**3GPP TSG-RAN WG2 Meeting #117-e R2-220xxxx**

**Online, 21th Feb -3rd March, 2022**

**Title:** [Draft] Reply LS on interruption for PUCCH SCell activation in invalid TA case

**Response to:** R2-2202149 (R4-2120420) LS on interruption for PUCCH SCell activation in invalid TA case

**Release:** Rel-17

**Work Item:** NR\_RRM\_enh2-Core

**Source:** RAN2

**To:** RAN WG4

**Cc:** RAN WG1

**Contact Person:**

#### Name:                   Jie Shi

E-mail Address:   shijie@catt.cn

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

Attachments: -

**1. Overall Description:**

RAN1 thanks RAN4 for the LS on interruption for PUCCH SCell activation in invalid TA case. For RAN4’s questions Q1/Q2:

* Q1: Can UE capability *diffNumerologyAcrossPUCCH-Group* defined in TS 38.306 be used to allow indication of UE support of parallel transmission of PRACH on PUCCH SCell and physical channels/signals with different SCS on other activated serving cells?
	+ If YES, RAN4 would like to respectfully ask RAN2 to clarify that *diffNumerologyAcrossPUCCH-Group* applies to PRACH in the corresponding “Definitions for parameters” in TS 38.306.
	+ If NO, are there any other existing capabilities that can serve this purpose? If so, RAN4 would like RAN1 to indicate the capabilities.
* Q2: If the answer in Q1 is NO, and there is no capabilities that can serve the purpose, what would be the expected UE behavior when a target PUCCH SCell PRACH has a different SCS from SpCell/SCell physical channels/signals according to RAN1/2 spec? e.g. Shall UE be able to simultaneously transmit PRACH on PUCCH SCell and physical channels/signals on other activated serving cells irrespective of SCS configurations?

RAN2 has taken RAN1 reply LS(R2-2203885/ R1-2202599) into account and discussed the technical aspects from RAN2 scope, RAN2 reply is as follows for Q1/Q2:

* A1:
* The answer is “NO”, according to the capability description in 38.306, the UE capability *diffNumerologyAcrossPUCCH-Group* is only related to data/control (data refers to PUSCH and control refers to PUCCH), but not to PRACH transmission
* The relevant capability in 38.306 which serves RAN4’s designated purpose is *parallelTxPRACH-SRS-PUCCH-PUSCH* for inter-band CA.
* The following spec texts quoted from 38.306 are for RAN4’s reference

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| ***diffNumerologyAcrossPUCCH-Group***Indicates whether different numerology across two NR PUCCH groups for data and control channel at a given time in NR CA and (NG)EN-DC/NE-DC is supported by the UE. |

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| ***parallelTxPRACH-SRS-PUCCH-PUSCH***Indicates whether the UE supports parallel transmission of PRACH and SRS/PUCCH/PUSCH across CCs in an inter-band CA band combination. |

* A2:
* For inter-band CA capability of simultaneous PRACH transmission on PUCCH SCell and SRS/PUCCH/PUSCH transmission on other activated serving cells, it is provided by *parallelTxPRACH-SRS-PUCCH-PUSCH* as from 38.306, regardless of the SCS combination, there is no restriction to the PUCCH SCell for PRACH and the other activated serving cells for physical channels/signals should be in the same PUCCH group or different PUCCH groups.
* For intra-band CA, RAN2 agree to the understanding of RAN1 reply LS(R2-2203885/ R1-2202599), i.e., according to 38.213 8.1 as in below text table, UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot or when the gap between PRACH transmission and PUSCH/PUCCH/SRS transmission is less than N symbols; hence, UE does not transmit PRACH and PUSCH/PUCCH/SRS simultaneously for intra-band CA.

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| *For single cell operation or for operation with carrier aggregation in a same frequency band, a UE does not transmit PRACH and PUSCH/PUCCH/SRS in a same slot or when a gap between the first or last symbol of a PRACH transmission in a first slot is separated by less than* $N$ *symbols from the last or first symbol, respectively, of a PUSCH/PUCCH/SRS transmission in a second slot where* $N=2$ *for* $μ=0$ *or* $μ=$*1,* $N=4$ *for* $μ=2$ *or* $μ=3$*, and* $μ$ *is the SCS configuration for the active UL BWP. For a PUSCH transmission with repetition Type B, this applies to each actual repetition for PUSCH transmission [6, TS 38.214].* |

**2. Actions:**

**To RAN WG4**

**ACTION:** RAN2 kindly asks RAN4 to take the above information into account.

**3. Date of Next TSG-RAN2 Meetings:**

RAN2#118-e 2022-05-16 2022-05-20 Online Meeting

RAN2#119 2022-08-22 2022-08-22 Toulouse, FR