**3GPP TSG-RAN WG4 Meeting # 104-e R4-221xxxx**

**Electronic Meeting, 15– 26 August 2022**

**Title:** **WF on UL Segmented Transmission for UL synchronization for IoT NTN**

**Source:** **MediaTek inc.**

**Agenda item: 13.4**

**Document for: Approval**

# Introduction

This contribution is to capture the agreements for the email discussion for UL Segmented Transmission for UL synchronization for IoT NTN (R1-2205642) in RAN4 #104-e meeting.

# Way-forward

#### Sub-topic 3-1: timing adjustment during a UL repetition period

* The following proposals are discussed in this meeting and can be further discussed.
  + Proposal 1: RAN4 shall clarify the IoT NTN behaviour in TS 36.133 for Rel-17 to allow UEs to adjust TA during the ongoing repetition.
  + Proposal 1a: The restriction on UL transmission adjustment shall be updated according to RAN1 LS on per-segment TA pre-compensation.
  + Proposal 2: RAN4 shall specify the IoT NTN behaviour in TS 36.133 to ensure the UE keeps a constant TA value within each segment
  + Proposal 3: Segmented UL transmission can be covered by NTN UE transmit timing requirements, i.e. Te\_NTN. FFS whether and how to capture in RAN4

---------- The below discussion part will be removed from the Formal WF ---------------

*Recommendations for 2nd round:* The proposal 1a and 3 are moved from email thread [239]. Proposal 1a and 1 would address the same issue. The “restriction” in Proposal 1a is referring to the following statement

*When a repetition period is configured on the uplink for which R>1, the UE shall not adjust the uplink transmission timing autonomously during an ongoing repetition period other than at initial transmission as defined above.*

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| **Company** | **Comments** |
| MTK | Support Proposal 1. And still concern on Proposal 2, because RAN1 did not make any agreement to preclude UE pre-compensating the TA during the segment.  Besides, in NTN, UE pre-compensation needs to be considered, during the segment, and there should be no issue as long as the RAN4 timing requirements (e.g. Te\_NTN) are met. |
| Qualcomm | We need a further investigation on the impact on IoT UE implementation and performance. The text of “segment-wise pre-compensation” and “remain constant within a segment” in RAN1 seems to mean “UE does not update TA within the segmented block.” Both proposals under Option 1 is not clear whether the wording “constant” and “adjust” are from UE pre-compensation perspective or satellite Rx perspective. Our view is closer to the former.  Further comments on Sub-topics #3-2 and $3-3:  The details need to be discussed in the corresponding WI. There are subtle differences between IoT NTN and NR NTN in terms of the reference point of TA due to segmented block wise UL pre-compensation. We are okay with no further discussion on this as this is not immediately related to reply LS. |
| Sony | Support both proposals under option 1.  For proposal 1, we would also like to discuss further how to address this issue in 36.133. Should we add a clarification under the section of TN IoT and eMTC (7.20.2/ 7.24.2)?  For proposal 2, Our understanding of the LS (and the preceding discussion in RAN1) is that the LS states that the “TA constant per segment” functionality is applied. Otherwise, if TA pre-compensation could be applied within each segment by UEs, then RAN1 can simply say something like “UE can pre-compensate the TA between the repetitions” instead of introducing the concept of segmented UL transmission. We are okay to discuss this issue in RAN4 further to reach a consensus.  On the other hand, setting the requirement is a separate discussion. We are open to further discussing it once we reach a common understanding of proposal 2.  To QC: our understanding is that we are talking about UE pre-compensation aspect. |
| Ericsson | Since it is the first time the topic is being discussed, we also prefer to keep all these proposals open to allow companies to further study RRM impact. |