**3GPP TSG RAN WG1 #100b R1-2002845**

**e-Meeting, April 20th – 30th, 2020**

**Agenda item:** 7.2.6.3.

**Source:** Moderator (LG Electronics)

**Title:** TP for capturing outcome of email thread [100b-e-NR-eMIMO-MB1-03]

**Document for:** Discussion and Decision

1. Issues on clarifying the BWP/CC for default PL RS and default spatial relation
   1. Analysis

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| Reasons for change | For default PL RS/spatial relation, it need to be clarified ‘the lowest ID CORESET’ refers to ‘the lowest ID CORESET of the active DL BWP of the serving cell’. |
| Summary of changes | Add ‘on the active DL BWP of the cell’ to the CORESET with the lowest ID, and some editorial changes to align parameter names |
| Specs/Sections impacted | 1. TS 38.213 V16.1.0, clause 7.3.1 2. TS 38.213 V16.1.0, clause 7.1.1 3. TS 38.214 V16.1.0, clause 6.1 4. TS 38.214 V16.1.0, clause 6.2.1 |
| Consequences if not approved | The spec is either ambiguous or erroneous (incorrect implementation, incorrect description contrary to agreements) |

* 1. Text Proposal

TP1.1 for clause 7.3.1 of TS 38.213 V16.1.0

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| 7.3.1        UE behavior  < Unchanged parts are omitted >  - -  is a downlink pathloss estimate in dB calculated by the UE using RS resource index  as described in Clause 7.1.1 for the active DL BWP of serving cell  and SRS resource set  [6, TS 38.214]. The RS resource index  is provided by *pathlossReferenceRS* associated with the SRS resource set  and is either an *ssb-Index* providing a SS/PBCH block index or a *csi-RS-Index* providing a CSI-RS resource index If the UE is provided *enablePLRSupdateForPUSCHSRS*, a MAC CE [11, TS 38.321] can provide by *SRS-PathlossReferenceRS-Id* a corresponding RS resource index for aperiodic or semi-persistent SRS resource set  - If the UE is not provided *pathlossReferenceRS* or *SRS-PathlossReferenceRS*, or before the UE is provided dedicated higher layer parameters, the UE calculates  using a RS resource obtained from the SS/PBCH block that the UE uses to obtain *MIB*  - If the UE is provided *pathlossReferenceLinking*, the RS resource is on a serving cell indicated by a value of *pathlossReferenceLinking*  - If the UE  - is not provided *pathlossReferenceRS* or *SRS-PathlossReferenceRS*,  - is not provided *spatialRelationInfo*, and  - is provided *enableDefaultBeamPlForSRS*  the UE determines a RS resource index  providing a periodic RS resource with 'QCL-TypeD' in  - the TCI state or the QCL assumption of a CORESET with the lowest index on the active DL BWP, if CORESETs are provided in the active DL BWP of the serving cell  - the active PDSCH TCI state with lowest ID [6, TS 38.214] on the active DL BWP, if CORESETs are not provided in the active DL BWP of the serving cell  < Unchanged parts are omitted > |

TP1.2 for clause 7.1.1 of TS 38.213 V16.1.0

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| 7.1.1 UE behaviour  < Unchanged parts are omitted >  -     If  -     the PUSCH transmission is scheduled by a DCI format 0\_0 on the serving cell,  -     the UE is not provided PUCCH resources on the active UL BWP of the serving cell, and  -     the UE is provided *enableDefaultBeamPlForPUSCH0\_0*        the UE determines a RS resource index  providing a periodic RS resource with 'QCL-TypeD' in the TCI state or the QCL assumption of a CORESET with the lowest index in the active DL BWP of the serving cell  -     If  -     the PUSCH transmission is scheduled by a DCI format 0\_0 on the serving cell,  -     the UE is configured with PUCCH resources on the active UL BWP of the cell where all the PUCCH resource(s) are not configured with any spatial relation, and  -     the UE is provided *enableDefaultBeamPlForPUSCH0\_0*        the UE determines a RS resource index  providing a periodic RS resource with 'QCL-TypeD' in the TCI state or the QCL assumption of a CORESET with the lowest index in the active DL BWP of the serving cell  < Unchanged parts are omitted > |

