**3GPP T****SG-RAN WG3 Meeting #123 R3-24xxxx**

**Athens, Greece, 26 February-1 March 2024**

**Title:** **Summary of R18 Positioning offline discussion**

**Source: CATT**

**Agenda item: 23.1**

**Document Type: Decision**

# 0. For Chair’s Notes

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**SL Positioning:**

Wait for the LS response from RAN2 on LMF involvement for SL-PRS resource allocation.

🡺Check latest RAN2 progress? If their LS response will be available today or tomorrow?

Currently, RAN2 initially discussed and agreed not to involve LMF in SL-PRS resource allocation for Rel-18. The formal agreement or LS will come soon.

**Proposal 1: LMF is not involved in the SL-PRS allocation in Rel-18.**

**LPHAP:**

We discussed the preconfigured and non-preconfigured SRS allocation, SRS reservation, and SRS activation procedure, the following proposals are agreeable.

**Proposal 2: In POSITIONING INFORMATION REQUEST, combine the new added parameters in *Requested SRS Transmission Characteristics* IE to a new IE, e.g. *Validity Area specific SRS Information.***

**Proposal 3: Add new IE in Positioning Information Request to provide pre-configured SRS information (requested SRS transmission characteristics, including the VA) from LMF to the serving gNB, a new IE listed 16 SRS characteristics.**

**Proposal 4: The serving gNB provides a list of preconfigured SRS configuration, each of them is associated to a VA to the LMF in Positioning Information Response.**

**Proposal 5: No need to introduce validity timer for SRS in NRPPa and F1AP.**

**Proposal 6: SRS Reservation Notification procedure is needed.**

**Proposal 7: Use the new added parameters defined for the *Requested SRS Transmission Characteristics* IE instead of the *SRS Config* in SRS INFORMATION RESERVATION NOTIFICATION. (maybe encoding as a new IE, e.g. *Validity Area specific SRS Information)***

**Proposal 8: The cell list of positioning validity area could be optionally signaled to gNB-DU for area-specific SRS allocation in POSITIONING INFORMATION REQUEST. (It’s not needed in the POSITIONING INFORMATION RESPONSE.)**

**Proposal 9: The cell list of positioning validity area is provided to gNB-DU in F1AP SRS INFORMATION RESERVATION NOTIFICATION to make proper SRS reservation.**

**Proposal 10: In XnAP, extend the RRC Resume Cause in RETRIEVE UE CONTEXT REQUEST message to indicate UE requests for activation of SRS. (semantics and code-point)**

**Proposal 11: In XnAP, include the preconfigured and non-preconfigured SRS configuration in RETRIEVE UE CONTEXT RESPONSE message (a list of SRS configurations, and corresponding VAs).**

**Proposal 12: For the SRS activation, the last serving gNB send the POSITIONING INFORMATION UPDATE to LMF, indicating the SRS is activated.**

**WA:**

**Proposal 13a: An ID is optionally included in the POSITIONING INFORMATION RESPONSE and SRS INFORMATION RESERVATION NOTIFICATION to differentiate the reserved SRS for the UE. Which ID to be used, I-RNTI or new defined ID is to be further discussed. (assumption is the serving gNB support partial UE context relocation )**

**Proposal 13b: The receiving gNB indicates the last serving gNB whether UE context relocation is expected (full context relocation is desired when SRS is not reserved in the receiving gNB).**

**(to be continued the next meeting.)**

**BW Aggregation:**

**Proposal 14: Support new Reporting Granularity Factor {-3, -4, -5, -6} in addition to {-1, -2}.**

**Proposal 15: Rename *PRS Bandwidth Aggregation Request Information* IE to *PRS Bandwidth Aggregation Request Indication* IE.**

**RedCap Positioning:**

**Proposal 16: Existing *Bandwidth* in *Requested SRS Transmission Characteristics* IE is used to implicitly indicate the RedCap with Tx FH configuration, no new sub-IE is needed, and procedure texts are beneficial for the Positioning Information Exchange procedure.**

**(to indicate that “*For a RedCap UE with Tx FH capability, a request on bandwidth for SRS for positioning from the LMF to the serving gNB that exceeds RedCap UE bandwidth implies configuration of SRS for positioning with Tx FH configuration”*)**

