**3GPP TSG RAN WG1 #120 R1-2501491**

**Athens, Greece, February 17th – 21st, 2025**

Source: Moderator (vivo)

Title: Summary of discussion on CR on QCL assumption

Agenda Item: 7

Document for: Discussion and Decision

# Discussion

In [1], a draft CR is provided for clarifying QCL assumptions, two issues are discussed.

Issue 1:

In TS38.331, the condition of applying the indicated TCI state for aperiodic CSI-RS resource(s) is clearly stated per the field description of *qcl-info* quoted as follows:

When this field is absent for aperiodic CSI RS, the UE shall use QCL information included in the "indicated" DL only/Joint TCI state as specified in TS 38.214

However, TS38.214 has wrongly captured the above condition:

If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* is quasi co-located with the RS(s) in the indicated TCI state.

Issue 2:

In Rel-17, group-based beam reporting has been enhanced to be associated with two CSI resource sets as stated in TS38.214,

For aperiodic CSI, and for aperiodic CSI resource settings, each trigger state configured using the higher layer parameter *CSI-AperiodicTriggerState* is associated with one or multiple *CSI-ReportConfig* where the *CSI-ReportConfig* configured with *groupBasedBeamReporting-r17* is associated with *resourcesForChannel* and *resourcesForChannel2*, which correspond to first and second resource sets, respectively, for L1-RSRP measurement.

Accordingly, *qcl-info2* can be configured in *resourcesForChannel2* as specified in TS38.331. However, related description is missing in TS38.214.

Based on the above reasons following two changes are proposed for 38.214 section 5.2.1.5.1.

Change#1

- If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *~~trs-Info~~ qcl-info* is quasi co-located with the RS(s) in the indicated TCI state.

Please provide your view on whether you agree with the proposed change.

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| --- | --- |
| Company | Comments  |
| CATT | The issues raised is vaild. However, trs-info should not be deleted. We propose the following modficationsIf *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* and *qcl-info* is quasi co-located with the RS(s) in the indicated TCI state. |
| MTK | We do not think *trs-info* should be deleted according to the previous RAN1 agreement. |
| Ericsson | The issue is valid, but we must not remove trs-info. Note that the qcl-info is not part of the CSI-RS resource set. We propose the following modification :If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* and associated with a CSI triggering state without *qcl-info* is quasi co-located with the RS(s) in the indicated TCI state.  |
| Mod  | Based on replies above, I would suggest to take the suggestion from EricssonIf *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* and associated with a CSI triggering state without *qcl-info* is quasi co-located with the RS(s) in the indicated TCI state.  |
| vivo | We agree to keep trs-Info. This part of CR for Rel-17 can be revised to:- If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* is quasi co-located with the RS(s) in the indicated TCI state if *qcl-info* is not configured.And the CR for Rel-18 taking into account mTRP extension can be revised to:- If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* is quasi co-located with the RS(s) in the indicated TCI state if *qcl-info* or *qcl-info2* is not configured. |
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Change#2

* For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in clause 5.1.5, through higher layer signaling of *qcl-info* or *qcl-info2* which contains a list of references to *TCI-State's* for the aperiodic CSI-RS resources associated with the CSI triggering state. If a *State* referred toin the list is configured with a reference to an RS configured with *qcl-Type* set to 'typeD', that RS may be an SS/PBCH block located in the same or different CC/DL BWP or a CSI-RS resource configured as periodic or semi-persistent located in the same or different CC/DL BWP.

Please provide your view on whether you agree with the proposed change.

|  |  |
| --- | --- |
| Company | Comments  |
| CATT | Agree. |
| MTK | Agree. |
| Ericsson | OK. In the same paragraph, should we take the opportunity to fix *State ?* That should be *TCI-State,* I assume. |
| Mod | Based on above replies and comment from Ericsson it is proposed to agred on following corrections.* For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in clause 5.1.5, through higher layer signaling of *qcl-info* or *qcl-info2* which contains a list of references to *TCI-State's* for the aperiodic CSI-RS resources associated with the CSI triggering state. If a *TCI-State* referred toin the list is configured with a reference to an RS configured with *qcl-Type* set to 'typeD', that RS may be an SS/PBCH block located in the same or different CC/DL BWP or a CSI-RS resource configured as periodic or semi-persistent located in the same or different CC/DL BWP.
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# Conclusion

Based on the discussion above, there are few options for change#1, provided below as options for TP#1

**TP#1**

**Option1:**

* If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* and *qcl-info* is quasi co-located with the RS(s) in the indicated TCI state.

**Option2:**

* If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* and associated with a CSI triggering state without *qcl-info* is quasi co-located with the RS(s) in the indicated TCI state.

**Option3:**

 TP for Rel-17 can be revised to:

* If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* is quasi co-located with the RS(s) in the indicated TCI state if *qcl-info* is not configured.

TP for Rel-18 taking into account mTRP extension can be revised to:

* If *dl-OrJointTCI-StateList-r17* is provided, the UE may assume that a CSI-RS resource in an aperiodic CSI-RS resource set configured without *trs-Info* is quasi co-located with the RS(s) in the indicated TCI state if *qcl-info* or *qcl-info2* is not configured.

It seems change#2 is agreeable, additionally according to suggestion from Ericsson TP#2 is proposed below

**TP#2**

* For each aperiodic CSI-RS resource in a CSI-RS resource set associated with each CSI triggering state, the UE is indicated the quasi co-location configuration of quasi co-location RS source(s) and quasi co-location type(s), as described in clause 5.1.5, through higher layer signaling of *qcl-info* or *qcl-info2* which contains a list of references to *TCI-State's* for the aperiodic CSI-RS resources associated with the CSI triggering state. If a *TCI-State* referred toin the list is configured with a reference to an RS configured with *qcl-Type* set to 'typeD', that RS may be an SS/PBCH block located in the same or different CC/DL BWP or a CSI-RS resource configured as periodic or semi-persistent located in the same or different CC/DL BWP.

# References

R1-2500329 Draft CR on QCL assumption of AP CSI-RS vivo

R1-2500330 Draft mirror CR on QCL assumption of AP CSI-RS (Rel-18 mirror) vivo