**3GPP TSG-RAN WG2 Meeting #115-e *R2-210***

**Electronic, 9th – 27th August, 2021**

Agenda Item: 6.3.3

Source: Huawei, HiSilicon

Title: [AT115-e][Offline-607][POS] PRS-only TP flag and other identifiers (Huawei)

**Document for: Discussion and Agreement**

# Introduction

This document is to handle the following email discussion:

* [AT115-e][607][POS] PRS-only TP flag and other identifiers (Huawei)

Scope: Discuss the possibility of signalling cell identifiers for the PRS-only TP, and the proposal for including a TP-ID, and draft an agreeable CR.

Intended outcome: Agreeable CR in R2-2108937

Deadline: Tuesday 2021-08-24 0600 UTC

In this discussion, we will discuss the following discussion papers and CRs:

|  |  |  |
| --- | --- | --- |
| [R2-2107332](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2107332%20Correction%20to%20PRS-only%20TP.doc) | Correction to PRS-only TP | Huawei, HiSilicon |
| [R2-2108404](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2108404%20Discussion%20Need%20Code.docx) | on Need codes and PRS-only TP | Ericsson |
| [R2-2108406](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2108406%20Addition%20of%20PRS%20Only%20TP.docx) | Addition of PRS only TP | Ericsson |

* 1. Contact Information

|  |  |  |
| --- | --- | --- |
| **Company** | **Delegate name** | **Delegate email** |
| **Apple** | **Sasha Sirotkin** | **ssirotkin@apple.com** |

# Discussion

Background

During RAN2#114bis-e, the following CR have been submitted to the meeting for the issue of PRS-only TP, with the conclusion that the discussion is postponed.

R2-2105054 Correction to PRS-only TP Huawei, HiSilicon CR Rel-16 37.355 16.4.0 0305 - F NR\_pos-Core

* Postponed

During the online discussion, the following summary has been given for LPP corrections, with proposal 4 discussing the issue of PRS-only TP

[R2-2108808](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2108808%20Summary%20of%206_3_3%20REL-16%20LPP%20Corrections%20v2_clean.docx) Summary of agenda item 6.3.3 - REL-16 LPP Corrections Nokia, Nokia Shanghai Bell discussion Rel-16 NR\_pos-Core Late

Proposal 4: RAN2 is kindly requested to first discuss and decide if a PRS-Only TP indication in DL-PRS assistance data is needed. If agreeable, RAN2 should also discuss if the addition of a new TP ID along with PRS-Only TP indication is needed. Other details in the CRs in R2-2107332 and R2-2108406 can be decided later once these two points are discussed and resolved.

Some initial agreements have been made:

* Agree to have the PRS-only TP flag; other aspects can be discussed offline

In this offline email discussion, we further investigate the remaining issues regarding PRS-only TP in the LPP spec.

Remaining issues

### 2.2.1 Issue#1: PCI/NCGI in measurement results/location estimate

It is proposed in [R2-2107332](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2107332%20Correction%20to%20PRS-only%20TP.doc) that when the PRS configuration includes the field PCI+ARFCN/NGCI, the UE shall include the PCI+ARFCN/NCGI in the corresponding measurement results (taking DL-TDOA as an example) and location estimate, respectively as follows.

