**3GPP TSG RAN WG1 #118bis R1-****2409264**

**Hefei, China, October 14th – 18th, 2024**

**Agenda item:** 7

**Source:** Moderator (MediaTek Inc.)

**Title:** Summary on PDSCH reception scheduled by CORESET not following the unified TCI state (Round 1)

**Document for:** Discussion and Decision

# **Alternatives for online discussion**

For PDSCH reception scheduled by a CORESET not following the unified (indicated) TCI state with the scheduling offset equal to or greater than *timeDurationForQCL*:

* Atl1 (original CR from MTK, Docomo, and E///): Regardless of TCI field present/absent in the DL DCI, the UE applies the same QCL assumption as the one applied to the scheduling PDCCH to the corresponding PDSCH reception.

Support/fine: Huawei, Google(?), Ericsson, Docomo, vivo, MediaTek

* Alt2: Regardless of TCI field present/absent in the DL DCI, the UE applies the unified (indicated) TCI state to the corresponding PDSCH reception.

Support/fine: Samsung, ZTE, Ericsson, Docomo, MediaTek

* Alt3:
  + If TCI field is present in the DL DCI, the UE applies the unified (indicated) TCI state to the corresponding PDSCH reception.
  + If TCI field is not present in the DL DCI, the UE applies the same QCL assumption as the one applied to the scheduling PDCCH to the corresponding PDSCH reception.

Support/fine: Qualcomm

# **Text Proposals**

**Alt1 (Original CR): For PDSCH reception scheduled by a CORESET not following the unified (indicated) TCI state with the scheduling offset equal to or greater than *timeDurationForQCL*, regardless of TCI field present/absent in the DL DCI, the UE applies the same QCL assumption as the one applied to the scheduling PDCCH to the corresponding PDSCH reception.**

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| **5.1.5 Antenna ports quasi co-location**  **<Unchanged parts are omitted>**  Independent of the configuration of *tci-PresentInDCI* and *tci-PresentDCI-1-2* in RRC connected mode, if the UE is provided *dl-OrJointTCI-StateList-r17*, and if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL* and at least one configured TCI state for the serving cell of scheduled PDSCH contains *qcl-Type* set to 'typeD', regardless of configuration of *followUnifiedTCI-State*,  - if the indicated TCI state is associated with the PCI of the serving cell, the indicated TCI state is applied to PDSCH reception.  - if the indicated TCI state is associated with a PCI different from the serving cell, the UE may assume that the DM-RS ports of PDSCH(s) of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In the CA case, if the 'QCL-TypeD' of the PDSCH DM-RSs from respective CCs in a band are different in a slot, the QCL-TypeD assumption of the PDSCH DM-RS in the CC with lowest CC ID in the band is applied to all the PDSCH DM-RSs in the CCs in the band. In this case, if the *qcl-Type* is set to 'typeD' of the PDSCH DM-RS is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers).  Independent of the configuration of *tci-PresentInDCI* and *tci-PresentDCI-1-2* in RRC connected mode, for a UE that is provided *dl-OrJointTCI-StateList-r17*, if a PDSCH of a serving cell is scheduled by a CORESET that does not follow the indicated TCI state, and if the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than a threshold *timeDurationForQCL*, the UE may assume that the TCI state or the QCL assumption for the PDSCH of the serving cell is identical to the TCI state or QCL assumption whichever is applied for the CORESET used for the reception of the DL DCI within the active BWP of the serving cell.  **<Unchanged parts are omitted>** |

**Alt2: For PDSCH reception scheduled by a CORESET not following the unified (indicated) TCI state with the scheduling offset equal to or greater than *timeDurationForQCL*, regardless of TCI field present/absent in the DL DCI, the UE applies the unified (indicated) TCI state to the corresponding PDSCH reception.**

