**3GPP TSG-RAN WG1 Meeting #107-e R1-21xxxxx**

**e-Meeting, November 11th – 19th, 2021**

**Agenda Item: 7.2.8**

**Source: Moderator (vivo)**

**Title: Summary of [107-e-NR-Pos-04]**

**Document for: Discussion and decision**

# Introduction

This document provides the discussion summary of [107-e-NR-Pos-04] on the correction for the parameter dl-PRS-ResourceTimeGap.

[107-e-NR-Pos-04] Email discussion/approval on the parameter *dl-PRS-ResourceTimeGap* (Aspect #4) until November 17 – Huaming (vivo)

# Background

In [1], it is noticed that the definition of the parameter *dl-PRS-ResourceTimeGap* captured in TS 38.214 [2] below is not correct given this parameter is defined as corresponding to two repeated instances of a DL PRS resource with the same resource ID and not resource set ID.

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| 5.1.6.5 PRS reception procedure  …  A DL PRS resource set is configured by *NR-DL-PRS-ResourceSet*, consists of one or more DL PRS resources and it is defined by:  …  *- dl-PRS-ResourceTimeGap* defines the offset in number of slots between two repeated instances of a DL PRS resource with the same *nr-DL-PRS-ResourceSetId* within a single instance of the DL PRS resource set. The UE only expects to be configured with *dl-PRS-ResourceTimeGap* if *dl-PRS-ResourceRepetitionFactor* is configured with value greater than 1. The time duration spanned by one instance of a *nr-DL-PRS-ResourceSet* is not expected to exceed the configured value of DL PRS periodicity. All the DL PRS resources within one resource set have the same value of *dl-PRS-ResourceTimeGap.*  … |

Note that this is a misalignment with previous RAN1 agreement and corresponding specification of TS 37.355 [3].

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| Agreement (RAN1#98bis):   * Parameter DL-PRS-ResourceRepetitionFactor is configured for a DL PRS Resource Set and controls how many times each DL-PRS Resource is repeated for a single instance of the DL-PRS Resource Set   + Values: 1, 2, 4, 6, 8, 16, 32 * Parameter DL-PRS-ResourceTimeGap is configured for a DL-PRS Resource Set   + DL-PRS-ResourceTimeGap indicates offset in units of slots between two repeated instances of a DL PRS Resource corresponding to the same DL-PRS Resource ID within a single instance of the DL PRS Resource Set   + DL-PRS-ResourceTimeGap is provided only if DL-PRS-ResourceRepetitionFactor is configured and is greater than 1   + Values: 1, 2, 4, 8, 16, 32 * The time duration spanned by one DL PRS Resource set containing repeated DL PRS Resources should not exceed DL-PRS-Periodicity * Note: UE RX beam sweeping is up to UE implementation |

TS 37.355, section 6.4.3

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| ***dl-PRS-ResourceTimeGap***  This field specifies the offset in units of slots between two repeated instances of a DL-PRS Resource corresponding to the same DL-PRS Resource ID within a single instance of the DL-PRS Resource Set. The time duration spanned by one DL-PRS Resource Set containing repeated DL-PRS Resources should not exceed DL-PRS-Periodicity. |

# Discussion

## *dl-PRS-ResourceTimeGap*

As pointed out by [1], current description of the definition of *dl-PRS-ResourceTimeGap* in TS 38.214 [2] is obviously not aligned with RAN2’s specification TS 37.355 [3] and not technically correct. There would be ambiguity if TS 38.214 is not fixed.

Furthermore, moderator’s understanding of previous RAN1 agreement and TS 37.355 is that “with the same DL PRS resource ID” is there to emphasize those two repeated instances of a DL PRS resource will have the same resource ID rather than to emphasize they are in the same resource set as that would be duplicate given it’s already covered by “within a single instance of the DL PRS resource set” at the end of this sentence. Note that no other place in TS 38.214 describes UE assumption of resource ID relationship for repeated PRS resource instances. Without this proposed fix, UE can only assume repeated instances of a DL PRS resource will have the same set ID but whether they have the same or different resource ID is not specified in 38.214.

Given the proposed change is simple and straight to fix an obvious error, moderator suggest to take this change as it is.

### Proposal 1: Select the following text proposal for TS 38.214 to align with TS 37.355 on the definition of *dl-PRS-ResourceTimeGap*.

