**3GPP TSG RAN WG1 Meeting #113 R1-230xxxx**

Incheon, Korea, May 22nd – May 26th, 2023

**Agenda item: 9.17**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Summary on email discussion on** **NR Enhanced Positioning**

**Document for: Discussion and Decision**

# 1 Introduction

This thread will discuss the draft CR to 38.214 for the NR Enhanced Positioning.

First checkpoint for this discussion: **June 7th, UTC 12.00**!

# 2 Discussion – first round

The comments in this section are based on version 0 of the the draft CR available in the **Post RAN1#113 discussion.**

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| Company | Comments | Editor reply/Notes |
| CATT | Comment 1:  **Agreement**  Introduce DL reference carrier phase (DL RSCP) and NR DL reference carrier phase difference (DL RSCPD) as DL carrier phase measurements.   * Note: It is up to RAN4 to decide whether and how to define the requirements for DL RSCP and/or DL RSCPD. No LS needed to RAN4 for this note. * DL RSCP can be reported together with UE Rx – Tx time difference measurement * DL RSCPD can be reported together with RSTD measurement * …   Based on above agreement, we need to switch RSCPD and RSCP in the following paragraph:  *In 5.1.6.5 PRS reception procedure*  *….*  *For DL UE positioning measurement reporting in higher layer parameter NR-DL-TDOA-SignalMeasurementInformation,* the UE may be configured to report the DL Reference Signal Carrier Phase Difference (RSCPD) [7, TS 38.215] measurement along with the DL RSTD. When the UE reports RSCPD measurements the reference is the same as the one configured, or reported, for the RSTD measurements. For DL UE positioning measurement reporting in higher layer parameter *NR-Multi-RTT-SignalMeasurementInformation* the UE may be configured to report the DL Reference Signal Carrier Phase (RSCP) measurement [7, TS 38,215] along with the UE Rx-Tx time difference.  Comment 2:  **Agreement**  If a UE reports RSCPD measurements together with RSTD measurements in a measurement report element, the reference TRP for RSCPD is the same as the reference TRP reported for RSTD.   * The target and the reference TRP are in the same PFL   Based on above agreement, suggest making the following change to the reference of the RSCPD:    *In 5.1.6.5 PRS reception procedure*  *….*  *For DL UE positioning measurement reporting in higher layer parameter NR-DL-TDOA-SignalMeasurementInformation,* the UE may be configured to report the DL Reference Signal Carrier Phase (RSCP) [7, TS 38.215] measurement along with the DL RSTD. When the UE reports RSCPD measurements, the reference TRP is the same as the one reported for the RSTD measurements. For DL UE positioning measurement reporting in higher layer parameter *NR-Multi-RTT-SignalMeasurementInformation* the UE may be configured to report the DL Reference Signal Carrier Phase Difference (RSCPD) measurement [7, TS 38,215] along with the UE Rx-Tx time difference. |  |
| Qualcomm | 1)  On the following:  For DL UE positioning measurement reporting in higher layer parameter NR-DL-TDOA-SignalMeasurementInformation, the UE may be configured to report the DL Reference Signal Carrier Phase (RSCP) [7, TS 38.215] measurement along with the DL RSTD  The agreement says RSCPD:   * DL RSCPD can be reported together with RSTD measurement   And similarly, for Rx-Tx is the RSCP:   * DL RSCP can be reported together with UE Rx – Tx time difference measurement   But the draft CR says:  For DL UE positioning measurement reporting in higher layer parameter NR-Multi-RTT-SignalMeasurementInformation the UE may be configured to report the DL Reference Signal Carrier Phase Difference (RSCPD) measurement  2) On PRS aggregation, and with regards to the following text:  When the UE is expected to perform joint measurements for bandwidth aggregation across DL PRS positioning frequency layers, the UE expects to be configured with linkage information, via higher layer parameter [*linkage*], between DL PRS resource sets across DL PRS positioning frequency layers associated with a *dl-PRS-ID*  The linked PRS resource sets will be associated with a different dl-PRS-ID. Observ that we have 256 PRS-IDs because it is up to 8 sets (2 sets per PFL), for up to 64 TRPs. So total 64\*8=256. Therefore, the sets that belong on different PFL will actually have a different dl-PRS-ID.  R-DL-PRS-AssistanceDataPerTRP-r16 ::= SEQUENCE {      dl-PRS-ID-r16                 INTEGER (0..255),      nr-PhysCellID-r16              NR-PhysCellID-r16          OPTIONAL,   -- Need ON      nr-CellGlobalID-r16            NCGI-r15                  OPTIONAL,   -- Need ON      nr-ARFCN-r16                  ARFCN-ValueNR-r15          OPTIONAL,   -- Need ON      nr-DL-PRS-SFN0-Offset-r16      NR-DL-PRS-SFN0-Offset-r16,      nr-DL-PRS-ExpectedRSTD-r16     INTEGER (-3841..3841),      nr-DL-PRS-ExpectedRSTD-Uncertainty-r16                                   INTEGER (0..246),      nr-DL-PRS-Info-r16             NR-DL-PRS-Info-r16,  NR-DL-PRS-Info-r16 ::= SEQUENCE {      nr-DL-PRS-ResourceSetList-r16      SEQUENCE (SIZE (1..nrMaxSetsPerTrpPerFreqLayer-r16)) OF                                                                NR-DL-PRS-ResourceSet-r16,      ...  }  nrMaxSetsPerTrpPerFreqLayer-r16        INTEGER ::= 2      -- Maximum resource sets for one TRP  Therefore, our suggestion is to keep the agreement wording for now: “per TRP”:  When the UE is expected to perform joint measurements for bandwidth aggregation across DL PRS positioning frequency layers, the UE expects to be configured with linkage information on a per TRP basis, via higher layer parameter [*linkage*], between DL PRS resource sets across DL PRS positioning frequency layers ~~associated with a~~ *~~dl-PRS-ID~~*  3) We think the following sentence from the agreement needs to be captured and it may related to the last part of the paragraph below.  ***It is assumed that the PRS resources across the linked PRS resource sets are linked if the conditions are satisfied. For the non-linked PRS resource sets, no aggregation is assumed***  Our understanding of the agreement and proposal is as follows:  For the linked PRS resource sets, the UE is expected to be configured with the same values of QCL, *dl-PRS-Periodicity-and-ResourceSetSlotOffset, dl-PRS-NumSymbols*,*dl-PRS-ResourceTimeGap, dl-PRS-ResourceSymbolOffset,* *dl-prs-MutingBitRepetitionFactor,* CP, comb size, power per subcarrier, *NR-MutingPattern*, and *NR-DL-PRS-SFN0-Offset,* and the UE is expected to be configured with PRS resources that maintain uniformly spaced PRS RE pattern within a symbol across aggregated DL PRS positioning frequency layers. The UE may assume that PRS resources across the linked PRS resource sets which satisfy the above conditions are linked for PRS bandwidth aggregation, otherwise, the UE does not assume that PRS resources from the linked DL PRS resource sets are linked.  Note: More comments will be added later from our side. Thanks! |  |
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