**3GPP TSG RAN WG1 Meeting #104-e R1-2102247**

**e-Meeting, January 25th – February 5th, 2021**

**Title: DRAFT** LS on TCI State Update for L1/L2-Centric Inter-Cell Mobility

**Response to:**

**Release:** Rel-17

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

**Source:** Samsung

**To:** RAN2

**Cc:** RAN3, RAN4

**Contact Person:**

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**1. Overall Description:**

RAN1 discussed the support of L1/L2-centric inter-cell mobility and made the following agreement.

**Agreement**

On Rel.17 enhancements for L1/L2-centric inter-cell mobility,

* Discuss whether to support at least the source RS types already agreed for intra-cell mobility for the purpose of referencing to non-serving cell(s). Note: This implies the following source RS(s):
  + CSI-RS for BM configured for non-serving cell(s) for DL QCL and UL TX spatial references
  + CSI-RS for tracking (TRS) configured for non-serving cell(s) for DL QCL and UL TX spatial references
  + SSB configured for non-serving cell(s) for UL TX spatial references
  + SRS for BM configured for non-serving cell(s) for UL TX spatial references
  + FFS: whether to support CSI-RS for mobility
  + FFS: whether to support other source RS(s) potentially agreed later for intra-cell mobility
  + FFS: whether to support CSI-RS for BM and tracking configured for non-serving cell(s) and without non-serving cell SSB as QCL-TypeD source
* Send an LS to RAN2 on TCI state update (beam indication) using source RS configured for non-serving cell(s) for DL reception and UL transmission. The following topics are considered for the LS:
  + RRC configuration issues
  + Serving cell issues
  + C-RNTI issues
  + Issues related to CU-DU split
  + Inter-band CA issues
  + Inter-frequency issues

As a part of the Rel-17 NR\_FeMIMO WID wherein the group is tasked to “identify and specify features to facilitate more efficient (lower latency and overhead) DL/UL beam management to support higher intra- and L1/L2-centric inter-cell mobility”, RAN1 is currently investigating TCI state update (beam indication) for DL reception from and UL transmission to non-serving cell(s) – at least on UE-dedicated PDSCH, PDCCH, PUSCH, and PUCCH. In this case, the TCI is associated with a source RS configured for the non-serving cell(s).

For this purpose, RAN1 seeks a few answers from RAN2 on the following questions in order to proceed further.

**Question 1**: In regard of RRC configuration:

1. Is RRC reconfiguration signaling needed for DL reception from or UL transmission to a non-serving cell, at least on UE-dedicated PDSCH, PDCCH, PUSCH, and PUCCH? If so, which parameter(s)?
2. Can some RRC parameters related to the non-serving cell(s) be updated via dynamic signaling (e.g. MAC CE and/or DCI) without any additional RRC reconfiguration signaling?

**Question 2**: In regard of serving cell, is a UE expected to change its serving cell for DL reception from or UL transmission to another (i.e. a non-serving) cell, at least on UE-dedicated PDSCH, PDCCH, PUSCH, and PUCCH? If so, what would be the higher-layer impact?

**Question 3**: In regard of C-RNTI:

1. In what condition(s) does a UE require C-RNTI update for DL reception from and UL transmission to a non-serving cell, at least on UE-dedicated PDSCH, PDCCH, PUSCH, and PUCCH?
2. In such condition(s), if any, is RRC reconfiguration signaling or some other (dynamic) signaling needed for the C-RNTI update?

**Question 4**: In regard of CU-DU split, by restricting the above feature only for intra-DU scenarios (instead of allowing inter-DU scenarios as well), what would be the difference in terms of the following?

1. The associated RAN2 specification impact
2. The implication in applicable use cases and inter-operability (e.g. across different gNB vendors)

**Question 5**: In regard of inter-band CA issues, what would be the higher-layer impact assuming intra-band CA as opposed to inter-band CA?

**Question 6**: In regard of inter-frequency issues, what would be the higher-layer impact assuming intra-frequency scenarios as opposed to inter-frequency scenarios?

**2. Actions:**

**To: RAN2**

**ACTION:** RAN1 respectfully asks RAN2 to provide answers for the above questions with additional details that RAN1 shall further consider

**3. Date of Next TSG-RAN WG1 Meetings:**

TSG RAN WG1 Meeting #104bis-e 12th – 20th April, 2021 E-meeting