**3GPP TSG RAN WG1 Meeting #117 R1-24xxxxx**

**Fukuoka City, Fukuoka, Japan, May 20th – 24th, 2024**

**Source: Moderator (Intel Corporation)**

**Title: FL summary #1 on SL positioning reference signal**

**Agenda item: 8.1**

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

1. Introduction

This document presents the Feature Lead (FL) summary of submitted contributions to AI 8.1 on maintenance of SL PRS design as part of maintenance of Rel-18 WI on expanded and improved NR positioning.

Based on the submitted contributions to RAN1 #117, the only issue to be discussed is listed in the table below.

|  |  |  |
| --- | --- | --- |
| Issue # | Tdoc reference | Issue/Proposal |
| 1 | [4] R1-2404052, Nokia | Specify that a Tx UE may report whether “different SL PRS resources can be used to perform sidelink positioning measurements with multiple measurement samples”. |

Please follow the naming convention in this example:

* *SLPRS\_FLS -v000.docx*
* *SLPRS\_FLS -v001-CompanyA.docx*
* *SLPRS\_FLS -v002-CompanyA-CompanyB.docx*
* *SLPRS\_FLS -v003-CompanyB-CompanyC.docx*

If needed, you may “lock” a spreadsheet file for 30 minutes by creating a checkout file, as in this example:

* Assume CompanyC wants to update *SLPRS\_FLS-v002-CompanyA-CompanyB.docx*.
* CompanyC uploads an empty file named *SLPRS\_FLS-v003-CompanyB-CompanyC.checkout*
* CompanyC checks that no one else has created a checkout file simultaneously, and if there is a collision, CompanyC tries to coordinate with the company who made the other checkout (see, e.g., contact list below).
* CompanyC then has 30 minutes to upload *SLPRS\_FLS-v003-CompanyB-CompanyC.docx*
* If no update is uploaded in 30 minutes, other companies can ignore the checkout file.
* Note that the file timestamps on the server are in UTC time.

To avoid excessive email load on the RAN1 email reflector, please note that there is NO need to send an info email to the reflector just to inform that you have uploaded a new version of this document. Companies are invited to enter the contact info in the table below.

## FL1 Question 1-1

* *Please consider entering contact info below for the points of contact for this agenda item:*

|  |  |  |
| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Discussion on Identified Issues
   1. Issue #1

Reference [4] (Nokia) proposes the following:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Proposal 3:** Support the following text proposal of Clause 8.4.4 of TS 38.214   |  | | --- | | 8.2.4 SL PRS transmission procedure  <omitted text>  The UE may report the association information between the already transmitted SL PRSs of SL PRS resources and UE Tx ARP ID. The association information includes ARP ID(s) indicated by *sl-POS-ARP-ID-Tx*, SL PRS transmission timestamp(s) indicated by *sl-TimeStamp*, and optional SL PRS resource ID(s) indicated by *sl-PRS-ResourceID*.  The UE may report whether transmitted SL PRSs of SL PRS resources can be used to perform sidelink positioning measurements with multiple measurement samples.  <omitted text> |  |  |  | | --- | --- | | ***Reason for change:*** | RAN4 is now considering both single measurement sample and multiple measurement samples of SL PRS measurements. In RAN1, a specific SL PRS resource is uniquely defined within a slot, so a receiving UE can perform a positioning measurement based on a single measurement sample only. There is no way for the Rx UE to assume the same Tx antenna across different SL PRS resources. In order for Rx UE to perform SL PRS measurement with multiple measurement samples, RAN1 should support additional feature. At least, the Rx UE needs information which SL PRS resources have been transmitted with the same Tx antenna port.  It should be noted that antenna port number of DL PRS resources is the same, but it does not mean that the UE can use measurements from different DL PRS resources as multiple measurement samples to derive a single measurement. The UE reports a specific positioning measurement based on multiple measurement samples from **a single DL PRS resource** which is transmitted periodically. The positioning measurement based on multiple measurement samples cannot be done by randomly selecting different SL PRS resources by the Rx UE. | |  |  | | ***Summary of change:*** | Add the proposed text in Clause 8.2.4 of TS 38.214. | |  |  | | ***Consequences if not approved:*** | The Rx UE cannot obtatin positioning measurements with multiple measurement samples based on SL PRS, which is not aligned with the current RAN4 discussion. If this is not approved, RAN1 needs discussion with RAN4 to address the issue. | |

***Moderator comments:***

* *As discussed during RAN1 #116bis, for SL PRS transmission, use of multiple samples at the receiver should assume non-coherent combining. Thus, for RAN4 to define measurements on SL PRS using multiple samples, it is not necessary that the samples can be combined coherently.*
* *As long as the Tx ARPs for different SL PRS transmissions from a Tx UE (if different Tx ARPs are used for SL PRS transmissions from a Tx UE) are not considerably far apart relative to each other (i.e.,* ***not*** *the case as Tx antenna(s) at front and rear bumpers of a vehicle), any changes to precoding/antenna selection should still be able to be combined.*
  + *Further, the signalling of assistance data in the form of association information of Tx ARP ID to already transmitted SL PRS, when provided, can be utilized by LMF/server UE/Rx UE to decide on potential combining of multiple samples.*
* *Moreover, the TP proposed in [4] may not help much in addressing the issue raised in [4] unless further identification of the specific SL PRS resources is provided.*

