**3GPP TSG-RAN WG2 Meeting #117R2-2xxxxx**

**Electronic February 2022**

**Title: DRAFT**LS on further questions on feMIMO RRC parameters

**Response to: -**

**Release:** Rel-17

**Work Item:** NR\_feMIMO-Core

**Source:** ERICSSON to be replaced by 3GPP TSG-RAN WG2

**To:** 3GPP TSG-RAN WG1

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**Attachments:** None

**1. Overall Description:**

[RAN2 agreed question:]

RAN2 has further discussed the implementation of L1 parameters based on R1-2112976. One of the parameters is “*[AdditionalPCIInfo…]* ” (row 53) with description “*to support inter-cell mTRP operation, to associate SSB from the cell having different PCI than serving cell.*”

In current RRC running CR, AdditionalPCIInfo-r17 is introduced in the following IE.

* QCL-Info for inter-cell BM (DL-only/Joint TCI state) and inter-cell mTRP
* UL-TCIState-r17 for inter-cell BM (UL-only TCI state)
* PUCCH-SpatialRelationInfoExt-r16 for inter-cell mTRP

In the RAN2 RRC draft CR, for support of inter-cell mTRP operation, RAN2 has added additional PCI to TCI-State (used for Rel-16 operation). RAN2 wonders whether this additional PCI is also needed in PUCCH-SpatialRelationInfo for inter-cell mTRP operation.

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***Question 1.*** RAN2 would like to ask

a)whether additional PCI is needed in PUCCH-SpatialRelationInfo for inter-cell mTRP operation, or in any other place..

b) for DL-only/Joint TCI state, whether configuration of additional PCI could be different for qcl-Type1 and qcl-Type2 in DLorJoint-TCIState, i.e., if it is always the same then RAN2 will introduce configuration of additional PCI within DLorJoint-TCIState instead of within QCL-Info?

[Other suggested questions:]

RAN2 further discussed row 19 of the excel that advices “PDSCH configuration for each CC/BWP. The reference CC/BWP includes the Rel-17 TCI state pool (a list of TCI states) for PDSCH”. This is understood as signalling optimization for DL or joint TCI state list configuration when UE is configured with unified TCI state operation.

***Question 2.*** RAN2 would like to ask whether the UL BWPconfiguration (in which a Rel-17 UL TCI state list can be configured) can have a similar configuration, i.e. a reference CC/BWP parameter, where the indicated reference CC/BWP includes the Rel-17 UL TCI state pool (a list of TCI states) for this UL BWP ?

Question 2a: RAN2 assume that reference BWP/CC information is needed when Rel-17 unified TCI state list is absent for the corresponding cell/BWP. Please confirm it.

[BFR for inter-cell mTRP and BM]

RAN2 discussed about BFR and would like to ask the following questions:

Question 3: When a serving cell is configured with inter-cell mTRP or inter-cell beam management and includes a single BFD RS set, can the BFD RS set include RS of the serving cell and RS associated with an additional PCI?

Question 4: When a serving cell use inter-cell mTRP, can the UE be configured with two BFD RS sets? If yes, please explain if there is any relation between a BFD RS set and a PCI (e.g. one set associated with RS of this serving cell and another associated with RS associated with an additional PCI).

Question 5: Should new BFR mechanism (new BFR MAC CE, two BFD RS sets) be supported for inter-cell BM too? If yes, please explain if there is any relation between a BFD RS set and a PCI (e.g. one set associated with RS of this serving cell and another associated with RS associated with an additional PCI), or is there any impact to BFD/BFR with two BFD sets if switching towards beams associated with different PCI occurs.

[Simultaneous TCI state update]

RAN2 understands that Rel-16 simultaneous TCI state update (based on simultaneousTCI-UpdateList1-r16 and simultaneousTCI-UpdateList2-r16) should be applied for Rel-17 unified TCI state update as well as common TCI state update (based on reference BWP/CC information).

Question X: Is it correct understanding that Rel-16 simultaneous TCI state update (based on simultaneousTCI-UpdateList1-r16 and simultaneousTCI-UpdateList2-r16) should be applied for Rel-17 TCI state update as well as common TCI state update (based on reference BWP/CC information)?

In RAN2 meeting, it was proposed to use different RRC parameter (e.g. simultaneousTCI-UpdateList1-r17 and simultaneousTCI-UpdateList2-r17. The main motivation is to apply simultaneous TCI state update when Rel-16 TCI state and Rel-17 unified TCI state is configured for different serving cells. For example, Rel-17 unified TCI state list is configured in serving cell #1- #4, while Rel-16 TCI state list is configured in serving cell #5-#8. In this case, simultaneousTCI-UpdateList1-r17 and simultaneousTCI-UpdateList2-r17 are used to group serving cell #1-#4, while simultaneousTCI-UpdateList1-r16 and simultaneousTCI-UpdateList2-r16 are used to group serving cell #5-8 for simultaneous TCI state update.

Question X-1: Do we need to introduce different RRC parameter (e.g. simultaneousTCI-UpdateList1-r17 and simultaneousTCI-UpdateList2-r17?

Question X-2: Is there any restriction in configuring Rel-16 simultaneous TCI state update and Rel-17 common TCI state update (based on reference BWP/CC information) in the unified TCI state framework?

Question X-3: Is it correct understanding that the Rel-17 simultaneous TCI state update applies only to DL-only/Joint TCI state but not for ul-TCIState?

**2. Actions:**

**To RAN1 group:**

**ACTION:** RAN2 respectfully asks RAN1 to provide responses to above question.

**3. Date of Next TSG-RAN WG2 Meetings:**

ASN1 review April 2022 Electronic

TSG-RAN WG1 Meeting #118-e 16 – 27 May 2022 Electronic

TSG-RAN WG1 Meeting #119 August 2022 Electronic