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| TS 38.214 section 5.1.6.5 PRS reception procedure  < Unchanged parts are omitted >  *- dl-PRS-ResourceTimeGap* defines the offset in number of slots between two repeated instances of a DL PRS resource with the same *nr-DL-PRS-ResourceID* within a single instance of the DL PRS resource set. The UE only expects to be configured with *dl-PRS-ResourceTimeGap* if *dl-PRS-ResourceRepetitionFactor* is configured with value greater than 1. The time duration spanned by one instance of a *nr-DL-PRS-ResourceSet* is not expected to exceed the configured value of DL PRS periodicity. All the DL PRS resources within one resource set have the same value of *dl-PRS-ResourceTimeGap.*  < Unchanged parts are omitted > |

Companies are invited to express their views and suggestions in table below:

|  |  |
| --- | --- |
| Company Name | Comments |
| Nokia/NSB | To us this change seems to be non-essential as the DL PRS resources will have the same set ID anyways. LPP is also clear. But if there is strong preference from other companies we can be okay with the change. |
| vivo | As the proponent, we support this proposal.  The proposed fix is not intended to remove the condition where two repeated instances of a DL PRS resource will have the same set ID as that is still valid given “within a single instance of the DL PRS resource set”. Rather, the proposed change is to fix the missing condition in TS 38.214 that two repeated instances of a DL PRS resource need to have the same resource ID. |
| Huawei, HiSilicon | We support the change in the draft CR. However, we wonder whether this can be merged into the editor alignment CR to align with the agreement.  From our side, we are fine with either way. |
| ZTE | Agree with Huawei. |
| CATT | Support the change. |
| QC | OK |
| Intel | OK |
| Moderator | Seems companies are okay with the proposed change based on comments received so far.  On the comment whether to capture this into a draft CR to 38214 or merge into the editor alignment CR, formulate the following options for discussion. |

### Proposal 2: Select one of the following options for the correction to the definition of *dl-PRS-ResourceTimeGap*.

* **Option 1: Endorse the following proposed TP into a CR for 38.214**
* **Option 2: Endorse the following proposed TP and recommend to be captured in the editor alignment CR**

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| TS 38.214 section 5.1.6.5 PRS reception procedure  < Unchanged parts are omitted >  *- dl-PRS-ResourceTimeGap* defines the offset in number of slots between two repeated instances of a DL PRS resource with the same *nr-DL-PRS-ResourceID* within a single instance of the DL PRS resource set. The UE only expects to be configured with *dl-PRS-ResourceTimeGap* if *dl-PRS-ResourceRepetitionFactor* is configured with value greater than 1. The time duration spanned by one instance of a *nr-DL-PRS-ResourceSet* is not expected to exceed the configured value of DL PRS periodicity. All the DL PRS resources within one resource set have the same value of *dl-PRS-ResourceTimeGap.*  < Unchanged parts are omitted > |

Companies are invited to express their views on above options:

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| Company Name | Comments |
| ZTE | Option 2. |
| CATT | We prefer Option 2. |
| vivo | OK with either option 1 or 2 |
| Intel | Let’s take Option 2 – looks easier. |

**Moderator’s summary:**

It seems option 2 of proposal 2 is preferred. So moderator suggest to take that option.

# Conclusion

Moderator’s recommendation to agree:

### Proposal 2a: Endorse the following proposed TP (same as in R1-2110989) and recommend to be captured in the editor alignment CR for 38.214.

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| TS 38.214 section 5.1.6.5 PRS reception procedure  < Unchanged parts are omitted >  *- dl-PRS-ResourceTimeGap* defines the offset in number of slots between two repeated instances of a DL PRS resource with the same *nr-DL-PRS-ResourceID* within a single instance of the DL PRS resource set. The UE only expects to be configured with *dl-PRS-ResourceTimeGap* if *dl-PRS-ResourceRepetitionFactor* is configured with value greater than 1. The time duration spanned by one instance of a *nr-DL-PRS-ResourceSet* is not expected to exceed the configured value of DL PRS periodicity. All the DL PRS resources within one resource set have the same value of *dl-PRS-ResourceTimeGap.*  < Unchanged parts are omitted > |

# References

1. R1-2110989 Maintenance on Rel-16 NR positioning vivo
2. 3GPP TS 38.214, V16.7.0, 2021.09
3. 3GPP TS 37.355, v16.6.0, 2021.09