**Proposal 17: Introduce a new *Tx Hopping Configuration* IE in the *Positioning SRS Resource* IE that is aligned with RRC (TxHoppingConfig-r18).**

**Proposal 18: Introduce a new *SRS Periodicity* IE which can be reused within the *Requested SRS Transmission Characteristics* IE, *Positioning SRS Resource* IE, and *Tx Hopping Configuration* IE (in alignment with RRC).**

**Proposal 19: Add new IE in *TRP Measurement Result* to indicate the either a single-hop or multi-hops measurement. (e.g. define it as ENUMERATED (singleHop, multiHop, …) )**

**Proposal 20: add new IE in** ***TRP Measurement Result* to indicate which hop(s) the measurement is based on, bitmap could be used to indicate the hops.**

**BL CR Updates/Corrections:**

**Proposal 21: The IE IDs are missed for the IE *Additional Path List* and *Extended Additional Path List* in the BL CR, it should be added, e.g. id-ReportingGranularitykminus1AdditionalPath. (see NRPPa TP in contribution 0223)**

**Proposal 22: Add enumerated value UL RSCP for TRP Measurement Type, both tabular and ASN.1. (TP in Annex D of 0094 should be taken as start point, it’s better to restrict the usage of UL RSCP together with RTOA, multi-RTT in the procedure texts, if feasible.)**

**Proposal 23: Companies are encouraged to check the corrections/Update to the NRPPa BL CR in Contribution 0994. (check if the changes provided in Annex B, C, E are necessary)**

* NR UL SRS for Positioning BW Aggregation (section 2.2)
* NR DL PRS BW Aggregation (section 2.3)
* Simultaneous scheduling and their measurement of SRS for positioning from a target UE and PRU for UL CPP, UL-TDOA, multi-RTT (section 2.5)

**TP work split:**

**LPHAP:**

(TP to BL CR for TS 38.305) Support of LPHAP, revise from [R3-240524](file:///F%3A%5C%E4%BC%9A%E8%AE%AE%E6%96%87%E4%BB%B6%5CRAN3%5C2024%E5%B9%B4%5CTSGR3_123%5CDocs%5CR3-240524.zip) – Xiaomi

(TP to BL CR for TS 38.455) Support of LPHAP, revise from R3-240222 – CATT

(TP to BL CR for TS 38.473) Support of LPHAP, new – HW

(TP to BL CR for TS 38.470) Support of LPHAP, revise from [R3-240239](file:///F%3A%5C%E4%BC%9A%E8%AE%AE%E6%96%87%E4%BB%B6%5CRAN3%5C2024%E5%B9%B4%5CTSGR3_123%5CDocs%5CR3-240239.zip) - SS

(TP to BL CR for TS 38.423) Support of LPHAP, new – E///

**RedCap Positioning:**

(TP to BL CR for TS 38.455) Support of RedCap Positioning, revise from [R3-240332](file:///F%3A%5C%E4%BC%9A%E8%AE%AE%E6%96%87%E4%BB%B6%5CRAN3%5C2024%E5%B9%B4%5CTSGR3_123%5CDocs%5CR3-240239.zip) – Nokia

(TP to BL CR for TS 38.473) Support of RedCap Positioning, revise from [R3-240577](file:///F%3A%5C%E4%BC%9A%E8%AE%AE%E6%96%87%E4%BB%B6%5CRAN3%5C2024%E5%B9%B4%5CTSGR3_123%5CDocs%5CR3-240239.zip) – E///

**BW Aggregation:**

(TP to BL CR for TS 38.455) Support of BW Aggregation, new – CATT

(TP to BL CR for TS 38.473) Support of BW Aggregation, revise from [R3-240519](file:///F%3A%5C%E4%BC%9A%E8%AE%AE%E6%96%87%E4%BB%B6%5CRAN3%5C2024%E5%B9%B4%5CTSGR3_123%5CDocs%5CR3-240239.zip) – ZTE

