**3GPP TSG RAN WG1 #110-bis-e R1-22abcd**

**e-Meeting, October 10th – October 19th, 2022**

**Source: Moderator (Nokia)**

**Title: Feature Lead Summary #1 for Maintenance of multipath/NLOS mitigation**

**Agenda item:** **8.5**

**Document for:**  **Discussion and Decision**

# Introduction

In the WID, [1], for ePos the following objective was added at RAN#91 and was completed:

* Study and specify, if agreed, the enhancements of information reporting from UE and gNB for multipath/NLOS mitigation [RAN1, RAN2, RAN3]

In this contribution, we provide a summary of the maintenance for information reporting from UE and gNB for multipath/NLOS mitigation proposed by companies in contributions [2]-[5] and summarized in [6]. We also make some initial proposals to facilitate RAN1 discussion. This document also provides the summary of the following email discussion in RAN1#110-bis-e:

[110bis-e-R17-ePos-05] Email discussion for maintenance on enhancements of information reporting from UE and gNB for multipath/NLOS mitigation for issues 4-2, and for issues 4-1 and 4-3 as recommendation for editor’s alignment CR, in R1-2210266 – Ryan (Nokia)

* Check points: October 14, October 19

Issues for discussion

## Issue #4-2: RSRPP and RSTD measurement

The issue and proposals raised in [4] are:

* **Proposal 1**: When, as part of DL-TDOA, the UE reports both RSTD and RSRPP measurements it should use the same detected paths for both measurements in the reporting.
* **Proposal 2**: When, as part of Multi-RTT, the UE reports both UE Rx-Tx time difference and RSRPP measurements it should use the same detected paths for both measurements in the reporting.
* **Proposal 3**: Agree to the CR in R1-2208732.

As such it may be easiest to discuss the draft CR to TS 38.214 from [3] directly which is copied here:

<omitted text>

#### 5.1.6.5 PRS reception procedure

<omitted text>

The UE may be configured to measure and report, subject to UE capability, up to 24 DL PRS-RSRP measurements on different DL PRS resources associated with the same *dl-PRS-ID*. When the UE reports DL PRS-RSRP measurements from one DL PRS resource set, the UE may indicate which DL PRS-RSRP measurements associated with the same higher layer parameter *nr-DL-PRS-RxBeamIndex* [17, TS 37.355] have been performed using the same spatial domain filter for reception if for each *nr-DL-PRS-RxBeamIndex* reported there are at least 2 DL PRS-RSRP measurements associated with it within the DL PRS resource set. The UE may be configured to measure and optionally report via higher layer signaling *nr-DL-PRS-FirstPathRSRP-Result*, subject to UE capability, up to 24 DL PRS RSRPP for the first detected path on different DL PRS resources associated with the same *dl-PRS-ID*.

When the UE is configured to report both PRS RSTD and PRS RSRPP measurements as part of the same higher layer parameter *NR-DL-TDOA-SignalMeasurementInformation* the same detected paths for both PRS RSTD and PRS RSRPP measurements should be used in the reporting.

When the UE is configured to report both UE Rx-Tx and PRS RSRPP measurements as part of the same higher layer parameter *NR-Multi-RTT-SignalMeasurementInformation*, the same detected paths for both UE Rx-Tx and PRS RSRPP measurements should be used in the reporting.

<omitted text>

### Round #1 Discussion

**Proposal 4.2-A**

Endorse the draft CR in R1-2208732.

Companies views:

|  |  |
| --- | --- |
| Company Name | Comments |
| Qualcomm | We don’t see there is really a confusion. 37.355 in the description of the nr-DL-PRS-RSRPP it says:***nr-DL-PRS-RSRPP***This field specifies the DL PRS reference signal received path power (DL PRS-RSRPP) of the *NR-AdditionalPath* reported, as defined in TS 38.215 [36]. The mapping of the quantity is defined as in TS 38.133 [46].Also, the same timestamp is used for both the reported timing measurement (e.g. nr-RelativeTimeDifference-r16) and the RSRPP.  |
|  |  |

## Editorial Issue #4-1: LOS/NLOS Indicator Details

In [2] the issue of LOS/NLOS indicators is discussed and it is proposed that there is a current misunderstanding of the higher layer parameters parameter *nr-los-nlos-IndicatorRequest* and *LOS-NLOS-Indicator* in 38.214.