| *NR-DL-TDOA-SignalMeasurementInformation* field descriptions |
| --- |
| ***dl-PRS-ID***  This field is used along with a DL-PRS Resource Set ID and a DL-PRS Resources ID to uniquely identify a DL-PRS Resource. This ID can be associated with multiple DL-PRS Resource Sets associated with a single TRP.  Each TRP should only be associated with one such ID. |
| ***nr-PhysCellID***  This field specifies the physical cell identity of the associated TRP, as defined in TS 38.331 [35]. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-CellGlobalID***  This field specifies the NCGI, the globally unique identity of a cell in NR, of the associated TRP, as defined in TS 38.331 [35]. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-ARFCN***  This field specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-TimeStamp***  This field specifies the time instance at which the TOA and DL PRS-RSRP (if included) measurement is performed. Note, the TOA measurement refers to the TOA of this neighbour TRP or the reference TRP, as applicable, used to determine the *nr-RSTD* or *nr-RSTD-ResultDiff*. |
| ***nr-RSTD***  This field specifies the relative timing difference between this neighbour TRP and the PRS reference TRP, as defined in TS 38.215 [36]. Mapping of the measured quantity is defined as in TS 38.133 [46]. |
| ***nr-AdditionalPathList***  This field specifies one or more additional detected path timing values for the TRP or resource, relative to the path timing used for determining the *nr-RSTD* value. If this field was requested but is not included, it means the UE did not detect any additional path timing values. |
| ***nr-TimingQuality***  This field specifies the target device′s best estimate of the quality of the TOA measurement. Note, the TOA measurement refers to the TOA of this neighbour TRP or the reference TRP, as applicable, used to determine the *nr-RSTD* or *nr-RSTD-ResultDiff*. |
| ***nr-DL-PRS-RSRP-Result***  This field specifies the NR DL-PRS reference signal received power (DL PRS-RSRP) measurement, as defined in TS 38.215 [36]. The mapping of the quantity is defined as in TS 38.133 [46]. |
| ***nr-RSTD-ResultDiff***  This field provides the additional DL RSTD measurement result relative to *nr-RSTD.* The RSTD value of this measurement is obtained by adding the value of this field to the value of the *nr-RSTD* field. The mapping of the field is defined in TS 38.133 [46]. |
| ***nr-DL-PRS-RSRP-ResultDiff***  This field provides the additional DL-PRS RSRP measurement result relative to *nr-DL-PRS-RSRP-Result.* The DL-PRS RSRP value of this measurement is obtained by adding the value of this field to the value of the *nr-DL-PRS-RSRP-Result* field. The mapping of the field is defined in TS 38.133 [46]. |

-- ASN1START

NR-TimeStamp-r16 ::= SEQUENCE {

dl-PRS-ID-r16 INTEGER (0..255),

nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

nr-SFN-r16 INTEGER (0..1023),

nr-Slot-r16 CHOICE {

scs15-r16 INTEGER (0..9),

scs30-r16 INTEGER (0..19),

scs60-r16 INTEGER (0..39),

scs120-r16 INTEGER (0..79)

},

...

}

-- ASN1STOP

| ***NR-TimeStamp* field descriptions** |
| --- |
| ***dl-PRS-ID***  This field specifies the DL-PRS ID of the TRP for which the *nr-SFN* is applicable. |
| ***nr-PhysCellID***  This field specifies the physical cell identity of the associated TRP, as defined in TS 38.331 [35]. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-CellGlobalID***  This field specifies the NCGI, the globally unique identity of a cell in NR, of the associated TRP, as defined in TS 38.331 [35]. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-ARFCN***  This field specifies the ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID* associated with the *dl-PRS-ID*. The UE shall include this field if it is provided in the assistance data for the TRP. |
| ***nr-SFN***  This field specifies the NR system frame number for the time stamp. |
| ***nr-Slot***  This field specifies the NR slot number within the NR system frame number indicated by *nr-SFN* for the time stamp. |

***Question1: Do companies agree that the UE should carry the field PCI/NCGI when it sends the measurement results or the location estimate if the PRS configuration include PCI/NCGI?***

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| Qualcomm | No | The UE cannot always obtain the cell IDs from neighbour cells, and therefore, the fields cannot always be included in the location report. Just copying the information from the provided assistance data list into the measurement report seem meaningless. |
| Ericsson | No | Agree with QC |
| Apple | No | Agree with QC |
| CATT | No | Agree with QC. |
| Intel | No | Agree with QC. |
| vivo | No | When the PCI/NCGI is included in the PRS configuration, it implies that the node is not a PRS-only TP. Upon receiving the configuration, the UE expects that one of the dl-PRS-ID along with a nr-DL-PRS-ResourceSetID and a nr-DL-PRS-ResourceID can be used to uniquely identify a DL PRS resource. Therefore, in our view, the PCI/NCGI is not mandatory in the measurement report. |