**CPP:**

(TP to BL CR for TS 38.455) Support of CPP, revise from R3-240094 – QC

**/////////////////////////////////////////////////// End /////////////////////////////////////////////////////**

# Discussion

## SL Positioning

**Incoming LS:**

**Base on the RAN1 LS [17]:**

The following agreement was reached in RAN1 related to the request for specific SL PRS resource characteristic(s)/SL-PRS resource configuration for scheme 1

|  |
| --- |
| AgreementSend an LS to RAN2 and RAN3 with the following:* From RAN1 perspective, for scheme 1, it is important for the following request to be specified:
	+ a gNB is able to receive a request from either LMF or UE for SL-PRS bandwidth
* Action to RAN2 and RAN3 to consider how to specify support for such request, if not already specified.
 |

**To RAN2 and RAN3:**

RAN1 respectfully requests RAN2 and RAN3 to consider how to specify support for such request, if not already specified.

🡺RAN3 should discuss whether and how to satisfy the requirement of RAN1, i.e. provision of SL-PRS bandwidth from LMF to the gNB.

**LS [18] from SA2 to RAN2, RAN3 is in CC.**

🡺No immediate RAN3 impact is foreseen.

Corresponding contributions [19]~[24] have some discussion on the SL-Positioning. On whether and how the LMF is involved for SL-PRS configuration, the potential ways are listed:

* **Option 1:** As requested by RAN1, only provide the SL-PRS Bandwidth from LMF to the gNB, and the info is provided from CU to DU over F1AP. [20][21][23][24]
* **Option 2:** LMF request for the SL PRS from the gNB, and gNB report the SL-PRS configuration to the LMF. [19][22]
* **Option 3:** Wait for LS from RAN2?

As the whole procedure for LMF involvement is not so clear for now, we do not need to make a SL-PRS resource allocation procedure over NRPPa. The only thing we could do is provide the SL-PRS bandwidth from LMF to the gNB, and the SL-PRS resource allocation will be done by the gNB and provided to the UE via RRC.

🡺Check latest RAN2 progress? If LS will be available today or tomorrow?

**Wait for the LS response from RAN2 on LMF involvement for SL-PRS resource allocation.**

## LPHAP

### 1.2.1 SRS Configuration & Reservation

Contributions [7] – [15] provide views on SRS configuration and reservation for LPHAP.

1. **POSITIONING INFORMATION REQUEST/Response:**

Issue 1: whether to introduce a *LPHAP Assistance Information* IE to include the LPHAP parameters in *Requested SRS Transmission Characteristics* IE?

**Proposal x: In POSITIONING INFORMATION REQUEST, combine the new added parameters in *Requested SRS Transmission Characteristics* IE to a new IE, e.g. *Validity Area specific SRS Information.***

Issue 2: Whether and how to distinguish preconfigured SRS or for non-preconfigured SRS? Or how to support of pre-configured SRS with multiple SRS validity Areas?

* Only indicate the request type is for preconfigured SRS or non-preconfigured?
* preconfigured VAs and corresponding SRS configure are provided by the LMF?
* Preconfigured VAs and corresponding SRS characteristics are provided by LMF?

**Proposal x: Add new IE in Positioning Information Request to provide pre-configured SRS information (requested SRS transmission characteristics, including the VA) from LMF to the serving gNB, a new IE listed 16 SRS characteristics.**

**The serving gNB provides a list of preconfigured SRS configuration, each of them is associated to a VA to the LMF in Positioning Information Response.**

Issue 3: Whether to introduce a validity timer for a SRS configuration?

In TS 38.331, TAT timer is defined and included in SRS configuration.

AreaValidityTA-Config-r18 ::= SEQUENCE {

 inactivePosSRS-ValidityAreaTAT-r18 ENUMERATED {ms1280, ms1920, ms2560, ms5120, ms10240, ms20480, ms40960, infinity},

 inactivePosSRS-ValidityAreaRSRP-r18 RSRP-ChangeThreshold-r17 OPTIONAL, -- Need M

 autonomousTA-AdjustmentEnabled-r18 ENUMERATED {true} OPTIONAL -- Need M

}

We should discuss and determine whether and how to convey this timer from LMF to gNB? gNB to LMF? Whether need to introduce another timer?

**No need to introduce validity timer for SRS in NRPPa and F1AP.**

1. **SRS INFORMATION RESERVATION NOTIFICATION**

From the contributions, no company against for keeping the SRS Reservation Notification procedure.

