**3GPP TSG RAN WG1 #106-e R1-21xxxxx**

**e-Meeting, August 16th – 27th, 2021**

**Title: Draft reply LS on** **physical layer aspects of small data transmission**

**Response to:** **R2-2106561**

**Release: Rel-17**

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

**Source:** **RAN1**

**To:** **RAN2**

**Cc:**

**Attachments:**

**Contact Person:**

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**1. Overall Description:**

RAN1 would like to thank RAN2 for the LS on physical layer aspects of small data transmission in R2-2106561.

Regarding RA-SDT, RAN1 discussed the configuration parameters for the PRACH resource configuration when PRACH occasions are shared between SDT and non-SDT and when PRACH occasions are separately configured for SDT and non-SDT. RAN1 made the following agreements/conclusion for RA-SDT.

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| **Proposal 1: For RA-SDT, when PRACH occasions are separate between SDT and non-SDT, the existing PRACH resource configurations can be separately configured, including 4-step RACH and/or 2-step RACH based SDT.*** ~~E.g. following parameters can be configured~~
* ~~PRACH Configuration Index~~
* ~~Time resources and frequency resources of PRACH resources,~~
* ~~Number of SSBs associated with a valid RO,~~
* ~~Number of contention based preambles per SSB per valid RO,~~
* ~~totalNumberofRA-Preambles~~
* ~~prach-RootSequenceIndex,~~
* ~~zeroCorrelationZoneConfig,~~
* ~~restrictedSetConfig~~
* ~~FFS if separate ROs need to be configured for RA-SDT of both 4-step RACH and 2-step RACH~~

**Proposal 2:** For RA-SDT, when PRACH occasions are shared between SDT and non-SDT, at least following parameters can be configured, including 4-step RACH and/or 2-step RACH based SDT operation.* Number of contention-based preambles for SDT per SSB per valid RO
* ~~Starting position of the preambles for SDT per SSB per valid RO~~
* ~~FFS explicit indication, or implicit determination for preamble for SDT in shared ROs~~

Note: whether starting position of the preambles for SDT per SSB per valid RO needs to be configured for RA-SDT in shared ROs is up to RAN2 discussion.**Conclusion:** Further discuss on the case when ROs are shared between SDT and non-SDT, but different RACH types have separate ROs after RAN2’s decision* ~~Ask RAN2 about the possible combinations of RACH type for SDT and non−SDT~~

**Proposal 3: For RA-SDT, when PRACH occasions are shared between SDT and non-SDT, a PRACH mask can be configured to indicate a subset of ROs for RA-SDT.*** + The PRACH mask is used to indicate a subset of ROs associated with same SSB index for RA-SDT
	+ ~~The PRACH Mask indexes for 4-step SDT and 2-step SDT should be separately configured.~~

**Proposal 4:** For RA-SDT in shared ROs and separate ROs with non-SDT, the power control parameters follow those for non-SDT, * i.e. preambleReceivedTargetPower and power ramping setting follow those for non-SDT.
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Regarding the questions for CG-SDT on the working assumption and agreements, RAN1 made the following agreements.

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| Search space is configured for UEs performing CG-SDT**Proposal 5:** RAN1 confirms the working assumption on search space for CG-SDT.* UE-specific search space is configured for UEs performing CG-SDT.

BWP for CG-SDT resource**Proposal 6:** RAN1 confirms the RAN2 agreement that CG-SDT resource can be configured on either initial BWP or separate SDT BWP.* ~~For TDD if SDT is configured in a separate BWP, the BWP should includes the initial BWP to avoid BWP switching for receiving the SSBs~~

L1 feedback for CG-SDT**Proposal 7:** RAN1 to further discuss the followings for L1 feedback for CG-SDT* Option 1: Support explicit L1 feedback for CG-SDT.
	+ Option 1A: Reuse DFI based mechanism as introduced in Rel-16 NR-U
	+ Option 1B: Use UL grant scheduling DG-PUSCH with same HARQ process ID as CG-SDT PUSCH
* Option 2: Explicit ACK is not supported for CG-SDT. Reuse Rel-15 CG re-transmission for CG-SDT
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**2. Actions:**

RAN1 respectfully asks RAN2 to take into account the above information.

**3. Date of Next RAN1 Meetings:**

TSG-RAN WG1 Meeting #106b-e 11th Oct – 19th Oct 2021 e-meeting

TSG-RAN WG1 Meeting #107-e 11th Nov – 19th Nov 2021 e-meeting