**3GPP TSG-RAN WG1 Meeting #107-e R1-210xxxx**

**e-Meeting, November 11th – 19th, 2021**

**Agenda Item: 7.2.8**

**Source: Moderator (Huawei)**

**Title: Summary #1 of [107-e-NR-Pos-02] Correction to the time stamp**

**Document for: Discussion and decision**

# Introduction

In RAN1#107-e, the following paper discussed the correction to the time stamp.

1. R1-2110848 Correction to the time stamp Huawei, HiSilicon

This paper provides the moderator summary for the following email discussion

[107-e-NR-Pos-02] Email discussion/approval on Correction to the time stamp in PRS reception procedure and editorial corrections (Aspect #2) until November 17 – Su (Huawei)

# Discussion

In [2], it is noticed that there is potential ambiguity on the time stamp for UE Rx – Tx time difference measurement. It is proposed to clarify whether the time stamp corresponds to the PRS reception time or positioning SRS transmission time. In addition, corrections to parameter name *nr-DL-PRS-ExpectedRSTD-Uncer****t****ainty* is proposed. Finally, the change of “DL RSTD, UE Rx-Tx time difference” to “DL RSTD or UE Rx-Tx time difference, respectively” is suggested as indicated in provided draft CR below:

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| 5.1.6.5 PRS reception procedure ========================= Unchanged parts =========================  The UE may be indicated by the network that DL PRS resource(s) can be used as the reference for the DL RSTD, DL PRS-RSRP, and UE Rx-Tx time difference measurements in a higher layer parameter *nr-DL-PRS-ReferenceInfo*. The reference indicated by the network to the UE can also be used by the UE to determine how to apply higher layer parameters *nr-DL-PRS-ExpectedRSTD* and *nr-DL-PRS-ExpectedRSTD-Uncertainty*. The UE expects the reference to be indicated whenever it is expected to receive the DL PRS. This reference provided by *nr-DL-PRS-ReferenceInfo* may include a *dl-PRS-ID*, a DL PRS resource set ID, and optionally a single DL PRS resource ID or a list of DL PRS resource IDs [17, TS 37.355]. The UE may use different DL PRS resources or a different DL PRS resource set to determine the reference for the RSTD measurement as long as the condition that the DL PRS resources used belong to a single DL PRS resource set is met. If the UE chooses to use a different reference than indicated by the network, then it is expected to report the *dl-PRS-ID*, the DL PRS resource ID(s) or the DL PRS resource set ID used to determine the reference.  The UE may be configured to report quality metrics *NR-TimingQuality* corresponding to the DL RSTD and UE Rx-Tx time difference measurements which include the following fields:  *- timingQualityValue* which provides the best estimate of the uncertainty of the measurement  *- timingQualityResolution* which specifies the resolution levels used in the *timingQualityValue* field.  The UE expects to be configured with higher layer parameter *nr-DL-PRS-ExpectedRSTD*, which defines the time difference with respect to the received DL subframe timing the UE is expected to receive DL PRS, and *nr-DL-PRS-ExpectedRSTD-Uncertainty*, which defines a search window around the *nr-DL-PRS-ExpectedRSTD*.  For DL UE positioning measurement reporting in higher layer parameters *NR-DL-TDOA-SignalMeasurementInformation* or *NR-Multi-RTT-SignalMeasurementInformation* the UE can be configured to report the DL PRS resource ID(s) or the DL PRS resource set ID(s) associated with the DL PRS resource(s) or the DL PRS resource set(s) which are used in determining the UE measurements DL RSTD or UE Rx-Tx time difference, respectively.  For the DL RSTD, DL PRS-RSRP, and UE Rx-Tx time difference measurements the UE can report an associated higher layer parameter *nr-TimeStamp*. The *nr-TimeStamp* can include the *dl-PRS-ID*, the SFN and the slot number for a subcarrier spacing corresponding to the reception time of the DL-PRS. These values correspond to the reference which is provided by *nr-DL-PRS-ReferenceInfo*.  ========================= Unchanged parts ========================= |

## Round 1

The moderator would like to ask the following questions corresponding to the proposed change based on the comments received during the preparation phase.

### Question 2.1-1

* Do you think it is useful to clarify in TS 38.214 that the time stamp for the UE Rx – Tx time difference measurement corresponds the Rx time instead of Tx time given the following field description from LPP.

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| ***nr-TimeStamp***  This field specifies the time instance for which the measurement is performed. |

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| **Company** | **Answer** | **Comments** |
| Qualcomm | No | It is clear that the time stamp corresponds to when the measurement is performed. |
| Nokia/NSB |  | It doesn’t seem completely essential to do this even if it may be slightly easier to read. |
| vivo |  | We don’t think this clarification is necessary in TS 38.214. |
| ZTE |  | OK to clarify it. But slightly prefer to update the spec in TS 37.355, which can be similar to time stamp for DL RSTD,  ***nr-TimeStamp***  This field specifies the time instance at which the TOA and DL PRS-RSRP (if included) measurement is performed. Note, the TOA measurement refers to the TOA of this neighbour TRP or the reference TRP, as applicable, used to determine the *nr-RSTD* or *nr-RSTD-ResultDiff*. |
| CATT |  | No need to add such clarification in TS 38.214. |
| OPPO |  | Looks like the 2nd change is not needed. As defined in 37.355, the timestamp is the time when the measurement is performed. But the 2nd change seems to change it to the time of receiving PRS. |

### Question 2.1-2

* Which option do you prefer to handle the change proposed by [1]?
  + Alt.1 Agree to the draft CR.
  + Alt.2 The change on the time stamp is not needed and the remaining editorial change can be included in the editor alignment CR.

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| **Company** | **Alt.1** | **Comments** |
| Qualcomm | Alt. 2 |  |
| Nokia/NSB | Alt 2 |  |
| vivo | Alt. 2 |  |
| ZTE | OK for Alt.1 |  |
| CATT | Alt.2 |  |
| OPPO |  | Prefer Alt.2 |

## Round 2

With the comments received so far, the moderator has the following proposal.

### Proposal 2.2-1

* For the changes submitted in the draft CR R1-2110848
  + The change on the time stamp is not needed
  + The remaining editorial changes are recommended to be captured in the editor alignment CR.

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| **Company** | **Yes/No** | **Comments** |
| vivo |  | The first sub-bullet seems should be a conclusion and not as part of agreement.  For the 2nd sub-bullet, we suggest to explicitly list the changes (i.e. TP) instead of referring to as “the remaining editorial changes” to avoid any different interpretation |
| ZTE | Yes | As commented by vivo, provide a full Draft CR after revisions would be better. |
| CATT | Yes | It will be better to list the changes for capturing into the editor alignment CR, as comments by vivo and ZTE. |

# Conclusion