**3GPP TSG-RAN WG2 Meeting #121bisR2-2304341**

**Electronic April 2023**

**Title:** **DRAFT** LS on 2TA operation for Rel-18 MIMO

**Response to: -**

**Release:** Rel-18

**Work Item:** NR\_MIMO\_evo\_DL\_UL-Core

**Source:** Ericsson (to be replaced with 3GPP TSG-RAN WG2)

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

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**Attachments:** None

RAN2 has discussed the 2TA aspects including per TRP UE initiated RACH procedure, configuring more than one TAG per serving cell and configuring additional RACH configs based on RAN1 input and RAN2 contributions.

For per TRP UE initiated RACH procedure RAN2 agreed the following:

* From RAN2 perspective, per TRP UE-initiated RACH procedure is not supported.

As for the other aspects e.g., the possible grouping, related operations for 2TAs, RAN2 has some questions need to check with RAN1.

1. **TAG groups**

RAN2 discussed how the cells/TRPs configured for the UE, are to be grouped if UE is configured with two TAG groups per serving cell.

For example, if UE is configured with three serving cells, named here as A,B,C, and each as two active TRPs. First TRP of cell A is marked as A1 and second TRP of cell A is marked as A2 and so on. Group1 denotes cells/TRPs that follow the first UL timing and hence first time alignment timer and Group2 denotes cells/TRPs that follow the second UL timing and hence second time alignment timer.

There can be different ways to allow this grouping. For example, the allowed grouping is such that both groups need to contain the same cells although it may be optional which TRP is included. If the reference timing is for first group cell A, then the same cell is also reference timing for group 2. Two example groupings could be:

Example 1

Group 1: **A1**, B1, C1

Group2: **A2**, B2, C2

Or example 2:

Group 1: A1, **B2**, C1

Group2: A2, **B1**, C2

The operation according to the above example 1 could be that if TA in A1 of group 1 is lost, it is considered to be lost for A1, B1 and C1 but A2, B2 and C2 would still be running.

Another possibility is that this per TRP TA operation is local to a serving cell, at least for the second time alignment timer.

Example 3

Group 1: A1, **B1**, C1, D1

Group2: A2

Group3: B2

Group4: C2

With this example 3, in Group 1, there is one reference timing which follows the TRP1 of cell B and the first TRPs of cell A, C and D follow the TAT of that. Then, each cell has second group with it’s own TAT. It should be noted that with 4 TAGs, the D2 will not have TAG left as all four TAGs are consumed already.

In another Example 4, in which each TRP of cells has its own reference timing and related TAT, such as

Group1: A1

Group2: A2

Group3: B1

Group4: B2

RAN2 would like to receive RAN1 feedback on the intended grouping and related operation

**Question 1 on grouping and reference timing**

**Q1a:** For the TAG groups configured for the UE, what are the rules for grouping serving cells and their TRPs according to RAN1 understanding?

**Q1b:** What are the rules for the reference timing cell/TRP selection. E.g. If A1 is the reference timing of group 1, is then A2 a reference timing for group 2 or can another cell/TRP of group 2 be chosen as reference timing?

**Question 2 on operation**

**There is general understanding in RAN2 that the functionality RAN1 is designing involves two time-alignment timers associated per one serving cell. One timer is associated to UL towards one TRP and the other towards the other TRP.**

Q2 Given the above assumption, when one of the timers associated to one serving cell expires, is it according to RAN1 view that UL towards that TRP the timer is associated (e.g. UL transmissions associated to UL TCI state, PUCCH and SRS resources of that TRP) are impacted but UL towards the another TRP can remain in operation?

1. **Additional RACH configs:**

RAN2 discussed the additional RACH configs for the inter-cell case where the serving cell is configured with additionalPCIs and one of these PCIs is at the time active for the second TRP while the first TRP is associated to the original PCI of the serving cell. RAN2 would like to understand better the configuration details. Currently, the serving cells of one TAG share one common RACH configuration between two TRPs and among all the serving cells configured for the UE, and that configuration is applied in the UL BWP in which the RACH is performed. In Rel-17, RAN1 introduced the “inter-cell” mTRP operation where additional PCI may be associated to the second TRP within one serving cell configuration. RAN2 understanding of the RAN1 agreement is that each of the additionaPCIs withing one serving cell, may be configured with it’s own RACH configuration.

**Question 3 on RACH**

**Q3a:** Is there a difference in the preamble or resource configuration(or some other aspect) between first and second TRP in this “inter-cell mTRP”? Further, which is the difference depending on which additional PCI is active for the second TRP?

**Q3b:** Is there a difference in the preamble or resource configuration(or some other aspect) between first and second TRP in this “inter-cell mTRP”? Further, which is the difference depending on which additional PCI is active for the second TRP?

**4. Actions:**

**To RAN1 group:**

**ACTION:** RAN2 respectfully asks RAN1 to take the agreements into consideration in the future work and provide responses to above questions.

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

TSG-RAN WG2 Meeting #122 May 2023 Incheon

TSG-RAN WG2 Meeting #123 August 2023 Toulouse