**3GPP TSG-RAN WG4 Meeting # 104-e R4-22xxxxx**

**Electronic Meeting, 15th-26th, Aug., 2022**

**Title:** WF on FeMIMO RRM impact for unified TCI state

**Agenda item:** 9.17.2

**Source:** Intel

**Document for:** Approval

# Way Forward on Unified TCI state

### Sub-topic 1-1 Active UL TCI state

**Issue1-1-1a Whether UE need to track UL time/frequency for UL TCI state activation when DL-RS is associated with serving cell**

* Proposals:
	+ Proposal 1: No, UL timing is derived from DL timing of serving cell
	+ Proposal 2: Depends on whether source RS in active UL TCI state is a subset of source RS in DL active TCI list
	+ Proposal 3: Other option

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| **Company** | **Comments** |
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**Issue1-1-1b Whether UE need to track UL time/frequency for UL TCI state activation when DL-RS is associated with cell with different PCI**

* Proposals:
	+ Proposal 1: No, UL timing for cell with different PCI if derived from DL timing of serving cell
	+ Proposal 2: Depends on whether source RS in active UL TCI state is a subset of source RS in DL active TCI list
	+ Proposal 3: Other option

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| **Company** | **Comments** |
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**Issue1-1-2 PL-RS maintenance for active TCI**

*Moderator note: Suggest to discuss in revision of LS R4-2212689.*

**Issue1-1-3 The relation of active UL TCI state list with active DL TCI state list**

* Proposals:
	+ Proposal 1(ZTE):
		- The active DL TCI state list and active UL TCI state list are independent. Active UL TCI state list should not be impacted by active DL TCI state list.
	+ Proposal 1a (Apple):
		- Independent for separate UL/DL TCI state list indicated by dl-orJoint-TCI-ToAddModList for DL TCI state and ul-TCI-ToAddModList for UL TCI state . But for joint TCI state the same TCI is used for UL and DL indicated by dl-orJoint-TCI-ToAddModList
	+ Proposal 2:
		- Active UL TCI should be a subset of the active DL TCI
	+ Proposal 2a :
		- If UL TCI state is associated with cell with different PCI, active UL TCI state is a subset of active DL TCI state

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### Sub-topic 1-2 MAC CE based TCI state Switching delay requirements

 **Issue 1-2-1 Joint TCI switching delay requirement**

* Agreement in GTW discussion:
	+ keep the previous agreement and further work on the CR to further clarify the following wordings in the CR:
* *In 38.133, for DL TCI state switching,*
	+ *[In case of joint TCI state switch, UE is not expected to receive on DL before UE completes the DL and UL TCI state switch.]*
* *In 38.133, for UL TCI state switching,*
	+ *[In case of joint TCI state switch, UE is not expected to transmit on UL before UE completes the DL and UL TCI state switch.]*

*Moderator note: Follow the agreement of GTW, further discuss the wording in revision of CR* [*R4-2212665*](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212665.zip)*.*

**Issue 1-2-2 MAC-CE based UL TCI state switching delay when SSB is indicated as PL-RS in UL TCI state for FR2**

*Moderator note: Majority view are selected.*

* Proposals
	+ Proposal 1(Intel, Apple, Huawei, Samsung):
		- Longer delay is expected.
	+ Proposal 2(MTK, vivo, Ericsson, ZTE, Nokia):
		- Reuse the existing delay requirement of MAC CE based UL TCI state switch.

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| **Company** | **Comments** |
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**Issue 1-2-3 Wording Update of introduction for active DL/UL TCI state switch delay requirements**

*Moderator note: Discuss the detail wording in the revision of CR* [*R4-2213482*](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213482.zip)*.*

### Sub-topic 1-3 Common TCI state switching in CA case

**Issue 1-3-1 Known condition on shared RS in CA scenario**

*Moderator note: companies have different view regarding to the QCL type which can be configured to shared RS in common TCI state activation. However, for the legacy known TCI definition, no detailed QCL type is mentioned in RAN4.*

*A compromised proposal 3 is provided without mentioning detailed QCL type. Would company please check whether option 3 is acceptable?*

* Proposals
	+ Proposal 1:
		- The known condition will depend on the associated RS in common TCI state and if the associated RS provides QCL-TypeD or QCL-TypeC.
	+ Proposal 2:
		- The known condition will depend on the associated RS in common TCI state and if the associated RS provides QCL-TypeD.
	+ Proposal 3:
		- The known condition will depend on the associated RS in common TCI state.

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| **Company** | **Comments** |
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**Issue 1-3-2 Known condition on different RS in CA scenario**

*Moderator note: Majority companies support the proposal 1. Please proponent of proposal 2 check whether Proposal 1 is agreeable.*

* Proposals
	+ Proposal 1:
		- Reuse the existing known condition. If the source RS is configured per CC, then the known condition is per CC.
	+ Proposal 2:
		- Common TCI is for intra-band CA. RAN4 may skip the case that QCL-type is configured per CC for common TCI.

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| **Company** | **Comments** |
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**Issue 1-3-3 Common TCI state switching delay requirement**

* Proposals
	+ Proposal 1:
		- Define the requirement without differentiating the triggering signaling, e.g. unifiedTCI-StateRef or simultaneousU-TCI-UpdateList1/2/3/4-r17.
	+ Proposal 2:
		- Define the requirement indicated by IE simultaneousU-TCI-UpdateList1/2/3/4-r17.

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| **Company** | **Comments** |
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### Sub-topic 1-4 TCI state list update delay

**Issue 1-4-1 Whether to consider unknown TCI state in the TCI state list**

**Agreement in GTW:**

* [Longer delay applies if any TCI state is unknown in TCI state list update]. Active TCI state list can contains known and unkown TCI states.

*Moderator note: Suggest to discuss in revision of CR R4-2213940 based on the GTW agreement.*

**Issue 1-4-2 MAC CE based TCI state list update delay for unknown TCI state**

*Moderator note: Suggest to discuss in revision of CR R4-2213940 based on the GTW agreement.*

### Sub-topic 1-5 Clarification on the applicable TCI after DCI BWP switching

**Issue 1-5-1 Clarification on the applicable unified TCI after DCI BWP switching**

*Moderator note: Suggest to discuss the wording in revision of CR R4-2212665.*