**3GPP TSG-RAN WG1 Meeting #104-eR1-210xxxx**

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

**Title: [DRAFT]** Reply LS on physical layer aspects of small data transmission

**Response to:** R2-2010841, LS on physical layer aspects of small data transmission

**Release:** Rel-17

**Work Item:** NR\_SmallData\_INACTIVE-Core

**Source:** ZTE [RAN1]

**To:** 3GPP TSG-RAN WG2

**Contact Person:**

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**Attachments:** None

**1. Overall Description:**

RAN1 would like to thank RAN2 for the LS on physical layer aspects of small data transmission

**For RA-SDT**

RAN1 has discussed CORESET and search space for monitoring the PDCCH addressed to the C-RNTI after successful completion of the RACH procedure during RA-SDT. From RAN1 perspective, the existing type-1 PDCCH CSS used for random access can be reused but it may impose higher PDCCH blocking rate and impact to the legacy UE performing random access, so at least a new search space that is different from the existing CSS should be supported for RA-SDT. Both a new common search space and UE-specific search space were considered in RAN1, and we think it is better to let RAN2 further evaluate the feasibility and make the decision. The configuration of CORESET will depend on the conclusion for search space.

Based on the above, the following conclusions have been made.

* From RAN1 perspective, at least a new SearchSpace that is different from the existing common SearchSpace should be supported for monitoring the PDCCH addressed to the C-RNTI after successful completion of the RACH procedure during RA-SDT
  + It is up to RAN2 decision if the new SearchSpace is UE-specific or common to the UEs performing RA-SDT
* If the new SearchSpace is not configured, type-1 PDCCH CSS can be reused.
* FFS UE-specific CORESET or common CORESET, depending on the conclusion for SearchSpace.

**For CG-SDT**

First of all, RAN1 concludes that one or multiple SSBs can be configured per CG configuration for CG-SDT. Regarding the association between the configured SSB(s) and the CG resources per CG configuration, at least two feasible solutions have been considered in RAN1, one alternative is to reuse the SSB-to-RO mapping rule as much as possible, and the other alternative is to associate all the CG resources per CG configuration with the same set of SSB(s) that is explicitly configured for the CG configuration. It is also noted that other solutions are not precluded. RAN1 will continue the discussion and provide more details later.

Based on the above, the following conclusions have been made.

* One or multiple SSBs can be configured per CG configuration for CG-SDT.
* From RAN1 perspective, the following alternatives can be considered for the association between the configured SSBs and the CG resources (including transmission occasions and DMRS) per CG configuration for CG-SDT.
  + Alt. 1: Reuse the SSB-to-RO mapping rules
    - FFS the potential RAN1 impact, e.g. mapping ratio and association period
  + Alt. 2: All the CG transmission occasions per CG configuration are associated with the same set of SSB(s) by explicit signalling.
  + Other solutions are not precluded
* FFS whether repetition is supported for CG-SDT or not, and if supported how to handle the mapping between the SSBs and repetitions
* FFS TA validation and PUSCH validation for CG-SDT.

**2. Actions:**

**To RAN2:**

**ACTION:** RAN1 respectfully requests that RAN2 takes the above into account.

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

TSG-RAN WG1 Meeting #104-bis-e 12 Apr. – 20 Apr. 2021 Electronic Meeting

TSG-RAN WG1 Meeting #105-e 19 May. – 27 May. 2021 Electronic Meeting