**3GPP TSG-RAN WG2 Meeting #115 Electronic DRAFT R2-210xxxx**

**Elbonia, 16 – 27 August 2021**

**Title: [DRAFT]** LS on inter-cell beam management and multi-TRP in Rel-17

**Response to:** -

**Release:** Release 17

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

**Source:** Nokia [RAN2]

**To:** RAN1

**Cc:** RAN4

**Contact Person:**

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**Send any reply LS to: 3GPP Liaisons Coordinator,** **mailto:3GPPLiaison@etsi.org**

**Attachments:** -

**1. Overall Description:**

RAN2 has continued the discussion on inter-cell beam management (including multi-TRP) in the context of the Rel-17 FeMIMO WI, would like to request some clarifications on various areas to better understand the required RAN2 work.

First, RAN2 would like to note that as the term "non-serving cell" has been problematic, the following questions use "**serving cell TRP**" to denote the "legacy" TRP and "**TRP with different PCI**" to denote the "non-serving cell" configured for the UE. RAN2 would also like to note that the questions below are for both inter-cell multi-TRP operation and inter-cell beam management so in case there are differences between those operations, RAN2 would like to understand what those differences are.

Consequently, RAN2 would request answers to the following questions:

* **1) Basic Tx/Rx operation with inter-cell beam management :** The WI states that "*For inter-cell beam management, a UE can transmit to or receive from only a single cell (i.e. serving cell does not change when beam selection is done)*" When UE is configured to use both *serving cell TRP* and *TRP with different PCI*, RAN2 would like to understand the corresponding behaviour for:
	+ a) **UL and DL:** Are UL and DL always processed at the same TRP or can UE use e.g. *serving cell TRP* for UL transmissions and *TRP with different PCI* for DL reception?
	+ b) **System information and paging:** If UE is receiving DL from TRP with different PCI on dedicated channels, is UE still required to receive system information and paging from *serving cell TRP*?
	+ c) **SSB reception:** Should UE always receive CD-SSB from *serving cell TRP* and is there any impact to RRM measurements of serving or neighbour cells?
	+ **d) Number of TRPs:** Is the number of TRPs involved in the operation restricted to two TRPs (i.e. *serving cell TRP* and *TRP with different PCI*?**e) PCell/PSCell/SCell: Is the inter-cell beam management applicable to any serving cell (i.e. PCell/PSCell/SCell) ?**
	+ f) Which signalling should be used for TCI switch for inter-cell BM
	+ d) Simutaneous Tx/Rx from and to “serving cell TRP” and “TRP with different PCI”: Is it correct understanding that such simultaneous Tx/Rx is not supported for “inter-cell beam management”, but is supported for “inter-cell mTRP”? If so, what is the difference regarding their configuration that need to be introduced by RAN2?
* **2) MAC aspects:** RAN2 would like to understand the impacts to MAC operation, in particular:
	+ a) **Timing advance:** Is it assumed that TA is the same for both *serving cell TRP* and *TRP with different PCI*, or does UE maintain different TAs for each?
	+ b) **RACH:** Are there any impacts to RACH operation with inter-cell beam management ? That is, is it necessary to perform RACH toward TRP with different PCI e.g. for TA, BFR, etc?
	+ c) **UL PC/PHR:** When UE is configured for *TRP with different PCI* for a cell with UL, is there an impact to UL power control or PHR?
* **3) HARQ operation:** How does the HARQ operation work with the multi-beam operation? In particular:
	+ a) **HARQ entity:** Is there a single HARQ entity handling both the *serving cell TRP* and *TRP with different PCI*?
	+ b) **HARQ retransmissions:** Can retransmission occur from different TRP than initial transmission for the same HARQ process? E.g. can initial transmission be done from *serving cell TRP* and retransmission from *TRP with different PCI*?
* **4) Unified TCI aspects:** How are the unified TCI states used in the inter-cell beam management?
* **5）PxxCH channel configuration, PRACH configuration, and L1 management configuration:** For the PxxCH configuration (i.e. PUSCH/PDSCH/PDCCH/PUCCH) and PRACH configuration of the TRP with different PCI, how many or which parameters could be different from the serving cell? Also, what configuration(s) need to be provided for beam measurement and reporting? ‎

RAN2 would request RAN1 feedback (on a level that explains the features, i.e. a dump of RAN1 agreements alone is usually not very helpful for progressing the work) on these.

**2. Actions:**

**To RAN4 group.**

**ACTION:** RAN2 respectfully asks RAN1 to provide answers to the above questions and indicate information on any other aspects that may impact RAN2 work**.**

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

3GPP RAN2#116-e from 2021-11-01 to 2021-11-12 Electronic Meeting