam by resetting all TCI codepoints to the new identified beam.

**Consequences if not approved:** gNB and UE cannot communicate with default beam after BFR in the case of single-DCI based mTRP.

***Text Proposal for 38.213***

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| --Unchanged part omitted------------------------  For the PCell or the PSCell, after 28 symbols from a last symbol of a first PDCCH reception in a search space set provided by *recoverySearchSpaceId* where a UE detects a DCI format with CRC scrambled by C-RNTI or MCS-C-RNTI, the UE assumes same antenna port quasi-collocation parameters as the ones associated with index  for PDCCH monitoring in a CORESET with index 0, and if at least one TCI codepoint indicates two TCI states and UE is configured with *enableTwoDefaultTCIStates*, the UE assumes all TCI codepoints indicate same antenna port quasi-collocation parameters as the ones associated with index .  A UE can be provided, by *schedulingRequestID-BFR-SCell-r16*, a configuration for PUCCH transmission with a link recovery request (LRR) as described in Clause 9.2.4. The UE can transmit in a first PUSCH MAC CE providing index(es) for at least corresponding SCell(s) with radio link quality worse than Qout,LR, indication(s) of presence of for corresponding SCell(s), and index(es) for a periodic CSI-RS configuration or for a SS/PBCH block provided by higher layers, as described in [11, TS 38.321], if any, for corresponding SCell(s). After 28 symbols from a last symbol of a PDCCH reception with a DCI format scheduling a PUSCH transmission with a same HARQ process number as for the transmission of the first PUSCH and having a toggled NDI field value, the UE  - monitors PDCCH in all CORESETs on the SCell(s) indicated by the MAC CE using the same antenna port quasi co-location parameters as the ones associated with the corresponding index(es) , if any  - If at least one TCI codepoint indicates two TCI states and UE is configured with *enableTwoDefaultTCIStates* on the SCell(s) indicated by the MAC CE, the UE assumes all TCI codepoints indicate same antenna port quasi-collocation parameters as the ones associated with the corresponding index(es) , if any. |

***FL proposal***

As the discussion is to make a conclusion (ND issue), the following possible conclusion is proposed based on the comments from preparation phase. Similar to MB.4, I am not sure whether Alt1 is still valid since it is an ND issue.

**Possible conclusion**

* **Alt1: For single-DCI based multi-TRP mode, UE resets the default PDSCH beam based on newly identified beam after 28 symbols after receiving beam failure recovery response**
  + **Endorse TP in R1-2104651**
* **Alt 2: For single-DCI based multi-TRP mode, UE does not automatically update default PDSCH beam after receiving beam failure recovery response**
  + **No spec change is needed**
* **Alt3: Other (Please provide details)**

**Companies’ view and comments**

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| Company | Comments |
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