### FL1 Proposal 2.1-1

* *Agree on TP#1 for TS 38.214, Clause 8.2.4 to support indication of use of same antenna port for transmission of different SL PRS resources.*

|  |
| --- |
| **------------------------------ TP#1: TS 38.214 -----------------------------------**  8.2.4 SL PRS transmission procedure  <omitted text>  The UE may report the association information between the already transmitted SL PRSs of SL PRS resources and UE Tx ARP ID. The association information includes ARP ID(s) indicated by *sl-POS-ARP-ID-Tx*, SL PRS transmission timestamp(s) indicated by *sl-TimeStamp*, and optional SL PRS resource ID(s) indicated by *sl-PRS-ResourceID*.  The UE may report whether transmitted SL PRSs of SL PRS resources can be used to perform sidelink positioning measurements with multiple measurement samples.  <omitted text> |

|  |  |
| --- | --- |
| ***Reason for change:*** | RAN4 is not considering multiple measurement samples of SL PRS measurements. In RAN1, a specific SL PRS resource is uniquely defined within a slot, so a receiving UE can perform a positioning measurement based on a single measurement sample only. There is no way for the Rx UE to assume the same antenna port across different SL PRS resources. In order for Rx UE to perform SL PRS measurement with multiple measurement samples, RAN1 should support additional feature. At least, the Rx UE needs information which SL PRS resources have been transmitted with the same Tx antenna port. |
| ***Summary of change:*** | Add the proposed text in Clause 8.2.4 of TS 38.214. |
| ***Consequences if not approved:*** | The Rx UE cannot obtatin positioning measurements with multiple measurement samples based on SL PRS, which is not aligned with the current RAN4 discussion. If this is not approved, RAN1 needs discussion with RAN4 to address the issue. |

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Not needed. We discussed it also last meeting. |
| vivo | Not needed. |
|  |  |
|  |  |
|  |  |

1. Proposals for Monday GTW

…

1. List of Text Proposals for Monday GTW

…

1. Outcome from RAN1 #117

…

# References

1. R1-2403959 Remaining issues of Rel-18 positioning Huawei, HiSilicon
2. R1-2403970 Correction on collision handling of positioning SRS with frequency hopping in TDD systems Intel Corporation
3. R1-2403971 Corrections on positioning SRS with frequency hopping Intel Corporation
4. R1-2404052 Maintenance on Expanded and Improved NR Positioning Nokia
5. R1-2404153 Draft CR on PRS for carrier phase positioning vivo
6. R1-2404154 Draft CR on SRS bandwidth aggregation for positioning measurements vivo
7. R1-2404155 Draft CR on SRS frequency hopping for positioning vivo
8. R1-2404156 Draft CR on Sidelink congestion control in dedicated SL PRS resource pool vivo
9. R1-2404366 Correction on the definition of sidelink PRS channel busy ratio CATT, CICTCI
10. R1-2404372 Correction on the UE procedure for transmitting PSCCH in dedicated SL PRS resource pool CATT, CICTCI
11. R1-2404373 Discussion on the higher layer parameters in a dedicated SL PRS resource pool CATT, CICTCI
12. R1-2404986 Correction on PRS bandwidth aggregation for 38.214 ZTE
13. R1-2404987 Correction on SRS bandwidth aggregation in RRC\_INACTIVE for 38.214 ZTE
14. R1-2404988 Draft CR for dropping rule on SRS bandwidth aggregation ZTE
15. R1-2404989 Draft CR on PRS processing for bandwidth aggregation ZTE
16. R1-2404990 Correction on SRS configuration and UE behavior in validity area for LPHAP for 38.214 ZTE
17. R1-2404991 Correction on UE behavior in validity area for LPHAP for 38.213 ZTE
18. R1-2404992 Draft CR for carrier phase positioning ZTE
19. R1-2404993 Draft CR for collision handling of positioning SRS with Tx hopping in TDD system ZTE
20. R1-2404994 Discussion on collision handling of positioning SRS with Tx hopping in TDD system ZTE
21. R1-2404995 Draft CR for RedCap UE frequency hopping ZTE
22. R1-2404996 Draft CR for UE behavior on monitoring DCI format 3\_2 ZTE
23. R1-2404997 Discussion on UE behavior on monitoring DCI format 3\_2 ZTE
24. R1-2404998 Correction on SL positioning for 38.214 ZTE
25. R1-2404999 Correction on SL positioning for 38.212 ZTE
26. R1-2405000 Correction on SL positioning for 38.211 ZTE
27. R1-2405001 Missed RRC parameters for sidelink positioning ZTE
28. R1-2405288 Draft CR for correction to SRS for positioning with tx hopping in 38.211 Ericsson
29. R1-2405289 Draft CR for correction to SRS for positioning with tx hopping in 38.214 Ericsson
30. R1-2405313 Correction to 38.202 on support of combination of SL CA and SL positioning Huawei, HiSilicon
31. R1-2405314 Correction to 38.213 on support of DCI formats for SL positioning Huawei, HiSilicon
32. R1-2405315 Correction to 38.211 on the transmission counter Huawei, HiSilicon
33. R1-2405320 Correction to the impact from DL reception on the affected bands Huawei, HiSilicon
34. R1-2405321 Correction to the provision of RTD in SL positioning Huawei, HiSilicon
35. 3GPP TR 38.859, Study on expanded and improved NR positioning (Release 18)”, December 2022.
36. R1-2401828, RAN1 agreements for Rel-18 WI on Expanded and Improved NR Positioning Rapporteur (Intel Corporation), RAN1 #116bis, April 2024.