TP1.3 for clause 6.1 of TS 38.214 V16.1.0

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| 6.1 UE procedure for transmitting the physical uplink shared channel < Unchanged parts are omitted >  For PUSCH scheduled by DCI format 0\_0 on a cell, the UE shall transmit PUSCH according to the spatial relation, if applicable, corresponding to the dedicated PUCCH resource with the lowest ID within the active UL BWP of the cell, as described in Clause 9.2.1 of [6, TS 38.213].  For PUSCH scheduled by DCI format 0\_0 on a cell and if the higher layer parameter *enableDefaultBeamPlForPUSCH0\_0* is set 'enabled', the UE is not configured with PUCCH resources on the active UL BWP and the UE is in RRC connected mode, the UE shall transmit PUSCH according to the spatial relation, if applicable, with a reference to the RS with 'QCL-TypeD' corresponding to the QCL assumption of the CORESET with the lowest ID on the active DL BWP of the cell.  For PUSCH scheduled by DCI format 0\_0 on a cell and if the higher layer parameter *enableDefaultBeamPlForPUSCH0\_0* is set 'enabled', the UE is configured with PUCCH resources on the active UL BWP where all the PUCCH resource(s) are not configured with any spatial relation and the UE is in RRC connected mode, the UE shall transmit PUSCH according to the spatial relation, if applicable, with a reference to the RS with 'QCL-TypeD' corresponding to the QCL assumption of the CORESET with the lowest ID on the active DL BWP of the cell in case CORESET(s) are configured on the cell.  < Unchanged parts are omitted > |

TP1.4 for clause 6.2.1 of TS 38.214 V16.1.0

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| 6.2.1       UE sounding procedure  < Unchanged parts are omitted >  When the higher layer parameter *enableDefaultBeamPlForSRS* is set 'enabled', and if the higher layer parameter *spatialRelationInfo* for the SRS resource, except for the SRS resource with the higher layer parameter *usage* in SRS-ResourceSet set to 'beamManagement' or for the SRS resource with the higher layer parameter *usage* in SRS-ResourceSet set to 'nonCodebook' with configuration of *associatedCSI-RS* or for the SRS resource configured by the higher layer parameter [SRS-for-positioning], is not configured in FR2 and if the UE is not configured with higher layer parameter(s) *pathlossReferenceRS*, the UE shall transmit the target SRS resource  - with the same spatial domain transmission filter used for the reception of the CORESET with the lowest *controlResourceSetId* in the active DL BWP in the CC.  - with the same spatial domain transmission filter used for the reception of the activated TCI state with the lowest ID applicable to PDSCH in the active DL BWP of the CC if the UE is not configured with any CORESET in the active DL BWP of the CC  < Unchanged parts are omitted > |

1. Issues on aligning RAN1 spec with RAN2 spec for simultaneous multi-CC TCI/spatial relation update
   1. Analysis

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| Reasons for change | - For simultaneous multi-CC TCI/spatial relation update, RRC parameter names introduced in TS 38.331 are not aligned with TS 38.213 and TS 38.214.  - TS 38.214 needs to be updated according to the recent TS 38.321. |
| Summary of changes | - Update RRC parameter names on simultaneous multi-CC TCI/spatial relation update  - Update TS 38.214 according to the recent TS 38.321 |
| Specs/Sections impacted | 1. TS 38.213 V16.1.0, clause 10.1 2. TS 38.214 V16.1.0, clause 6.2.1 3. TS 38.214 V16.1.0, clause 5.1.5 4. TS 38.214 V16.1.0, clause 6.2.1 |
| Consequences if not approved | The spec is either ambiguous or erroneous (incorrect implementation, incorrect description contrary to agreements) |

