**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 in R1-2007446. Based on the RAN1 agreements, RAN2 has discussed and agreed to focus on the scenarios from the two representative use cases agreed in RAN1 (control-to-control and smart grid):

* **Control-to-Control:** 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.
* **Smart Grid:** 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.

It is noted that two Uu interfaces are involved in the Control-to-control scenario and one Uu interface is involved in the Smart Grid scenario. The agreed synchronicity budget per Uu interface is tabulated below:

|  |  |
| --- | --- |
| **Scenario** | **Single Uu interface Budget** |
| Control-to-Control | ±145ns to ±275ns |
| Smart Grid | ±795ns to ±845ns |

These values are determined with assumptions such that network-side synchronization for Control-to-control is based on gPTP and Smart Grid 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 a number within the range is also acceptable. 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.

**RAN2 respectfully asks RAN1 to determine the Propagation Delay Compensation algorithms/procedures suitable to meet the synchronization accuracy requirement mentioned herein.**

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

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