**3GPP TSG-RAN WG1 Meeting #106-e R1-210xxxx**

**e-Meeting, August 16th – 27th, 2021**

**Agenda Item: 7.2.8**

**Source: Moderator (Huawei)**

**Title: Summary of [106-e-NR-Pos-01] Replacement of cell terminology**

**Document for: Discussion and decision**

# Introduction

This document provides the summary for [106-e-NR-Pos-01] on the replacement of cell terminology.

[106-e-NR-Pos-01] Email discussion/approval on replacement of cell terminology (Aspect #1) until August 20 – Su (Huawei)

The related submission of contributions includes

1. R1-2106448 Draft CR on terminology correction to cell for positioning Huawei, HiSilicon
2. R1-2107991 Maintenance on Rel-16 NR positioning vivo

The email discussion is divided into two rounds, with the intermediate summary at 23:59 UTC, Aug. 18.

# General information

In **Error! Reference source not found.**, it is proposed to change the terminology “cell” in the descriptions of the higher layer parameters *NR-DL-PRS-SFN0-Offset* and *dl-PRS-QCL-Info* as shown below:

* In *NR-DL-PRS-SFN0-Offset*, the “transmitting cell” is changed to “DL PRS resource set”, and the “reference cell” is changed to “reference indicated by *nr-DL-PRS-ReferenceInfo*”.
* In *dl-PRS-QCL-Info*, “a non-serving cell” is changed to “not from any serving cell”.

The corresponding TP is provided below:

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| **TS 38.214**  5.1.6.5 PRS reception procedure  ========================= Unchanged parts =========================  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:  ========================= Unchanged parts =========================  *- NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for the DL PRS resource set with respect to SFN0 slot 0 of reference provided by *nr-DL-PRS-ReferenceInfo*.  ========================= Unchanged parts =========================  A DL PRS resource is defined by:  ========================= Unchanged parts =========================  *- dl-PRS-QCL-Info* defines any quasi co-location information of the DL PRS resource with other reference signals. The DL PRS may be configured with QCL 'typeD' with a DL PRS either from a serving cell or not from any serving cell, or with *rs-Type* set to 'typeC', 'typeD', or 'typeC-plus-typeD' with a SS/PBCH Block from a serving or non-serving cell.  ========================= Unchanged parts ========================= |

In [2], the similar change was proposed, for the description of ‘cell’ in section 5.1.6.5 in TS38.214, it is suggested to use the unified description just like ‘TRP’ in the specification, e.g., ‘*dl-PRS-ID*’ as provided in TP below:

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| **TS 38.214 (clause 5.1.6.5)**  < Unchanged parts are omitted >  *NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for ~~the transmitting cell~~ each *dl-PRS-ID* with respect to SFN0 slot 0 of the reference indicated by *dl-PRS-ID* in higher layer parameter *nr-DL-PRS-ReferenceInfo*~~reference cell~~.  < Unchanged parts are omitted > |

# Discussion

## *NR-DL-PRS-SFN0-Offset*

The reason for the change was believed to be removing “cell” terminology, since from UE reception of PRS perspective, TRP and cell should be differentiated. **Error! Reference source not found.** also argued that PRS could be transmitted from a TRP-only TP where there is no cell associated with it.

**Proposal: Select one alternative to fix the cell terminology in *NR-DL-PRS-SFN0-Offset***

* **Alt.1**

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| *- NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for the DL PRS resource set with respect to SFN0 slot 0 of reference provided by *nr-DL-PRS-ReferenceInfo*. |

* **Alt.2**

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| *NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for ~~the transmitting cell~~ each *dl-PRS-ID* with respect to SFN0 slot 0 of the reference indicated by *dl-PRS-ID* in higher layer parameter *nr-DL-PRS-ReferenceInfo*~~reference cell~~. |

