**3GPP TSG RAN WG2 NR ASN.1 Ad-hoc electronic R2-220xxxx**

**e-Meeting, April 20th – 22nd, 2022**

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

**Response to: -**

**Release:** Rel-17

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

**Source:** Ericsson, Intel [to be RAN2]

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

**Contact Person:**

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**Attachments:** None

**1. Overall Description:**

During ASN.1 review, RAN2 identified some questions that needs RAN1 inputs as follows.

**Issue 1 : Pathloss Reference RS for BM and PUCCH mTRP (RIL: E016, Editor’s note in Rel-17 TS 38.331)**

pathlossReferenceRS-Id-r17 was used originally for DLorJoint-TCIState-r17 and PUCCH-PowerControlSetInfo-r17 separately but changed to PUCCH-PathlossReferenceRS-Id/PUSCH-PathlossReferenceRS-Id in order to avoid RRC syntax error. In order to define pathlossReferenceRS-Id-r17 or reuse PUCCH-PathlossReferenceRS-Id PUSCH-PathlossReferenceRS-Id, it is necessary to know what the maximum number of pathloss Reference RSs is for BM and PUCCH mTRP respectively. Especially, for the unified TCI state, RAN1 agreement is "Total of maintained PL-RS per CC is up to 4". However, it is not clear what is “maintained”.

**Question 1:** What is maximum number for 1) Pathloss RS set for unified TCI state and 2) Pathloss RS set for PUCCH power control set?

**Issue 2: sfnScheme-r17 and sfnSchemePdsch-r17 in HST (RILS: V107, V108, I113, E011)**

RAN1 indicates sfnScheme-r17 and sfnSchemePdsch-r17 as per BWP. However, there is a note that “In Rel-17, all downlink BWPs (except initial BWP and FFS: BWP-DownlinkCommon) within a CC should have the same configuration of SFN scheme”. In addition, it is not clear whether PDSCH and PDCCH can have different SFN schemes in one CC?

**Question 2:** Is it really necessary to define sfnScheme-r17 and sfnSchemePdsch-r17 per BWP? If yes, what is the usage for having it per BWP (e.g. forward compatibility)?

**Question 3:** what is RAN1 assumption on whether PDSCH and PDCCH can have different SFN schemes in one CC? Could it be independent or same SFN scheme for PDSCH and PDCCH?

**Issue 3: CSI-mTRP (RILS: V109, V111, V110, I104, M361)**

RAN2 introduced 2 types of RI restrictions and two CBRS per CodebookConfig. However, it is not clear how those features are enabled e.g. independently (simultaneous configuration) or only one feature? Currently, all of them are added as mandatory field under type1 which means it should be configured at the same time.

**Question 4:** The following assumption is correct?

* RI restriction and CBSRs may or may not be configured simultaneously.
* either RI restriction for sTRP or RI restriction for NCJT will be configured. That is, cannot be configured simultaneously.
* Two CBSRs should be configured together whenever two CMR groups are configured. If two CRM groups are not configured, two CBSRs should not be configured.

**Issue 4:**

There are several parameters to support mTRP PUSCH (i.e. PUSCH repetition). It is RAN2 assumption that those parameters should be configured when two SRS resource sets are configured for usage codebook or noncodebook by parameter usage in SRS-Config. However, it is not clear the exact condition for two SRS resource sets especially, the Rel-15/16 SRS resource sets can configure up to 16 and there two types of SRS resource sets for DCI format 0\_1 and 0\_2 separately.

    srs-ResourceSetToAddModList             SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet                  OPTIONAL,   -- Need N

    srs-ResourceSetToAddModListDCI-0-2-r16  SEQUENCE (SIZE(1..maxNrofSRS-ResourceSets)) OF SRS-ResourceSet          OPTIONAL, -- Need N

**Question 5:** what is the correct condition/defintion for two SRS resource sets for mTRP PUSCH (i.e. PUSCH repetition)?

**Issue 5: (RIL E008)**

A parameter ul-powerControl configures power control parameters for PUCCH, PUSCH and SRS when UE is configured with unifiedtci-StateType. The parameter can be configured for the UE in a dedicated UL BWP or in unified TCI state concerning UL. Hence the current field description states:

***ul-powerControl***

Configures power control parameters for PUCCH, PUSCH and SRS when UE is configured with unifiedtci-StateType .The field is present here only if UL power control is not configured for any UL TCI state and DLorJoint-TCIState.

However, as it is understood that UE can be configured only with unified TCO state or Rel-15/16 TCI state framework, it is assumed UE cannot be configured with Rel-15/16 power control parameters when UE is configured with parameter ul-powerControl.

**Question 6:** Is UE always configured with parameter ul-powerControl when UE is configured with unified TCI state? When UE is configured with ul-powerControl how to correctly restrict UE’s configuration related to Rel-15/16 UL power control configuration options. Would the following suggestion be accurate to be added in the field description?

“When network includes this field either here or in any UL TCI state or DLorJoint-TCIState, the network does not configure the UE with corresponding power control parameters with PUCCH-PowerControl, PUSCH-PowerControl or SRS-Config”

**Issue 6: MPE reporting in ICBM (inter-cell beam management):**

It is not clear whether explicit additional PCI is needed or not. The use of the enhanced MPE report for ICBM has been confirmed by an LS reply from RAN1. But its use for inter-cell mTRP scenarios was not considered in RAN1.

**Question 7:** Is explicit additional PCI needed for MPW resource configuration?

**Issue 7: Max values FFS in Rel-17 TS 38.331**

**Question 8:** Please provide value for maxNrofCandidateBeams-r17.

**Question 9:** Please confirm value for maxNrofBFDResourcePerSet-r17.

**2. Actions:**

**To RAN1 group:**

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

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

TSG-RAN WG2 Meeting #118-e 16 – 27 May 2022 Electronic

TSG-RAN WG2 Meeting #119-e August 2022 Electronic