**3GPP TSG- RAN WG1 Meeting #103-e R1-2xxxxxx**

**e-Meeting, October 26th – November 13th, 2020**

Agenda Item: 7.2.6

Source: Apple Inc.

Title: Summary on 103-e-NR-eMIMO-02

Document for: Discussion/Decision

# Introduction

In this contribution, we provide a summary on email discussion 103-e-NR-eMIMO-02.

# MB.10 ZP+NZP IMR

For ZP+NZP IMR, currently there are two alternatives.

* **Alt1: Confirm the working assumption to support L1-SINR measured based on both ZP and NZP IMR**
  + **Endorse the TP in R1-2007909 except for the first change to add “SSB” in one resource setting case**
* **Alt2: Do not confirm the working assumption to support L1-SINR measured based on both ZP and NZP IMR**
  + **Endorse the TP in 2008571**

*Companies’ input*

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| Company | View |
| Apple | Support Alt2.  Alt1 has two issues:   1. ZP+NZP would become mandatory feature, since currently this is not included as a candidate value in UE feature 2. No clear use case for ZP+NZP, since it is agreed that the interference measurement behavior is the same for both ZP and NZP |
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# MB.13 PUCCH spatial relation assumption after CBRA-BFR

This issue has been discussed in RAN1 #102, and the proposal is modified as follows:

**Proposal (R1-2008536)**

* + **For CBRA based PCell/PSCell BFR, if Msg3 or MsgA of CBRA-BFR contains BFR MAC CE, after 3ms from the last symbol of the first PDCCH reception in response to Msg.3 or MsgA PUSCH as described in Clause 8.4 of TS38.213, with CRC scrambled by C-RNTI, 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, UE shall transmit PUCCH in the PCell/PSCell with spatial domain filter based on the latest PRACH transmission and with power control parameters *q\_u* = 0, *q\_d* = *q\_new* and *l* = 0**
    - ***q\_new* is the SSB selected for the PRACH transmission**
    - **Note: the first PDCCH is counted from the transmission of the Msg3 or MsgA**

*Companies’ input*

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| Company | View |
| Apple | Support with a modification by changing “3ms” into “28 symbols” to be aligned with other channels. |
| OPPO | Do not support.  This has been discussed a lot in a dedicated email in last meeting. Do not see any justification to discuss it again.  As guided by the Chairman, Only essential corrections. This issue is out of the scope of rel16 MB and it is not essential issue. We cannot introduce new non-essential feature at the very late stage of CR.  Furthermore, this proposal is introducing redundant function because what this proposal tries to support can be realized by the system implementation through the feature of default spatial relation. |

# MB.14 measurement restriction for L1-SINR

It has been agreed that MR can be configured for L1-SINR. But so far no UE behavior is defined in RAN1 specification.

**Proposal (R1-2008674)**

**When one or two resource settings are configured for L1-SINR measurement**

* **If a UE is not configured with higher layer parameter *timeRestrictionForChannelMeasurements* in *CSI-ReportConfig*, 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 a UE is configured with higher layer parameter *timeRestrictionForChannelMeasurements* in*****CSI-ReportConfig*, 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 a UE is not configured with higher layer parameter *timeRestrictionForInterferenceMeasurements* in *CSI-ReportConfig*, 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 a UE is configured with higher layer parameter *timeRestrictionForInterferenceMeasurements* in *CSI-ReportConfig*, 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.**

*Companies’ input*

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| Company | View |
| Apple | Support |
| OPPO | Ok |

# Editorial Corrections

## MB.12 RRC parameter name correction

**Reason for change**: RAN2 has changed the RRC parameter name from *nrofReportedRSForSINR* into *nrofReportedRS*

**Summary of change**: Change *nrofReportedRSForSINR* into *nrofReportedRS* in 38.214.

**Consequence if not agreed**: RAN1 and RAN2 specification misalignment

**Text Proposal**

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| **Text proposal for 38.214 v16.3.0** **5.2.1.4.2 Report Quantity Configurations** <omitted text>  If the UE is configured with a *CSI-ReportConfig* with the higher layer parameter *reportQuantity* set to 'cri-SINR' or 'ssb-Index-SINR',  - if the UE is configured with the higher layer parameter *groupBasedBeamReporting* set to 'disabled', the UE shall report in a single report *nrofReportedRS* (higher layer configured) different CRI or SSBRI for each report setting.  - if the UE is configured with the higher layer parameter *groupBasedBeamReporting* set to 'enabled', the UE shall report in a single reporting instance two different CRI or SSBRI for each report setting, where CSI-RS and/or SSB resources can be received simultaneously by the UE.  <omitted text> **5.2.1.4.4 L1-SINR Reporting** For L1-SINR computation, for channel measurement the UE may be configured with NZP CSI-RS resources and/or SS/PBCH Block resources, for interference measurement the UE may be configured with NZP CSI-RS or CSI-IM resources.  - for channel measurement, the UE may be configured with CSI-RS resource setting with up to 16 resource sets, with a total of up to 64 CSI-RS resources or up to 64 SS/PBCH Block resources.  For L1-SINR reporting, if the higher layer parameter *nrofReportedRS* in *CSI-ReportConfig* is configured to be one, the reported L1-SINR value is defined by a 7-bit value in the range [-23, 40] dB with 0.5 dB step size, and if the higher layer parameter *nrofReportedRS* is configured to be larger than one, or if the higher layer parameter *groupBasedBeamReporting* is configured as 'enabled', the UE shall use differential L1-SINR based reporting, where the largest measured value of L1-SINR is quantized to a 7-bit value in the range [-23, 40] dB with 0.5 dB step size, and the differential L1-SINR is quantized to a 4-bit value. The differential L1-SINR is computed with 1 dB step size with a reference to the largest measured L1-SINR value which is part of the same L1-SINR reporting instance. When NZP CSI-RS is configured for channel measurement and/or interference measurement, the reported L1-SINR values should not be compensated by the power offset(s) given by higher layer parameter *powerControOffsetSS* or *powerControlOffset*.  <omitted text> |