### 2.2.2 Issue#2: TP ID for PRS-only TP

It has also been proposed in [R2-2108406](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2108406%20Addition%20of%20PRS%20Only%20TP.docx) that a new field TP-id should be added such that the number of unique identifiers for PRS-only TP can be extended to 65536

tpId-v16xy INTEGER (256..65535) OPTIONAL, -- Need ON

***Question2: Do companies agree that TP ID should be added such that the number of identifies for PRS-only TP can be extended to 65536?***

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| Qualcomm | Not sure | Some more background/clarification would be needed. E.g., how is it going to be used? The CR R2-2108406 includes this only in the NR-DL-PRS-AssistanceData. |
| Ericsson |  | we can decide if we need to also include in UE report |
| Apple |  | We are not against, but as QC mentioned – it would be good to understand how this is going to be used. |
| CATT |  | We should understand how to use this ID first. If it is used to identify the measurement result associated with a TP that is not associated with a cell, it would make sense. For such case, the range of TP ID should be discussed and decided, e.g. whether it is the only ID identified in a certain area or in the same PLMN etc. |
| Intel |  | Should not this be discussed together with PRS-only TP indication? |
| vivo |  | It is agreed to have the PRS-only TP indication.  As to the TPID, the proponent should further clarify the funcition and the range of the ID. |

### 2.2.3 Issue#3 Update of definitions for PRS-only TP

The following has been proposed for the update of definition for PRS-only TP

|  |
| --- |
| **PRS-only TP**: A TP which only transmits PRS signals for PRS-based TBS positioning or DL-PRS and is not associated with a cell. |

The following NOTE has also been added in the clause for NR-DL-PRS assistance data

|  |
| --- |
| NOTE 5: Due to support of cells containing multiple TPs and PRS-only TPs not associated with cells, the term "cell" as used in clause 6.5.10, 6.5.11, 6.5.12 may not always correspond to a cell for the NR. |

***Question3: Do companies agree that the update above the definition of PRS-only TP and “cell” for PRS-only TP?***

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| Qalcomm | See comments | The first change seem editorial and could be merged into another CR. However, the "or DL-PRS" should be moved to the beginning of the sentence:  "A TP which only transmits PRS or DL-PRS signals…|  On NOTE 5: The term "cell" is not used in clause 6.5.10, 6.5.11, 6.5.12 anyhow, other than for Cell-IDs (for which the term "cell" is correct). The specification mentions only TRPs. What is the significance of this NOTE?? |
| Ericsson |  | On Note agree with QC. The intention was to reuse from LTE specs when tpid was introduced as below was added in LTE.  NOTE 2: Due to support of cells containing multiple TPs and PRS-only TPs not associated with cells, the term "cell" as used in clause 6.5.1 may not always correspond to a cell for the E-UTRAN.  But, yes agree with QC that the term that has been used is TRP and not cell and thus the note may not be needed. |
| Apple | Not against | No strong view though |
| CATT |  | Agree with QC’s first comments. For the NOTE, Ericsson’s comments can be considered, i.e. the note may be not needed. |
| Intel |  | Do not see the strong need for the NOTE. |
| vivo |  | Agree with QC |

### 2.2.4 Miscellaneous editorial corrections

In addition, [R2-2107332](file:///C:\Users\mtk16923\Documents\3GPP%20Meetings\202108%20-%20RAN2_115-e,%20Online\Extracts\R2-2107332%20Correction%20to%20PRS-only%20TP.doc) has also proposed various other editorial corrections for the current LPP spec:

First, a reference has been added for the TS 38.213, which has been cited wrongly in the current spec