* 1. Text Proposal

TP2.1 for clause 10.1 of TS 38.213 V16.1.0

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| < Unchanged parts are omitted >  - an antenna port quasi co-location, from a set of antenna port quasi co-locations provided by *TCI-State*, indicating quasi co-location information of the DM-RS antenna port for PDCCH reception in a respective CORESET;  - if the UE is provided by up to two lists of cells for simultaneous TCI state activation by *simultaneousTCI-UpdateList-r16* and/or *simultaneousTCI-UpdateListSecond-r16*, the UE applies the antenna port quasi co-location provided by *TCI-States* with same activated *tci-StateID* value to CORESETs with index in all configured DL BWPs of all configured cells in a list determined from a serving cell index provided by a MAC CE command  < Unchanged parts are omitted > |

TP2.2 for clause 6.2.1 of TS 38.214 V16.1.0

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| < Unchanged parts are omitted >  When a *spatialRelationInfo* is activated/updated for a semi-persistent or aperiodic SRS resource configured by the higher layer parameter *SRS-Resource* by a MAC CE for a set of CCs/BWPs, where the applicable list of CCs is indicated by higher layer parameter *simultaneousSpatial-UpdatedList-r16* or *simultaneousSpatial-UpdatedListSecond-r16*, the *spatialRelationInfo* is applied for the semi-persistent or aperiodic SRS resource(s) with the same SRS resource ID for all the BWPs in the indicated CCs.  < Unchanged parts are omitted > |

TP2.3 for clause 10.1 of TS 38.213 V16.1.0

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| 5.1.5 Antenna ports quasi co-location  < Unchanged parts are omitted >  The UE receives an activation command, as described in clause 6.1.3.14 of [10, TS 38.321], used to map up to 8 TCI states to the codepoints of the DCI field *'Transmission Configuration Indication'* in one CC/DL BWP or in a set of CCs/DL BWPs, respectively. When a set of TCI state IDs are activated for a set of CCs/DL BWPs, where the applicable list of CCs is determined by indicated CC in the activation command, the same set of TCI state IDs are applied for all DL BWPs in the indicated CCs.    When a UE supports two TCI states in a codepoint of the DCI field '*Transmission Configuration Indication'* the UE may receive an activation command, as described in clause 6.1.3.24 of [10, TS 38.321], the activation command is used to map up to 8 combinations of one or two TCI states to the codepoints of the DCI field *'Transmission Configuration Indication'*. The UE is not expected to receive more than 8 TCI states in the activation command.  < Unchanged parts are omitted > |

TP2.4 for clause 10.1 of TS 38.213 V16.1.0

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| 6.2.1 UE sounding procedure  < Unchanged parts are omitted >  - when a UE receives an spatial relation update command, as described in clause 6.1.3.26 of [10, TS 38.321], for an SRS resource, and when the HARQ-ACK corresponding to the PDSCH carrying the update command is transmitted in slot n, the corresponding actions in [10, TS 38.321] and the UE assumptions on updating spatial relation for the SRS resource shall be applied for SRS transmission starting from the first slot that is after slot The update command contains spatial relation assumptions provided by a list of references to reference signal IDs, one per element of the updated SRS resource set. Each ID in the list refers to a reference SS/PBCH block, NZP CSI-RS resource configured on serving cell indicated by *Resource Serving Cell ID* field in the update command if present, same serving cell as the SRS resource set otherwise, or SRS resource configured on serving cell and uplink bandwidth part indicated by Resource *Serving Cell ID* field and *Resource BWP ID* field in the update command if present, same serving cell and bandwidth part as the SRS resource set otherwise. When the UE is configured with the higher layer parameter *usage* in *SRS-ResourceSet* set to 'antennaSwitching', the UE shall not expect to be configured with different spatial relations for SRS resources in the same SRS resource set.  < Unchanged parts are omitted > |