*Companies’ input*

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| Company | View |
| Apple | Support |
| OPPO | Ok |

## MB.8 BFD RS correction

**Reason for change**: Current specification may imply only CSI-RS in PCell/PSCell can be configured for BFD.

**Summary of change**: CSI-RS in SCell can also be configured for BFD

**Consequence if not agreed**: It is unclear whether CSI-RS in SCell can be configured for BFD or not.

**Text Proposal**

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| Link recovery procedures A UE can be provided, for each BWP of a serving cell, a set  of periodic CSI-RS resource configuration indexes by *failureDetectionResources* and a set  of periodic CSI-RS resource configuration indexes and/or SS/PBCH block indexes by *candidateBeamRSList* or *candidateBeamRSListExt-r16* or *candidateBeamRSSCellList-r16* for radio link quality measurements on the BWP of the serving cell. If the UE is not provided  by *failureDetectionResources* for a BWP of the serving cell, the UE determines the set  to include periodic CSI-RS resource configuration indexes with same values as the RS indexes in the RS sets indicated by *TCI-State* for respective CORESETs that the UE uses for monitoring PDCCH and, if there are two RS indexes in a TCI state, the set  includes RS indexes with QCL-TypeD configuration for the corresponding TCI states. The UE expects the set  to include up to two RS indexes. The UE expects single port RS in the set . The UE expects single-port or two-port CSI-RS with frequency density equal to 1 or 3 REs per RB in the set .  The thresholds Qout,LR and Qin,LR correspond to the default value of *rlmInSyncOutOfSyncThreshold*, as described in [10, TS 38.133] for Qout, and to the value provided by *rsrp-ThresholdSSB* or *rsrp-ThresholdBFR-r16*, respectively.  The physical layer in the UE assesses the radio link quality according to the set  of resource configurations against the threshold Qout,LR. For the set , the UE assesses the radio link quality only according to SS/PBCH blocks on the PCell or the PSCell or periodic CSI-RS resource configurations that are quasi co-located, as described in [6, TS 38.214], with the DM-RS of PDCCH receptions monitored by the UE. The UE applies the Qin,LR threshold to the L1-RSRP measurement obtained from a SS/PBCH block. The UE applies the Qin,LR threshold to the L1-RSRP measurement obtained for a CSI-RS resource after scaling a respective CSI-RS reception power with a value provided by *powerControlOffsetSS*.  In non-DRX mode operation, the physical layer in the UE provides an indication to higher layers when the radio link quality for all corresponding resource configurations in the set  that the UE uses to assess the radio link quality is worse than the threshold Qout,LR. The physical layer informs the higher layers when the radio link quality is worse than the threshold Qout,LR with a periodicity determined by the maximum between the shortest periodicity among the SS/PBCH blocks on the PCell or the PSCell, and/or periodic CSI-RS configurations, in the set  that the UE uses to assess the radio link quality and 2 msec. In DRX mode operation, the physical layer provides an indication to higher layers when the radio link quality is worse than the threshold Qout,LR with a periodicity determined as described in [10, TS 38.133].  For the PCell or the PSCell, upon request from higher layers, the UE provides to higher layers the periodic CSI-RS configuration indexes and/or SS/PBCH block indexes from the set  and the corresponding L1-RSRP measurements that are larger than or equal to the Qin,LR threshold. |

*Companies’ input*

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| Company | View |
| Apple | Support |
| OPPO | Suggest to delete the SS/PBCH since SS/PBCH can not be used as BFD for both PCell and SCell:   * For PCell: there are methods for set q0. Method 1 is RRC configures q0. And method 2 is UE derive q0 based on the TCI state configured to the PDCCH. In method 1: the RRC can only configure CSI-RS in q0 as specified in 213. In the method 2, the TCI states configured to UE-specific PDCCH can only use CSI-RS as QCL-TypeD RS, as specified in 38.214. Thus, in either case, there is only CSI-RS and no SS/PBCH block in the q0 for PCell.   Therefore, for clear specification, we suggest to delete the ‘SS/PBCH block’ for both PCell and SCell BFD:   |  | | --- | | 6 Link recovery procedures \*\*\* Unchanged text is omitted \*\*\*  The physical layer in the UE assesses the radio link quality according to the set  of resource configurations against the threshold Qout,LR. For the set , the UE assesses the radio link quality only according to periodic CSI-RS resource configurationsthat are quasi co-located, as described in [6, TS 38.214], with the DM-RS of PDCCH receptions monitored by the UE. The UE applies the Qin,LR threshold to the L1-RSRP measurement obtained from a SS/PBCH block. The UE applies the Qin,LR threshold to the L1-RSRP measurement obtained for a CSI-RS resource after scaling a respective CSI-RS reception power with a value provided by *powerControlOffsetSS*.  In non-DRX mode operation, the physical layer in the UE provides an indication to higher layers when the radio link quality for all corresponding resource configurations in the set  that the UE uses to assess the radio link quality is worse than the threshold Qout,LR. The physical layer informs the higher layers when the radio link quality is worse than the threshold Qout,LR with a periodicity determined by the maximum between the shortest periodicity among the periodic CSI-RS configurationsin the set  that the UE uses to assess the radio link quality and 2 msec. In DRX mode operation, the physical layer provides an indication to higher layers when the radio link quality is worse than the threshold Qout,LR with a periodicity determined as described in [10, TS 38.133].  \*\*\* Unchanged text is omitted \*\*\* | |