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ======  [xx] 3GPP TS 38.213: “NR; Physical layer procedures for control”.  ======  NR-SSB-Config-r16 ::= SEQUENCE {  nr-PhysCellID-r16 NR-PhysCellID-r16,  nr-ARFCN-r16 ARFCN-ValueNR-r15,  ss-PBCH-BlockPower-r16 INTEGER (-60..50),  halfFrameIndex-r16 INTEGER (0..1),  ssb-periodicity-r16 ENUMERATED { ms5, ms10, ms20, ms40, ms80, ms160, ...},  ssb-PositionsInBurst-r16 CHOICE {  shortBitmap-r16 BIT STRING (SIZE (4)),  mediumBitmap-r16 BIT STRING (SIZE (8)),  longBitmap-r16 BIT STRING (SIZE (64))  } OPTIONAL, --Need OR  ssb-SubcarrierSpacing-r16 ENUMERATED {kHz15, kHz30, kHz60, kHz120, kHz240, ...},  sfn-SSB-Offset-r16 INTEGER (0..15),  ...  }  -- ASN1STOP   | ***NR-SSB-Config* field descriptions** | | --- | | ***nr-ARFCN***  This field specifies the ARFCN of the first RE of SSB's RB#10. | | ***ss-PBCH-BlockPower***  Average EPRE of the resources elements that carry secondary synchronization signals in dBm that the NW used for SSB transmission, see TS 38.213 [xx], clause 7. | | ***halfFrameIndex***  Indicates the 5 msec offset of the SSB within a 10 msec system frame. | | ***ssb-periodicity***  The SSB periodicity in ms for the rate matching purpose. | | ***ssb-PositionsInBurst***  Indicates the time domain positions of the transmitted SS-blocks in a half frame with SS/PBCH blocks as defined in TS 38.213 [xx], clause 4.1. The first/leftmost bit corresponds to SS/PBCH block index 0, the second bit corresponds to SS/PBCH block index 1, and so on. Value 0 in the bitmap indicates that the corresponding SS/PBCH block is not transmitted while value 1 indicates that the corresponding SS/PBCH block is transmitted. | | ***ssb-SubcarrierSpacing***  Subcarrier spacing of SSB. Only the values 15 kHz or 30 kHz (FR1), and 120 kHz or 240 kHz (FR2) are applicable. | | ***sfn-SSB-Offset***  Indicates the 10 msec system frame offset of the SSB within the SSB periodicity. Value 0 indicates that the SSB is transmitted in the first system frame; 1 indicates that the SSB is transmitted in the second system frame and so on. This field shall be configured according to the field *ssb-Periodicity* and the indicated system frame shall not exceed the configured SSB periodicity. |   ====== |

Next, a typo has been corrected in the E-CID provide capabilities:

|  |  |  |
| --- | --- | --- |
| -- ASN1START  NR-ECID-ProvideCapabilities-r16 ::= SEQUENCE {  nr-ECID-MeasSupported-r16 BIT STRING { ssrsrpSup (0),  ssrsrqSup (1),  csirsrpSup (2),  csirsrqSup (3)} (SIZE(1..8)),  periodicalReporting-r16 ENUMERATED { supported } OPTIONAL,  triggeredReporting-r16 ENUMERATED { supported } OPTIONAL,  ...  }  -- ASN1STOP   | ***NR-ECID-ProvideCapabilities* field descriptions** | | --- | | ***nr-ECID-MeasSupported:***  Indicates the supported NR ECID measurements:  - *ssrsrpSup* indicates the UE supports SSB based cell/beam specific RSRP measurement;  - *ssrsrqSup* indicates the UE supports SSB based cell/beam specific RSRQ measurement;  - *csirsrpSup* indicates the UE supports CSI-RS based cell/beam specific RSRP measurement;  - *csirsrqSup* indicates the UE supports CSI-RS based cell/beam specific RSRQ measurement. | |

***Question4: Do companies agree with the above editorial changes?***

|  |  |  |
| --- | --- | --- |
| Company | Yes/No | Comments |
| Qualcomm | Yes |  |
| Ericsson | Yes |  |
| Apple | Yes |  |
| CATT | Yes |  |
| Intel | Yes |  |
| vivo | Yes |  |

# Conclusion

**TBD**

# 4 References