**3GPP TSG RAN WG2 Meeting#117-e R2-22xxxxx
Electronic Meeting, 21 February 2022 - 03 March 2022**

**Agenda item:** 8.11.2.3

**Source:** Lenovo, Motorola Mobility

**Title:** Report on [AT117-e][631][POS] Remaining OD-PRS issues (Lenovo)

**Document for:**Discussion and Decision

Introduction

This report summarizes the following AT-meeting discussion:

* [AT117-e][631][POS] Remaining OD-PRS issues (Lenovo)

 Scope: Discuss P1/P3/P15-1 of R2-2202236 and attempt to converge on the OD-PRS request behaviour.

 Intended outcome: Report to Monday CB session

 Deadline: Friday 2022-02-25 1200 UTC

Please note the deadline for companies’ inputs/views: **Friday 2022-02-25 1200 UTC**

## Contact Information

Please kindly provide your contact information:

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| Company | Delegate Contact | E-mail |
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Discussion

As per the Chair’s guidance the following discussion report aims to converge on the following Proposals reported in [1, R2-2202236].

* **Proposal 1: RAN2 to further discuss the need for blind on-demand PRS request support for UE-initiated on-demand PRS**.
* **Proposal 3: UE may explicitly request one or more the of the on-demand PRS parameters as provided in the RAN1 parameter list**.
* **Proposal 15-1: RAN2 to further discuss the following UE behavioural options upon receiving pre-defined configurations from the network:**
	+ **Option A: UE discards the pre-defined on-demand PRS configuration, after sending its preferred configuration(s).**
	+ **Option B: UE stores the pre-defined on-demand PRS configuration(s) until the LPP session ends or is overridden by a new set of on-demand PRS configuration(s)**.

## Blind on-demand PRS Request

Based on the Pre-meeting discussion [1, R2-2202236], the following advantages and disadvantages for blind on-demand PRS request were summarized:

Support for UE-initiated Blind on-demand PRS Requests:

* There are no changes to the LPP spec. required for supporting blind on-demand PRS requests.
* Blind requests are feasible to support parameter-based requests by the UE and the NW may still reject the request based on previous RAN2#116bis-e agreements.
* Not every deployment may have an index of pre-defined configurations, and may only require one or two parameters to be modified
* Blind requests may be used in scenarios where the pre-defined PRS configurations may have not been provided to the UE.

Arguments against UE-initiated Blind on-demand PRS Requests:

* The on-demand PRS request is dependent on already performed PRS measurements based on previously received AD
* Unnecessary signalling overhead, high probability of rejection by the LMF and additional latency incurred.
* Complexity of multiple combination of on-demand PRS parameters with no guarantee/probability the blind request is met.
* Increase of signalling load at the LMF.

Based on the online GTW discussion regarding the support of blind on-demand PRS requests, the following arguments have been captured in the Chair notes.

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| Discussion:Ericsson think from network perspective, it is better to have measurements than UE preferences. They see the explicit request as needed only when the network has not given pre-defined configurations.Qualcomm think any AD request in LPP is “blind”, and the question is whether there is a need to depart from this principle for on-demand PRS. If we constrain when the UE can send the Request Assistance Data, it would be a behavioural change in LPP. |

The aim of Question 1 is to focus on Proposal 1 and the related concerns raised during the online GTW discussion, which are provided in Q1-1 and follow-up Q1-2.

### Question 1-1

**Do companies agree that there is a need for supporting blind on-demand PRS requests by the UE (e.g., if the network has not provided any pre-defined configurations)?**

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#### Question 1-1 Rapporteur’s Summary

[TBD]

### Question 1-2

**As a follow-up question, especially to the companies that answered ‘No’ to the above Question 1-1**, **do companies agree that there would be a UE behavioural change in LPP by constraining the *RequestAssistanceData* message to the UE first receiving the set of pre-defined on-demand PRS configurations? If the answer is ‘Yes’, please also indicate if the UE behavioural change in LPP is justified?**

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#### Question 1-2 Rapporteur’s Summary

[TBD]

### Question 2-1

This question tackles the related issue of supporting an explicit on-demand PRS parameter request by the UE based on the following RAN2#116bis-e agreement [2].

