**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 , 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 , 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. 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** |
| ZTE | Yes |  |
| Intel | Yes | Support |
| CATT | Yes | Support. |

## *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** |
| ZTE | Yes |  |
| Intel | Yes | Support |
| CATT | Yes | Support. |

# Conclusion

TBD