* **Alt.3 Others**

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| **Company** | **Alternative** | **Comments** |
| vivo | Alt.2 | The wording of Alt.1 may be interpreted that SFN0 offset is for a DL PRS resource set. In case there’re multiple DL PRS resource sets on a TRP, that may cause confusion that each resource set has its own SFN0 offset.  So we support Alt.2. |
| OPPO | Alt.1 |  |
| ZTE | Alt.2 | Share the same view with vivo. |
| Huawei, HiSilicon | Alt.1 | We are fine with either one in general, but prefer Alt.1.  Currently SFN0 offset is described under the following text, which gives a good reason to say SFN0 offset for the PRS resource set.   |  | | --- | | 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:  …  *- NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for the transmitting cell with respect to SFN0 slot 0 of reference cell. |   We do not see the confusion vivo mentioned, since SFN0 is indicated in a per-TRP granularity.  Likewise for “dl-PRS-CombSizeN”, “dl-PRS-StartPRB”, and so on. |
| CATT | Alt.1 | We prefer Alt.1 as the *NR-DL-PRS-SFN0-Offset* is a parameter of DL PRS resource set. It will be better to use the text of DL PRS resource set directly. |
| Nokia/NSB | Alt. 1 |  |
| QC | Alt. 1 with a small change | *- NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for the DL PRS resource set with respect to SFN0 slot 0 of **the** reference provided by *nr-DL-PRS-ReferenceInfo*. |
| Intel | Alt.1 |  |
| Ericsson | Alt2 | Both option are OK but it seems alt2 is closer to the LPP description. |
| Apple | Alt2 | We share same view as vivo |

**Moderator summary:**

I think both alternatives can work. Given that 6 companies are OK with Alt.1 and 4 companies are OK with Alt.2.

Let’s see if the four companies can live with revised version of Alt.1 from Qualcomm.

### Proposal (update): Adopt the following TP to fix the cell terminology in *NR-DL-PRS-SFN0-Offset*

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| *- NR-DL-PRS-SFN0-Offset* defines the time offset of the SFN0 slot 0 for the DL PRS resource set with respect to SFN0 slot 0 of the reference provided by *nr-DL-PRS-ReferenceInfo*. |

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| **Company** | **Yes/No** | **Comments** |
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## *dl-PRS-QCL-Info*

The reason for the change was that PRS/PRS QCL could refer to the PRS resource from the same PRS-only TP, which does not necessarily need to be a cell.

### Proposal: Decide whether to adopt the following change.

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| *- dl-PRS-QCL-Info* defines any quasi co-location information of the DL PRS resource with other reference signals. The DL PRS may be configured with QCL ‘typeD’ with a DL PRS either from a serving cell or not from any serving cell, or with *rs-Type* set to ‘typeC’, ‘typeD’, or ‘typeC-plus-typeD’ with a SS/PBCH Block from a serving or non-serving cell. |

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| **Company** | **Yes/No** | **Comments** |
| vivo | Yes | OK |
| OPPO | No | The current wording has no issue. |
| ZTE | Support in principle. Prefer the changes in the right column. | We don’t need to mention whether the DL PRS should be from serving cell or non-serving cell since we only agreed that the source reference signal and target reference signal should be from the same TRP.  *- dl-PRS-QCL-Info* defines any quasi co-location information of the DL PRS resource with other reference signals. The DL PRS may be configured with QCL ‘typeD’ with a DL PRS ~~from a serving cell or a non-serving cell~~ associated with the same *dl-PRS-ID*, or with *rs-Type* set to ‘typeC’, ‘typeD’, or ‘typeC-plus-typeD’ with a SS/PBCH Block from a serving or non-serving cell. |
| Huawei, HiSilicon | Yes | Ok with either the original change or ZTE’s proposed change. |
| CATT | Yes | We support the motivation of the change for PRS-only TP. And we think ZTE’s version looks better. |
| Nokia/NSB | Yes | Okay with ZTE’s version of the original change. |
| QC | Yes to ZTE’s version |  |
| Intel | Yes | OK with updates from ZTE |
| Ericsson | Yes (ZTE version) | ZTE’s version is clearer. |
| Apple | Yes | Support ZTE’s version |

**FL summary:**

It seems all companies should be OK with ZTE’s version except one. Given the majority support, Let’s see if the objecting companies can reconsider the position on the following TP.

### Proposal (update): Adopt the following TP to fix the PRS QCL cell information

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| *- dl-PRS-QCL-Info* defines any quasi co-location information of the DL PRS resource with other reference signals. The DL PRS may be configured with QCL ‘typeD’ with a DL PRS associated with the same *dl-PRS-ID*, or with *rs-Type* set to ‘typeC’, ‘typeD’, or ‘typeC-plus-typeD’ with a SS/PBCH Block from a serving or non-serving cell. |

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| **Company** | **Yes/No** | **Comments** |
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# Conclusion

TBD