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| RAN2#116bis-e Agreement:LPP signalling supports index-based and explicit request of on-demand DL-PRS parameters from the UE. The UE is not required to implement requesting explicit parameters and the LMF is not required to grant them if the UE does request. |

Some companies expressed views that the explicit request is only dependent on the support of blind requests, which is also based on the outcome of Question 1. However, in order to better understand how to support the UE explicit request for on-demand PRS parameters in the context of the above agreement, companies are encouraged to provide their views on how the UE may send an explicit request for the desired on-demand PRS parameters to the network. The question posed during the Pre-meeting discussion [1, R2-2202236] to derive Proposal 3 has been modified to obtain further companies views:

**To support explicit request of on-demand PRS parameters, companies are encouraged to provide their preference on the following option(s):**

* **Option 1: For blind on-demand PRS requests, UE may request any of the explicit parameters from the RAN1 agreed parameter list.**
* **Option 2: For pre-defined on-demand PRS configurations (index-based), UE may only further explicitly request the parameters that were indicated by the network via prior signalling.**
* **Option 3: Other behaviors for UE-initiated on-demand PRS explicit request, please specify.**

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#### Question 2-1 Rapporteur’s Summary

[TBD]

### Question 2-2

For proponents of Option 2 in Q2-1, the prior signalling to be used for the explicit request may require some additional clarifications. Note that the prior signalling mentioned below is based on the signalling from the LMF to the UE.

**Companies are invited to provide their views on the “prior signalling” options in Q2-1 to be used as the basis for the explicit request:**

* **Option 1: Prior signalling is based on the on-demand PRS parameters received via the pre-defined configurations in a prior LPP *ProvideAssistanceData* message.**
* **Option 2: Prior signalling includes a separate list of supported on-demand PRS parameters provided by the LMF, i.e., not part of the pre-defined configurations as in Option 1.**
* **Option 3: Others, please specify.**

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#### Q2-2 Rapporteur’s Summary

[TBD]

## UE behaviour for handling pre-defined On-demand PRS configurations

Another remaining open issue is to understand whether there is an impact to the UE capability depending on whether the UE stores or discards the received pre-defined on-demand PRS configurations from the network. Question 3 aims to gather companies views on this particular on-demand PRS UE behaviour by using proposal 15-1 as basis for the discussion. Please also note that the pre-configured Assistance Data UE behaviour is a separate discussion and not to be confused with the UE behaviour of handling pre-defined on-demand PRS configurations.

### Question 3

**Companies are invited to provide their views on which of the following options best describes the UE behaviour, upon receiving the pre-defined on-demand PRS configurations:**

* **Option 1: UE discards the pre-defined on-demand PRS configurations, after sending the list of preferred configurations.**
* **Option 2: UE stores the pre-defined on-demand PRS configuration(s) until the LPP session ends or is overridden by a new set of pre-defined on-demand PRS configuration(s).**
* **Option 3: Other behaviour, please specify.**

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#### Q3 Rapporteur’s Summary:

[TBD]

# Conclusions

[TBD]

References

1. R2-2202236, “Report of [Pre117-e][608][POS] Open issues on on-demand PRS (Lenovo)”, RAN2#117-e, Feb.-Mar. 2022.
2. R2-2201665, “Report from session on positioning and sidelink relay”, RAN2#116bis-e, Jan. 2022.
3. ChairNotes, “Report from session on positioning and sidelink relay”, RAN2#117-e, Feb.-Mar. 2022.

# Annex A: Agreements on On-demand PRS

**RAN2#113bis-e (April 2021) (R2-2104305)**:

Agreements:

UE-initiated on-demand PRS request is enabled by enhancing LPP RequestAssistanceData. FFS how much control the network has over the UE request.

The UE-initiated mechanism is enabled by the UE request triggering a request from the LMF, and the actual PRS changes are requested by the LMF irrespective of whether the procedure is UE- or LMF-initiated.

Put the stage 2 description for UE-initiated and LMF-initiated PRS request under the same framework.

**RAN2#114-e (May 2021) (R2-2106475)**:

Agreements:

The network can signal predefined PRS configurations to the UE and the UE can select one to request. FFS if the UE can request a configuration with different parameters and exactly which parameters are flexible.

Agreements:

Proposal 2:Define a new LPP assistance data IE which can contain a set of possible on-demand DL-PRS configurations, where each on-demand DL-PRS configuration has an associated identifier.