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| **5.1.5 Antenna ports quasi co-location**  **<Unchanged parts are omitted>**  Independent of the configuration of *tci-PresentInDCI* and *tci-PresentDCI-1-2* in RRC connected mode, if the UE is provided *dl-OrJointTCI-StateList-r17*, and if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL* and at least one configured TCI state for the serving cell of scheduled PDSCH contains *qcl-Type* set to 'typeD', regardless of configuration of *followUnifiedTCI-State*,  - if the indicated TCI state is associated with the PCI of the serving cell, the indicated TCI state is applied to PDSCH reception.  - if the indicated TCI state is associated with a PCI different from the serving cell, the UE may assume that the DM-RS ports of PDSCH(s) of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In the CA case, if the 'QCL-TypeD' of the PDSCH DM-RSs from respective CCs in a band are different in a slot, the QCL-TypeD assumption of the PDSCH DM-RS in the CC with lowest CC ID in the band is applied to all the PDSCH DM-RSs in the CCs in the band. In this case, if the *qcl-Type* is set to 'typeD' of the PDSCH DM-RS is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers).  Independent of the configuration of *tci-PresentInDCI* and *tci-PresentDCI-1-2* in RRC connected mode, for a UE that is provided *dl-OrJointTCI-StateList-r17*, if a PDSCH of a serving cell is scheduled by a CORESET that does not follow the indicated TCI state, and if the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than a threshold *timeDurationForQCL*, the indicated TCI state is applied to the PDSCH of the serving cell.  **<Unchanged parts are omitted>** |

**Alt3: For PDSCH reception scheduled by a CORESET not following the unified (indicated) TCI state with the scheduling offset equal to or greater than *timeDurationForQCL***

* **If TCI field is present in the DL DCI, the UE applies the unified (indicated) TCI state to the corresponding PDSCH reception.**
* **If TCI field is not present in the DL DCI, the UE applies the same QCL assumption as the one applied to the scheduling PDCCH to the corresponding PDSCH reception.**

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| **5.1.5 Antenna ports quasi co-location**  **<Unchanged parts are omitted>**  Independent of the configuration of *tci-PresentInDCI* and *tci-PresentDCI-1-2* in RRC connected mode, if the UE is provided *dl-OrJointTCI-StateList-r17*, and if the offset between the reception of the DL DCI and the corresponding PDSCH is less than the threshold *timeDurationForQCL* and at least one configured TCI state for the serving cell of scheduled PDSCH contains *qcl-Type* set to 'typeD', regardless of configuration of *followUnifiedTCI-State*,  - if the indicated TCI state is associated with the PCI of the serving cell, the indicated TCI state is applied to PDSCH reception.  - if the indicated TCI state is associated with a PCI different from the serving cell, the UE may assume that the DM-RS ports of PDSCH(s) of a serving cell are quasi co-located with the RS(s) with respect to the QCL parameter(s) used for PDCCH quasi co-location indication of the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored by the UE. In the CA case, if the 'QCL-TypeD' of the PDSCH DM-RSs from respective CCs in a band are different in a slot, the QCL-TypeD assumption of the PDSCH DM-RS in the CC with lowest CC ID in the band is applied to all the PDSCH DM-RSs in the CCs in the band. In this case, if the *qcl-Type* is set to 'typeD' of the PDSCH DM-RS is different from that of the PDCCH DM-RS with which they overlap in at least one symbol, the UE is expected to prioritize the reception of PDCCH associated with that CORESET. This also applies to the intra-band CA case (when PDSCH and the CORESET are in different component carriers).  For a UE that is provided *dl-OrJointTCI-StateList-r17*, if a PDSCH of a serving cell is scheduled by a CORESET that does not follow the indicated TCI state, and if the time offset between the reception of the DL DCI and the corresponding PDSCH is equal to or greater than a threshold *timeDurationForQCL*,  - if the TCI field is present in the DL DCI scheduling the PDSCH of the serving cell, the indicated TCI state is applied to the PDSCH of the serving cell.  - if the TCI field is not present in the DL DCI scheduling the PDSCH of the serving cell, the UE assumes that the TCI state or the QCL assumption for the PDSCH of the serving cell is identical to the TCI state or QCL assumption whichever is applied for the CORESET used for the PDCCH transmission within the active BWP of the serving cell.  **<Unchanged parts are omitted>** |