**Proposal x: SRS Reservation Notification procedure is needed.**

On SRS reservation Notification procedure, several options are on the table:

**Option 1:** Use SRS Configuration, just remove the FFS.

**Option 2:** Use the all (or a subset) of the parameters defined for the *Requested SRS Transmission Characteristics* IE instead of SRS Config. [8]. (The new IE ***Validity Area specific SRS Information)***

***Option 3:*** *Use SRS-PosRRC-InactiveValidityAreaConfig instead of SRS Config [9]*

SRS-PosRRC-InactiveValidityAreaConfig-r18 ::= SEQUENCE {

 configType-r18 ENUMERATED {preconfig, non-preconfig},

 srs-PosConfigValidityArea-r18 SEQUENCE (SIZE(1..maxNrOfCellsInVA-r18)) OF CellIdentity,

 srs-PosConfigNUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R

 srs-PosConfigSUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R

 bwp-NUL-r18 BWP OPTIONAL, -- Need S

 bwp-SUL-r18 BWP OPTIONAL, -- Need S

 areaValidityTA-Config-r18 SetupRelease { AreaValidityTA-Config-r18 } OPTIONAL, -- Need M

 srs-PosRRC-AggBW-InactiveConfigList-r18 SetupRelease { SRS-PosRRC-AggBW-InactiveConfigList-r18 } OPTIONAL, -- Need M

 srs-PosResSetLinkedForAggBWInactiveList-r18 SetupRelease { SRS-PosResSetLinkedForAggBWInactiveList-r18 } OPTIONAL, -- Need M

 srs-PosHyperSFN-Index-r18 ENUMERATED {even0, odd1} OPTIONAL, --Need S

 ...

}

**Proposal x:** Use the new added parameters defined for the *Requested SRS Transmission Characteristics* IE instead of SRS Config in **SRS INFORMATION RESERVATION NOTIFICATION**. (maybe encoding as a new IE, e.g. ***Validity Area specific SRS Information)***

1. **F1AP impact:**

8.13.9 Positioning Information Exchange

……

If the *Positioning Validity Area Cell List* IE within the *Requested SRS Transmission Characteristics* IE is included in the POSITIONING INFORMATION REQUEST message, the gNB-DU shall, if supported, take this information into account for configuring SRS transmissions for the UE in the indicated validity area, and shall include the *SRS-PosRRC-InactiveValidityAreaConfig* IE, the *SFN Initialisation Time* IE and the *Positioning Validity Area Cell List* IE in the POSITIONING INFORMATION RESPONSE message.

Editor’s note: the procedural text and IE details are FFS

Editor’s Note: If the recommended validity area is not modified by the gNB-DU, whether to include *LPHAP Validity Area Cells* is FFS.

8.13.x SRS Information Reservation Notification

……

If the *SRS Reservation Request* IE is set to "reserve", the gNB-DU shall reserve the indicated SRS configuration for LPHAP in the indicated Validity Area Cells. If the *SRS Reservation Request* IE is set to "release", the gNB-DU shall release the previous SRS configuration in all the validity area.

Editor’s Note: the procedural details are FFS, especially the structure of the validity area and whether it should be signalled over F1

Base on company contributions, as one DU may manage multiple cells, it’s beneficial to provide the cell list of positioning validity area from CU to DU for SRS allocation and SRS reservation.

**Proposal x: The cell list of positioning validity area could be optionally signaled to gNB-DU for area-specific SRS allocation in POSITIONING INFORMATION REQUEST. (It’s not needed in the POSITIONING INFORMATION RESPONSE.)**

**Proposal x: The cell list of positioning validity area is provided to gNB-DU in F1AP SRS INFORMATION RESERVATION NOTIFICATION to make proper SRS reservation.**

### 1.2.2 Semi-persistent SRS activation

Some companies mentioned about how to activate the preconfigured or non-preconfigured SRS for LPHAP. Take the overall procedure provided in [14] for example:



**Proposed WF:**

**XnAP:**

* **Extend the RRC Resume Cause in RETRIEVE UE CONTEXT REQUEST message to indicate UE requests for activation of SRS. (semantics and code-point)**
* **Include the preconfigured and non-preconfigured SRS configuration in RETRIEVE UE CONTEXT RESPONSE message (a list of SRS configurations, and corresponding VAs).**

