**3GPP TSG RAN WG1 Meeting #106bis-e R1-210xxxx**

**e-Meeting, October 11th – 19th, 2021**

**Title: [DRAFT] Reply LS on Msg3 repetition in coverage enhancement**

**Response to:** R1-2108712(R2-2109195)

**Release:** Release 17

**Work Item:** NR\_cov\_enh-Core

**Source:** RAN1

**To:** RAN2

**Contact Person:**

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**Send any reply LS to: 3GPP Liaisons Coordinator, mailto:3GPPLiaison@etsi.org**

**Attachments:**

**1. Overall Description:**

RAN1 would like to thank RAN2 for the LS R1-2108712 (R2-2109195) on Msg3 repetition in coverage enhancement, which asked the following questions to RAN1.

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| * Question 1: Does RAN1 think it is feasible to support Msg3 repetition on both NUL and SUL? If it is feasible, whether different RSRP thresholds for requesting Msg3 repetition are needed for NUL and SUL?
* Question 2: Does RAN1 think it is feasible to configure random access preamble Group B together with Msg3 repetition?
* Question 3: For Msg1 transmission used to request Msg3 repetition, does RAN1 see any issue and benefit of optionally configuring a separate set of RACH parameters?
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Based on RAN1 understanding, RAN1 provides the respective answers for the three questions as follows.

Answer to Question 1: Yes. From RAN1 perspective, it is feasible to support Msg3 repetition on both NUL and SUL. RSRP threshold for requesting Msg3 repetition is configured per uplink carrier and different values of this threshold between NUL and SUL can be configured.

Answer to Question 2: Yes. From RAN1 perspective, it is feasible to support both Group A with or without Msg3 repetition and Group B with or without repetition. Majority companies in RAN1 see the necessity of supporting Group B with Msg3 repetition while no consensus reached in RAN1. If supported, a separate set of Group B related parameters such as *ra-Msg3SizeGroupA*, *messagePowerOffsetGroupB* and *numberOfRA-PreamblesGroupA* for request of Msg3 repetition can be introduced.

Answer to Question 3: RAN1 has no consensus on ~~the benefits or issues about~~ optionally configuring a separate set of RACH parameters for *preambleReceivedTargetPower*, *powerRampingStep*, *preambleTransMax* for requesting Msg3 repetition with shared RO. If separate RO is supported for requesting Msg3 PUSCH repetition (not supported yet and no consensus in RAN1), RAN1 thinks a separate set of RACH parameters can be configured.

In addition, RAN1 discussed the other RRC parameters for request of Msg3 repetition with shared RO, and RAN1 understanding is provided below.

* RAN1 thinks at least the number of preambles per SSB per RO for request of Msg3 repetition is needed. It’s up to RAN2 whether to indicate the start of preamble index for request of Msg3 repetition with shared RO.
* From RAN1 perspective, there is no need to separately configure the following legacy RACH parameters configured in *RACH-ConfigCommon* for requesting Msg3 PUSCH repetition with shared RO on a given UL carrier.
* *prach-ConfigurationIndex*
* *msg1-FDM*
* *msg1-FrequencyStart*
* *zeroCorrelationZoneConfig*
* *totalNumberOfRA-Preambles*
* *ssb-perRACH-OccasionAndCB-PreamblesPerSSB*
* *rsrp-ThresholdSSB-SUL*
* *prach-RootSequenceIndex*
* *msg1-SubcarrierSpacing*
* *restrictedSetConfig*
* *msg3-transformPrecoder*
* From RAN1 perspective, it can be beneficial to separately configure *rsrp-ThresholdSSB* for requesting Msg3 PUSCH repetition with shared RO on a given UL carrier.

**2. Actions:**

**To RAN2 group.**

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

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

TSG-WG1 Meeting #107-e 11st – 19th November 2021 Online Meeting

TSG-WG1 Meeting #107bis-e 17th – 25th January 2022 Online Meeting