3GPP TSG-RAN WG3 Meeting #115-e R3-222435

Online, 21 February – 03 March 2022

**Agenda item: 19.2.3**

**Source: Nokia (moderator)**

**Title: Summary of offline: On-demand PRS transmission**

**Document for: Discussion and Decision**

# 1 Introduction

This paper summarizes the following email discussion:

**CB: # 1904\_Pos\_OnDemandPRS**

**- PRS configuration:**

**- Can the NG-AP CR in R3-221873 be endorsed?**

**- is there a need to introduce new parameters as part of the PRS configuration, e.g. PRS Resource start time and duration?**

**- Is there a need to introduce a “PRS configuration on/off” indication from the LMF or just a “PRS configuration off indication?**

**- Any pending aspect of TRP Information?**

**- Capture agreements and provide TPs**

(Nok - moderator)

Summary of offline disc [R3-222435](file:///C:\Users\z00274494\Downloads\Inbox\R3-222435.zip)

# 2 For the Chair’s Notes

TBD

# 3 Discussion (Round 1)

Please provide your Round 1 views (5 questions) by **13:00 UTC Thursday February 24th**.

## 3.1 NRPPa open issues

Related papers in [1] and [4].

There are three main open issues to discuss for NRPPa:

1) **Start/end time of DL PRS transmission** (either per resource set per positioning frequency layer or per UE)

2) **ON/OFF indicator** (either per resource, or per resource set, or per UE)

3) **On-demand PRS TRP Information**

For **start/end time**, there can be various ways to encode. In [1], it is proposed to encode Start Time as the *Relative Time 1900* IE, and the End Time as a duration like in LPP. In [2], the encoding is FFS.

**Proposal 1:** Introduce a *Start Time* IE (encoded as the existing *Relative Time 1900* IE) and *Duration* IE (INTEGER type in seconds with max value 90060 in alignment with LPP) within the *Requested DL PRS Transmission Characteristics* IE at the TRP level and at the PRS Resource Set level.

A TP capturing proposal 1 is in [1] sections 9.2.x1 and 9.2.x1c.

**Question 1: Can Proposal 1 for start/end time be agreed? Please also provide any comments regarding the related TP in [1].**

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| **Company** | **Comments** |
| HW | Yes |
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| Moderator Summary:   * TBD | |

For “**OFF” indicator**, two different options have been proposed:

Option 1: Introduce a *PRS Configuration Request Type* IE in the PRS CONFIGURATION REQUEST, encoded as ENUMERATED type with two values (configure, off, …). For the “off” request type, introduce a *PRS Transmission Off Information* IE in the PRS CONFIGURATION REQUEST which includes a choice of TRP, PRS resource sets, or PRS resources to be turned off. See TP in [1] sections 9.1.1.a1 and 9.2.x1d.

Option 2: Introduce a “Deactivation Indicator” per PRS Resource Set ID or PRS Resource ID in the *Requested DL PRS Transmission Characteristics* IE. See TP in [4] section 9.2.x1.

**Question 2: Please indicate your preference between Option 1 and Option 2. Also, please provide any comments on the TP for your preferred option.**

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| **Company** | **Comments** |
| HW | Option 1. Additional comments: the “PRS Resource Set Off Indication”and“PRS Resource Off Indication”within the *PRS Transmission Off Information* IE may be no longer needed. |
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For “**ON” indicator**, two different options have been proposed:

Option 1: Nothing more is needed to support “on”, since the *Requested DL PRS Transmission Characteristics* IE is essentially an “on” request. The *Requested DL PRS Transmission Characteristics* IE is included in the PRS CONFIGURATION REQUEST when the value of the *PRS Configuration Request Type* IE is “configure”.

Option 2: Introduce the following parameters into the *Requested DL-PRS Resource List* IE as optional: Sequence ID, RE Offset, Resource Slot Offset, Resource Symbol Offset. See TP in [4] section 9.2.x1b.