**NRPPa:**

* **The last serving gNB send the POSITIONING INFORMATION UPDATE to LMF, indicating the SRS is activated.**
* **I-RNTI should be included in the POSITIONING INFORMATION RESPONSE and SRS INFORMATION RESERVATION NOTIFICATION to differentiate the reserved SRS for the UE.**

**Further discuss on non-relocation case.**

**Proposal x: SRS activation procedure should be added for stage 2, we could start from 0094.**

## BW Aggregation

### 1.3.1 New Reporting Granularity Factor

On the Reporting Granularity Factor, it’s agreed to support the K values of k={-1,-2}, which has been captured in RAN3 BL CRs. RAN1 and RAN4 further discussed the support of the other values e.g. -3, -4, -5, -6, and it’s agreed that:

Agreement

The new ReportingGranularityfactor also supports k = {-3, -4, -5, -6} in addition to {-1, -2}

• These k values are applicable for timing measurements for all applicable positioning methods

* Support for both DL and UL
* Support for both FR1 and FR2

• Reply the RAN4 LS R1-2310797, and CC to RAN2 and RAN3.

RAN4#109 discussed the report mapping for newly agreed k values, k = {-3, -4, -5, -6} and reached to the following agreements (in the RAN4 LS: R4-2321545).

**Agreements:**

**# Absolute RSTD measurement report mapping**

**For k = -3**

Minimum reported quantity value: RSTD\_00000000

Maximum reported quantity value: RSTD\_15760385

Total number of reported quantity values: 15760386

**For k = -4**

Minimum reported quantity value: RSTD\_00000000

Maximum reported quantity value: RSTD\_31520769

Total number of reported quantity values: 31520770

**For k = -5**

Minimum reported quantity value: RSTD\_00000000

Maximum reported quantity value: RSTD\_63041537

Total number of reported quantity values: 63041538

**For k = -6**

Minimum reported quantity value: RSTD\_000000000

Maximum reported quantity value: RSTD\_126083073

Total number of reported quantity values: 126083074

**# Additional path report mapping for RSTD measurement**

**For k = -3**

Minimum reported quantity value: path\_000000

Maximum reported quantity value: path\_130801

Total number of reported quantity values: 130802

**For k = -4**

Minimum reported quantity value: path\_000000

Maximum reported quantity value: path\_261601

Total number of reported quantity values: 261602

**For k = -5**

Minimum reported quantity value: path\_000000

Maximum reported quantity value: path\_523201

Total number of reported quantity values: 523202

**For k = -6**

Minimum reported quantity value: path\_0000000

Maximum reported quantity value: path\_1046401

Total number of reported quantity values: 1046402

**Proposal x: Support new Reporting Granularity Factor {-3, -4, -5, -6} in addition to {-1, -2}.**

### 1.3.2 Others

In [27], it’s proposed to rename the *PRS Bandwidth Aggregation Request Information* IE to *PRS Bandwidth Aggregation Request Indication* IE.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PRS Bandwidth Aggregation Request Indication |  | O | ENUMERATED(true, …) |  | YES | ignore |

**Proposal x: Rename *PRS Bandwidth Aggregation Request Information* IE to *PRS Bandwidth Aggregation Request Indication* IE.**

## RedCap Positioning

Base on company contributions, to support RedCap Positioning

**Proposal x: Existing *Bandwidth* in *Requested SRS Transmission Characteristics* IE is used to implicitly indicate the RedCap with Tx FH configuration, no new sub-IE is needed, and procedure texts are beneficial for the Positioning Information Exchange procedure.(to indicate that** For a RedCap UE with Tx FH capability, a request on bandwidth for SRS for positioning from the LMF to the serving gNB that exceeds RedCap UE bandwidth implies configuration of SRS for positioning with Tx FH configuration)

|  |  |  |  |
| --- | --- | --- | --- |
| Existing | In addition to current description in 38.455:For a RedCap UE with Tx FH capability, a request on bandwidth for SRS for positioning from the LMF to the serving gNB that exceeds RedCap UE bandwidth implies configuration of SRS for positioning with Tx FH configuration | Ref.: Bandwidth in 9.2.27 (38.455) | Bandwidth in (9.2.27) Requested SRS Transmission Characteristics |

If a request bandwidth within the *Requested SRS Transmission Characteristics* IE in the POSITIONING INFORMATION REQUEST message exceeds RedCap UE bandwidth, the NG-RAN node may take this information into account for configuring SRS transmissions for positioning with Tx FH configuration, and provide *Tx Hopping Config* IE in the *Positioning SRS Resource* IE in the POSITIONING INFORMATION RESPONSE message.