The draft CR is copied here:

#### 5.1.6.5 PRS reception procedure

**<Unchanged parts omitted>**

The UE may be requested via higher layer parameter *nr-los-nlos-IndicatorRequest*, subject to UE capability, to report LoS/NLoS indicator(s). The UE can report LoS/NLoS indicator(s) via higher layer parameter *nr-los-nlos-Indicator* associated with each DL RSTD, DL PRS-RSRP, and UE Rx-Tx time difference measurements. The UE can report LoS/NLoS indicator(s) via higher layer parameter *nr-los-nlos-Indicator* associated with each *dl-PRS-ID* in a measurement report. For the LoS/NLoS indicator(s) associated with DL RSTD, the UE may report one indicator associated with the *dl-PRS-ID* indicated by higher layer parameter *dl-PRS-ReferenceInfo* and one indicator associated with the *dl-PRS-ID* of the DL RSTD measurement. A UE may be provided with LoS/NLoS indicator(s) via higher layer parameter *nr-los-nlos-Indicator*, and it may be associated with each DL PRS resource of each configured *dl-PRS-ID* or may be associated with each configured *dl-PRS-ID*. The value of the higher layer parameter *LOS-NLOS-Indicator* may be one of soft values (0, 0.1, …, 0.9, 1) or one of hard values (0, 1) with the values corresponding to the likelihood of LoS, with a value of 1 corresponding to LoS and a value of 0 corresponding to NLoS.

**<Unchanged parts omitted>**

### Round #1 Discussion

**Proposal 4.1-A**

Endorse in principle the draft CR in R1-2208603 as an editorial CR.

Companies views:

|  |  |
| --- | --- |
| Company Name | Comments |
| Qualcomm | OK for editorial CR |
|  |  |

## Editorial Issue #4-3: Alginment on RSRPP parameters

In [5] it is noted that some higher layer parameters are still bracketed in the latest version of the spec. It is proposed to remove those brackets as shown in the draft CR below.

#### 5.1.6.5 PRS reception procedure

<Unrelated part omitted>

The UE may be configured to optionally report a differential DL RSRPP for a PRS resource with reference to *nr-DL-PRS-FirstPathRSRP-Result* and/or a differential DL PRS RSRP with reference to *nr-DL-PRS-RSRP-Result* via higher layer parameter *NR-DL-AoD-AdditionalMeasurementElement*.

<Unrelated part omitted>

### Round #1 Discussion

**Proposal 4.3-A**

Endorse in principle the draft CR in R1-2209458 and send to the editor as part of alignment CR.

Companies views:

|  |  |
| --- | --- |
| Company Name | Comments |
| Qualcomm | OK |
|  |  |

Conclusion

In this contribution, we provided a review of the submitted contributions for NR Positioning on maintenance of information reporting from UE and gNB for multipath/NLOS mitigation and prepared an initial set of proposals to facilitate further discussion/decision by RAN1 during the RAN1#110-bis–e meeting.

Outcome (if any):

To be updated

References

1. RP-210903, Revised WID on NR Positioning Enhancements, CATT, Intel Corporation, Ericsson.
2. R1-2208603, Correction on description of LoS/NLoS indicator, vivo.
3. R1-2208732 , Correction on PRS RSTD and PRS RSRPP reporting, Nokia, Nokia Shanghai Bell.
4. R1-2208731, Maintenance of NR Positioning Enhancements, Nokia, Nokia Shanghai Bell.
5. R1-2209458, Alignment CR on positioning for 38.214, ZTE.
6. R1-2210266, Summary for preparation phase on maintenance of Rel-17 WI on NR positioning enhancements, Moderator (CATT).