**Question 3: Please indicate your preference between Option 1 and Option 2. Also, please provide any comments on the TP for your preferred option.**

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| **Company** | **Comments** |
| HW | We are OK with Option 1.  If we need to support a switch on of the previously requested (or switched off) resource (set) list. The *PRS Transmission Off Information* IE in [1] & [2] can be updated to support indicating the list for both “off” and “on”; and also update PRS Configuration Request Type to include “ON”. |
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For **On-demand PRS TRP Information**:

- It is proposed in [1] that the gNB may not allow all nine of the on-demand DL PRS parameters agreed by RAN1 to be requested by the LMF. Therefore, the gNB should be able to indicate (using a BIT STRING) which parameters are allowed to be included/requested by the LMF in a PRS CONFIGURATION REQUEST message.

- In [4], it is proposed that the gNB may not allow all possible values of a particular on-demand DL PRS parameter (e.g. Periodicity, Repetition Factor, Comb Size, and Number of Symbols) to be requested by the LMF. Therefore, the gNB should be able to indicate (using a BIT STRING) which values of the parameter are allowed to be included/requested by the LMF in a PRS CONFIGURATION REQUEST message.

The above essentially enables the gNB to indicate support for on-demand PRS at two levels of granularity: parameter level, and parameter value level.

**Proposal 2:** The gNB can indicate via the TRP Information Exchange procedure whether a particular on-demand PRS transmission parameter is allowed to be requested by the LMF.

A TP capturing proposal 2 is in [1] section 9.2.x3.

**Question 4: Can Proposal 2 be agreed? Please also provide any comments regarding the related TP in [1].**

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| **Company** | **Comments** |
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**Proposal 3:** For at least some on-demand PRS transmission parameters (e.g. Periodicity, Repetition Factor, Comb Size, and Number of Symbols), the gNB can indicate via the TRP Information Exchange procedure whether particular values are allowed to be requested by the LMF.

A TP capturing proposal 3 is in [4] section 9.2.x3.

**Question 5: Can Proposal 3 be agreed? Please also provide any comments regarding the related TP in [4], e.g., which on-demand DL PRS parameters should the “value level of granularity” be applied to.**

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| **Company** | **Comments** |
| HW | Ok for the value level. The following parameters:   * per resource set per positioning frequency layer per FR   1. DL PRS Periodicity   2. DL PRS Resource Bandwidth   3. DL PRS Resource Repetition Factor   4. Number of DL PRS Resource Symbols per DL PRS Resource   5. DL-PRS CombSizeN |
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Finally, there may be miscellaneous corrections needed to support on-demand PRS. For example, according to [4] the frequency related information is currently missing from the *Requested DL-PRS Resource Set Item* IE, so the *Start PRB* and *Point A* IEs should be introduced into the *Requested DL-PRS Resource Set Item* IE.

**Proposal 4:** Introduce the *Start PRB* IE and *Point A* IE into the *Requested DL-PRS Resource Set Item* IE.

A TP capturing proposal 4 is in [4] section 9.2.x1.

**Question 6: Can Proposal 4 be agreed? Please also provide any comments regarding the related TP in [4], or if any other miscellaneous parameters are missing for on-demand PRS.**

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| **Company** | **Comments** |
| HW | Maybe no need. The frequency information is not listed in the RAN1 LS. The RAN1 LS only include the number of frequency layers. We need to follow RAN1 LS. |
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## 3.2 NGAP

An NGAP CR is provided in [3], proposing to update the NRPPa Transport procedure description to include the new Rel-17 NR positioning functions (currently Measurement Preconfiguration Information Transfer and PRS Information Transfer).

**Question 7: Can [3] be endorsed as baseline CR for NGAP?**

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| **Company** | **Comments** |
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| Moderator Summary:   * TBD | |

# 4 Discussion (Round 2)

TBD

# 5 Conclusions, Recommendations

TBD

# References

1. R3-221871, (TP for NR\_pos\_enh BL CR for TS 38.455) Resolution of open issues for on-demand PRS (Nokia, Nokia Shanghai Bell, Ericsson, Huawei)
2. R3-221872, (TP for NR\_pos\_enh BL CR for TS 38.473) Resolution of open issues for on-demand PRS (Nokia, Nokia Shanghai Bell, Ericsson, Huawei)
3. R3-221873, Introduction of NR positioning enhancements to NGAP (Nokia, Nokia Shanghai Bell, Ericsson, Huawei)
4. R3-221894, (TP for Positioning BLCRs) Further Consideration on On-Demand PRS (CATT)