**Proposal x: Introduce a new *Tx Hopping Configuration* IE in the *Positioning SRS Resource* IE that is aligned with RRC (TxHoppingConfig-r18). [0223][0333]**

**Proposal x: Introduce a new *SRS Periodicity* IE which can be reused within the *Requested SRS Transmission Characteristics* IE, *Positioning SRS Resource* IE, and *Tx Hopping Configuration* IE (in alignment with RRC). [0333]**

9.2.z2 Tx Hopping Configuration

This information element indicates the Tx hopping configuration.

| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| --- | --- | --- | --- | --- |
| Overlap Value | M |  | ENUMERATED(rb0, rb1, rb2, rb4) |  |
| Number of Hops | M |  | INTEGER(1..6) |  |
| **Slot Offset for Remaining Hops List** |  | *1* |  |  |
| **>Slot Offset for Remaining Hops Item** |  | *1..<maxnoofHopsMinusOne>* |  |  |
| >>CHOICE *slot offset remaining hops* | M |  |  |  |
| >>>*aperiodic* |  |  |  |  |
| >>>>Slot Offset | O |  | INTEGER(1..32) |  |
| >>>>Start Position | O |  | INTEGER(0..13) |  |
| *>>>semi-persistent* |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.z1 |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) |  |
| *>>>periodic* |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.z1 |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) |  |

| **Range bound** | **Explanation** |
| --- | --- |
| maxnoofHopsMinusOne | Maximum no of hops that can be configured for positioning SRS transmission minus one. Value is 5. |

On the TRP measurement report,

Agreement
For measurements based on DL PRS with Rx frequency hopping or UL SRS with Tx hopping:
- UE/gNB can report either a single-hop or multi-hops measurement.
- Indication of which of a single-hop or multi-hops measurement is optionally reported.

**Proposal x: Add new IE to indicate the either a single-hop or multi-hops measurement. Define it as**

 **as ENUMERATED (singleHop, multiHop, …), or indicate whether its multi Hop measurement?**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| >Multi Hop measurement | O |  | ENUMERATED(true, …) |  |  |  |

To satisfy the requirement of RAN1, the report should indicate which of a single-hop or multi-hops measurement is optionally reported.

**Proposal x: optionally indicate which hop(s) measurement is based, bitmap could be used to indicate the hops.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| >Measurement Hop Indicator | O |  | BIT STRING (SIZE(6)) | Each position in the bitmap represents which of a single-hop or multi-hops the measured result is based:1st bit: 1st Hop;2nd bit: 2nd Hop;And so on. |  |  |

## BL CR Updates/Corrections

Issue 1: miss of IE ID for additional path

In the NRPPa BL CR, id-ReportingGranularitykminus1 and id-ReportingGranularitykminus2 are wrongly used for *Additional Path List* and *Extended Additional Path List.* New IE IDs should be defined separately, e.g. id-ReportingGranularitykminus1/2 for the *Additional Path List* and *Extended Additional Path List*. In the TP， corresponding changes are provided, as below:

 id-ReportingGranularitykminus1,

 id-ReportingGranularitykminus2,

 id-ReportingGranularitykminus1AdditionalPath,

 id-ReportingGranularitykminus2AdditionalPath,

RelativePathDelay ::= CHOICE {

 k0 INTEGER(0..16351),

 k1 INTEGER(0..8176),

 k2 INTEGER(0..4088),

 k3 INTEGER(0..2044),

 k4 INTEGER(0..1022),

 k5 INTEGER(0..511),

 choice-Extension ProtocolIE-Single-Container { { RelativePathDelay-ExtIEs} }

}

RelativePathDelay-ExtIEs NRPPA-PROTOCOL-IES ::= {

 {ID id-ReportingGranularitykminus1AdditionalPath CRITICALITY ignore TYPE ReportingGranularitykminus1AdditionalPath PRESENCE mandatory}|

 {ID id-ReportingGranularitykminus2AdditionalPath CRITICALITY ignore TYPE ReportingGranularitykminus2AdditionalPath PRESENCE mandatory},

 ...

