3GPP TSG-RAN WG1 Meeting #117 Tdoc R1-2405518

**Fukuoka City, Fukuoka, Japan, May 20th – 24th, 2024**

Agenda Item: 7

Source: Ericsson

Title: Moderator summary of unified TCI state correction

Document for: Discussion

# 1 Introduction

As part of the Rel-17 unified TCI framework, RAN1 specified functionality to operate without any MAC CE: in case there is only one TCI state that can be activated using MAC CE, that TCI state should be activate automatically. However, the corresponding text in 38.214 is somewhat ambiguous.

A draft CR was submitted to clarify this in [1]. This document captures the discussion on the draft LS.

# 2 Discussion

As part of the Rel-17 unified TCI framework, RAN1 specified functionality to operate without any MAC CE: in case there is only one TCI state that can be activated using MAC CE, that TCI state should be activate automatically. This functionality was first discussed in RAN1#107e, and subsequently captued in the specification in RAN1#108e.

The paragraph in the specification where this is captured is however somewhat ambiguous. In the current version of 38.214, the paragraph looks like this:

Excerpt from 28.214, section5.1.5

If a UE receives a higher layer configuration of *dl-OrJointTCI-StateList* with a single *TCI-State*, that can be used as an indicated TCI state*,* the UE obtains the QCL assumptions from the configured TCI state for DM-RS of PDSCH and DM-RS of PDCCH, and the CSI -RS applying the indicated TCI state.

There are two ways to interpret this:

There may be two ways to interpret this paragraph:

1. dl-OrJointTCI-StateList contains a single TCI-State that can be used as an indicated TCI state (dl-OrJointTCI-StateList may contain additional TCI states that cannot be used as an indicated TCI state)
2. dl-OrJointTCI-StateList contains a single TCI-State, and that TCI state can be indicated (dl-OrJointTCI-StateList contains only this single TCI state)

Both interpretations are possible. However, only 1. leads to a valid TCI state configuration, since the UE must always be provided with at least two TCI states:

1. one TCI state that contains a TRS, which is used as QCL source for DMRS
2. one TCI state that contains an SSB, which is used as QCL source for the TRS in TCI state 1.

To clarify this, the draft CR [1] was submitted. In the online discussion, some editorial comments were made.

## 2.1 Company input

Please provide input, if any, to the updated draft CR.

|  |  |
| --- | --- |
| Company | Comment |
| CATT | Thanks for preparing the draft CR. The downlink part is fine. There is an issue with the uplink part (the following paragraph). All *TCI-UL-State* can be used as indicated TCI state. There is no TCI-UL-State that cannot be used as indicated TCI state. Therefore, the proposed change introduces ambiguity. So we propose to drop the change to the uplink part.  After a UE receives a higher layer configuration of *dl-OrJointTCI-StateList* where more than one *TCI-State* can be used as an indicated TCI stateor a higher layer configuration of *ul-TCI-StateList* where more than one *TCI-UL-State* can be used as an indicated TCI state as part of a Reconfiguration with sync procedure as described in [12, TS 38.331] and before applying an indicated TCI state from the configured TCI states:  Moderator: It is true that the addition of “can be used as an indicated TCI state” is not strictly needed for UL TCI states, since all UL TCI states can be indicated. However, the proposed update is not ambiguous, and I think it improves readability if we use the exact same statement for DL and UL TCI states – otherwise the reader may wonder why this restriction is there for DL but not UL TCI states. I hope that this is OK. |
| MediaTek | In Rel-17 unified TCI framework, all the default behaviors were introduced for only DL operation since this is the only case we need. Additional support for UL operation has been discussed in Rel-17, and it was not supported. |
|  |  |

# References

1. R1-2405270, Draft CR for 38.214 on unified TCI state, Ericsson, Samsung, MediaTek Inc., RAN1#117, Fukuoka, May 2024