**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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**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, and L1 management configuration:** For the PxxCH configuration (i.e. PUSCH/PDSCH/PDCCH/PUSCH) 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