Proposal 3 (modified): The new LPP assistance data IE from Proposal 2 can be included in an LPP Provide Assistance Data message and/or a new posSIB.

Agreements:

Proposal 4 (modified): The procedure(s) for on-demand DL-PRS should support at least the following functionality (up to RAN3 what is in NRPPa vs. OAM, etc.):

-Providing the requested on-demand DL-PRS configuration information from an LMF to the gNB (e.g., explicit parameter or identifier of a predefined DL-PRS configuration), and confirmation of the request by the gNB

-Provision of (possible/allowed) on-demand DL-PRS configurations that the gNB can support from a gNB to an LMF

-TRP capability transfer (e.g., whether the RAN node supports the reconfiguration of DL-PRS, etc.)

**RAN2#115-e (August 2021) (R2-2108835)**

Agreements (R2-2108400 Report on [Post114-e][603][POS] Procedures and signalling for on-demand PRS (Ericsson) Ericsson):

Before providing available DL-PRS configuration to the UE, the LMF may obtain configuration information on what DL-PRS can be supported from one or more TRPs via NRPPa.

Capture the steps provided above as a baseline, along with a note indicating it remains FFS if the UE can send the MO-LR to request on-demand PRS.

FFS if we indicate to SA2 that MO-LR can be used to trigger on-demand PRS procedure.

It is up to Network (LMF) implementation on the steps to follow (accept/reject/ignore) on receiving request from UE for changing the DL-PRS configurations.

**RAN2#116-e (November 2021) (R2-2111295)**

Agreements:

Proposal 1: RAN2 to agree to support the UE originated request of on-demand PRS via MO-LR for autonomous self location. (11/14)

Proposal 3: RAN2 to agree that UE can send an MO-LR Request message included in an UL NAS TRANSPORT message to the serving AMF including an LPP Request Assistance Data message which is used for on-demand DL-PRS transmission, and the MOLR-Type of this MO-LR Request message is “assistanceData”. (12/14)

Proposal 4: RAN2 to agree the following general stage 2 procedure as baseline for UE initiated on-demand PRS via MO-LR. (13/14) [Figure 2 of R2-2109483, with the associated list of steps as given in section 5 of R2-2109483.] To be discussed in development of the running stage 2 CR (post-meeting) how much of this detail we need to capture in 38.305

Agreements:

Proposal 1.1: The UE may initiate an on-demand PRS request per positioning method including DL-TDoA, DL-AoD and Multi-RTT, via the existing LPP RequestAssistanceData message.

Proposal 1.2: There is no need for introducing a new LPP message to carry the on-demand PRS request.

**RAN2#116bis-e (January 2022) (R2-2201665)**

Agreements:

If the LMF indicates predefined configurations, the UE can request them via LPP RequestAssistanceData.

Agreement:

LPP signalling supports index-based and explicit request of DL-PRS parameters from the UE. The UE is not required to implement requesting explicit parameters and the LMF is not required to grant them if the UE does request.

Agreements:

Proposal 3.2.3-1: [Easy agreements] [10/10] For On-Demand PRS, introduce LPP capability on UE-initiated On-Demand PRS Request;

**RAN2#117-e (Feb-March. 2022) [3]**

Agreements:

Proposal 4: UE may explicitly request on-demand PRS parameters based on the Rel-16 value ranges. [14/14]

Proposal 6: A UE reason/cause for an on-demand PRS request is not supported. [12/14]

Proposal 7: The posSI message cannot be the response for a UE’s On-Demand PRS request. [13/14]

Proposal 12: The DL-PRS-Configuration ID is only defined by an identifier (ID). [13/14]

Proposal 13: On-demand PRS configuration is at least provided per positioning method. [12/14]

Agreement:

Proposal 5: The UE may indicate its preferred on-demand PRS pre-defined configuration via a list in decreasing order of preference (i.e., sorted from the UE’s most preferred to least preferred on-demand PRS configuration). [10/14]

Agreement:

Proposal 14 (modified): UE-initiated on-demand PRS capability information is independently requested/indicated per positioning method.

Agreement:

Proposal 9-1 (modified): To respond to an unfulfilled UE-initiated on-demand PRS request, an error cause may be provided to the UE. To be discussed under running CR if the cause values are new or if we reuse existing values.

Agreement:

P11/P15-2/P15-3 to be discussed in the running CR discussion.