**3GPP TSG-RAN WG2 Meeting #112 Electronic R2-2010837**

**Elbonia, 02 – 13 November 2020**

**Title:** [DRAFT]Reply LS on propagation delay compensation enhancements

**Response to:** -

**Release:** Release 17

**Work Item:** NR\_IIOT\_URLLC\_enh

**Source:** Nokia, Nokia Shanghai Bell [TSG RAN WG2]

**To:** TSG RAN WG1

**Cc:**

**Contact Person:**

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**Attachments:** -

**1. Overall Description:**

RAN2 would like to thank RAN1 for providing information relating the agreements on time-synchronization, as well as asking RAN2 for feedback on synchronicity budget of Uu interface. Based on the RAN1 agreements, RAN2 has discussed and identified the following three scenarios from the two representative use cases agreed in RAN1 (control-to-control and smart grid):

* **Scenario 1:** In the control-to-control communication use case, where TSC devices behind a target UE are synchronized to any TD, from a GM behind the CN. The 5GS introduced error is caused by the relative time-stamping inaccuracy at the NW-TT and the DS-TTs.
* **Scenario 2:** In the control-to-control communication use case, where TSC devices behind a target UE are synchronized to any TD, from a GM behind the UE. The 5GS introduced error is caused by the relative time-stamping inaccuracies at the involved DS-TTs.
* **Scenario 3:** In the smart grid use case, where the TSC devices behind a target UE are synchronized to the 5G GM TD. The 5GS introduced error is caused by the synchronization of the 5G clock to the DS-TT.

RAN2 has agreed to focus on Scenario 2 and Scenario 3. It is noted that two Uu interfaces are involved in Scenario 2 and one Uu interface in Scenario 1 and 3. The agreed the synchronicity budget per Uu interface for scenario 1, 2 and 3 are tabulated below:

|  |  |
| --- | --- |
| **Scenario** | **Single Uu interface Budget** |
| **1** | **±595ns to ±725ns** |
| **2** | **±145ns to ±275ns** |
| **3** | **±795ns to ±845ns** |

These values are determined with assumptions such that Scenario1/2 synchronization is based on gPTP and Scenario 3 synchronization is based on GNSS. The Uu interface time synchronization budget can be interpreted as the maximum 5GS time synchronization error between the UE and the gNB-DU. It is RAN2’s understanding that RAN1 should aim to meet the most stringent requirement among these scenarios when considering the propagation delay compensation mechanism, but any value within the indicated budget range could be considered valid at RAN1’s discretion. RAN2 would like to point out that the time synchronization impact from the SFN timestamp quantization in referenceTimeInfo-r16 IE is already included in the network budget and therefore should not be included again in the Uu interface budget.

**2. Actions:**

**To RAN1**

**ACTION:** RAN2 respectfully asks RAN1 to take the above into account for the future work on propagation delay compensation for time synchronization.

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

3GPP RAN2#113e 25 January – 5 February 2021 Electronic Meeting