**3GPP TSG-RAN WG2 #109e R2-2002204**

**Elbonia, 24th February – 6th March, 2020**

**Title:** LS to RAN1 on preamble-to-PRU mapping for 2-step CFRA

**Release:** Rel-16

**Work Item:** NR\_2step\_RACH-Core

**Source:** RAN2

**To:** RAN1

**Contact Person:**

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**1. Overall Description:**

During the RAN2#109e meeting, RAN2 took the following agreements on the signaling of CFRA:

**Agreements**

**For 2-step CFRA**

1 Support dedicated msgA PUSCH resources, i.e non-shared msgA PUSCH resources between CFRA and CBRA.

2 For dedicated msgA PUSCH resources, the full msgA PUSCH configuration is signaled in RACH-ConfigDedicated

3 Dedicated msgA PRACH occasions are optionally configured for 2-step CFRA. If not configured, msgA PRACH occasions for 2-step CBRA are used.

The remaining issue for CFRA after these agreements was identified as part of the open issue summary on Control Plane [1]. The remaining issue is regarding the preamble-to-PRU mapping for CFRA and how to map a dedicated preamble to a dedicated CFRA msgA PUSCH resource. Currently RAN2 have discussed two alternatives for mapping:

**Alt 1:** Reusing the preamble-to-PRU mapping rule defined by RAN1 for CBRA and signaling the number of contention free preambles per SSB (field *msgA-NumberOfCF-PreamblesPerSSB*), and an offset to be used for the start of the contention free preamble in each RACH occasion(field *msgA-PreambleStartIndex*)[2]. Offset may not be needed if contention free preambles always starts immediately after the contention based preambles

**Alt 2:** The PUSCH occasions corresponding to a PRACH slot are indexed, first, in increasing order of frequency resource indexes for frequency multiplexed PUSCH occasions; second, in increasing order of time resource indexes for time multiplexed PUSCH occasions within a PUSCH slot and Third, in increasing order of indexes for PUSCH slots corresponding to a PRACH slot. PUSCH occasion index is signaled in *RACH-ConfigDedicated* in addition to *ra-PreambleIndex* [3].

And it is noted that CFRA requires 1-to-1 mapping between a preamble index and a PUSCH resource. It is clear from the discussions on these two alternatives that both may either require assistance from RAN1 or may have RAN1 specification impact. Alternative 2 has more support in RAN2.

For CFRA, RAN2 respectfully asks RAN1 to take the above alternatives into consideration and to implement the solution for CFRA preamble-to-PRU mapping that have the least impact and respond to RAN2 on the required signaling in order for the UE to successfully identify a PRU based on a dedicated preamble in respective SSB(s)/CSI-RS(s).

**2. Actions:**

**To RAN1:**

**ACTION:** RAN2 respectfully ask RAN1 to take the above considerations when specifying the preamble-to-PRU mapping and reply to RAN2 on the required signaling to identify a PRU in a dedicated PUSCH occasion.

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

RAN-WG2 Meeting #109bis Sapporo, Japan 20-24 April, 2020

RAN-WG2 Meeting #110 Athens, Greece 25-29 May, 2020

RAN-WG2 Meeting #111 Toulouse, France 24-28 Aug, 2020

**4. References**

[1] R2-2001917, Summary of CP open issues, Ericsson, RAN2#109e

[2] R2-2000998, Resource configuration for 2-step CFRA, ZTE, RAN#109e

[3] R2-2000224, PUSCH Resource Configuration for 2 step CFRA, Samsung, RAN2#109e