1. Issues on precluding to use default spatial relation/PL RS for multi-TRP
   1. Analysis

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| Reasons for change | Default spatial relation is to be applied ‘at least for the single TRP case’ but this condition has not been captured in specification. |
| Summary of changes | Add the condition for the single TRP case. |
| Specs/Sections impacted | 1. TS 38.213 V16.1.0, clause 7.2.1, 7.3.1, 9.2.2 2. TS 38.214 V16.1.0, clause 6.2.1 |
| Consequences if not approved | The spec is either ambiguous or erroneous (incorrect implementation, incorrect description contrary to agreements) |

* 1. Text Proposal

TP3.1 for clause 7.2.1, 7.3.1 and 9.2.2 of TS 38.213 V16.1.0

| 7.2.1 UE behaviour < Unchanged parts are omitted >  - If the UE  - is not provided *pathlossReferenceRSs*, and  - is not provided *PUCCH-SpatialRelationInfo,* and  - is provided *enableDefaultBeamPlForPUCCH*, and  -    is not provided different values of CORESETPoolIndex in ControlResourceSets, and is not provided at least one TCI codepoint mapped with two TCI states  the UE determines a RS resource index  providing a RS resource with 'QCL-TypeD' in the TCI state or the QCL assumption of a CORESET with the lowest index in the active DL BWP of the same serving cell < Unchanged parts are omitted >7.3.1 UE behaviour < Unchanged parts are omitted >  - If the UE  - is not provided pathlossReferenceRS or SRS-PathlossReferenceRS,  - is not provided spatialRelationInfo, and  - is provided enableDefaultBeamPlForSRS, and  -    is not provided different values of CORESETPoolIndex in ControlResourceSets, and is not provided at least one TCI codepoint mapped with two TCI states  the UE determines a RS resource index  providing a RS resource with 'QCL-TypeD' in  - the TCI state or the QCL assumption of a CORESET with the lowest index, if CORESETs are provided in the active DL BWP  - the active PDSCH TCI state with lowest ID [6, TS 38.214], if CORESETs are not provided in the active DL BWP < Unchanged parts are omitted >9.2.2 PUCCH Formats for UCI transmission < Unchanged parts are omitted >  - If a UE  - reports *beamCorrespondenceWithoutUL-BeamSweeping*,  - is not provided *pathlossReferenceRSs* in *PUCCH-PowerControl*,  - is provided *enableDefaultBeamPlForPUCCH*, and  - is not provided *PUCCH-SpatialRelationInfo*, and  -    is not provided different values of CORESETPoolIndex in ControlResourceSets, and is not provided at least one TCI codepoint mapped with two TCI states  a spatial setting for a PUCCH transmission from the UE is same as a spatial setting for PDCCH receptions by the UE in the CORESET with the lowest ID on the active DL BWP of the PCell. |
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TP3.2 for clause 6.2.1 of TS 38.214 V16.1.0

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| 6.2.1 UE sounding procedure < Unchanged parts are omitted >  When the higher layer parameter *enableDefaultBeamPlForSRS* is set 'enabled', and if the higher layer parameter *spatialRelationInfo* for the SRS resource, except for the SRS resource with the higher layer parameter *usage* in SRS-ResourceSet set to 'beamManagement' or for the SRS resource with the higher layer parameter *usage* in SRS-ResourceSet set to 'nonCodebook' with configuration of *associatedCSI-RS* or for the SRS resource configured by the higher layer parameter [SRS-for-positioning], is not configured in FR2 and if the UE is not configured with higher layer parameter(s) *pathlossReferenceRS*, and if UE is not configured with different values of CORESETPoolIndex in ControlResourceSets, and is not provided at least one TCI codepoint mapped with two TCI states, the UE shall transmit the target SRS resource  - with the same spatial domain transmission filter used for the reception of the CORESET with the lowest *controlResourceSetId* in the active DL BWP in the CC.  - with the same spatial domain transmission filter used for the reception of the activated TCI state with the lowest ID applicable to PDSCH in the active DL BWP of the CC if the UE is not configured with any CORESET in the CC  < Unchanged parts are omitted > |