}

**Proposal x: The IE IDs are missed for the IE *Additional Path List* and *Extended Additional Path List* in the BL CR, it should be added, e.g. id-ReportingGranularitykminus1AdditionalPath. (it’s included in the NRPPa TP of 0223)**

Issue 2: miss of UL RSCP in TRP Measurement Type

Another issue is the code-point for UL RSCP is missed in TRP Measurement Type, which should be fixed to align with F1AP BL CR.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| >>TRP Measurement Type | M |  | ENUMERATED (gNB-RxTxTimeDiff, UL-SRS-RSRP, UL-AoA, UL-RTOA,…, Multiple UL-AoA, UL SRS-RSRPP, UL-RSCP) | If UL-RSCP measurement is requested, gNB Rx-Tx Time Difference or UL-RTOA measurement must also be requested. | - |  |

**Proposal x: Add enumerated value UL RSCP for TRP Measurement Type, both tabular and ASN.1. (TP in Annex D of 0094 should be taken)**

Issue 3: NR UL SRS for Positioning BW Aggregation (section 2.2 in 0094)

Issue 4: NR DL PRS BW Aggregation (section 2.3 in 0094)

Issue 6: Simultaneous scheduling and their measurement of SRS for positioning from a target UE and PRU for UL CPP, UL-TDOA, multi-RTT (section 2.5 in 0094)

🡺Companies are encouraged to carefully check the potential issues and corresponding update in 0094.

# 2. Reference

1. R3-240035 (BL CR to 38.413) Support of NR Positioning Enhancements (ZTE, CATT, Huawei, Nokia, Nokia Shanghai Bell, Ericsson)
2. R3-240036 (BL CR to 38.423) Support of NR Positioning Enhancements (Huawei, CATT, ZTE, Nokia, Nokia Shanghai Bell, Ericsson)
3. R3-240037 (BL CR to 38.455) Support of NR Positioning Enhancements (CATT, Huawei, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi, Samsung, China Telecom)
4. R3-240038 Support of NR Positioning Enhancements (Ericsson, CATT, Huawei, ZTE, Nokia, Nokia Shanghai Bell, Xiaomi, Samsung)
5. R3-240039 (BL CR to TS 38.470) Support of NR Positioning Enhancements (Samsung, Huawei, CATT, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi)
6. R3-240040 (BL CR to TS 38.305) Support of NR Positioning Enhancements (Nokia, Nokia Shanghai Bell, CATT, Huawei, Ericsson, Xiaomi, ZTE, Samsung)
7. R3-240540 (TP to 38.455 etc ) Discussion on SRS Reservation Procedure (Huawei)
8. R3-240331 (TP for TS 38.455 BL CR) Coordination of area-specific SRS (Nokia, Nokia Shanghai Bell)
9. R3-240575 (TP to NRPPa BL CR) Addressing remaining LPHAP outstanding issues (Ericsson)
10. R3-240293 (TP for 38.455) Support of LPHAP (Xiaomi)
11. R3-240524 (TP to BL 38.305) Support of LPHAP (Xiaomi)
12. R3-240238 Remaining issues on LPHAP (Samsung)
13. R3-240239 TP for BLCR to 38.470 on LPHAP (Samsung)
14. R3-240222 (TP to BL CR for TS 38.455, 38.423, 38.305) On remaining issues for LPHAP (CATT)
15. R3-240597 Discussion on remaining issue on LPHAP (ZTE)
16. R3-240007 Reply LS on CPP (RAN1(CATT))
17. R3-240009 LS on the request for specific SL PRS resource characteristic(s)/SL-PRS resource configuration (RAN1(Qualcomm))
18. R3-240041 LS on coverage condition for Ranging/Sidelink Positioning (SA2(ZTE))
19. R3-240518 [TP to 38.455 & 38.473] LMF involvement in SL positioning (ZTE)
20. R3-240294 (TP for 38.455) Support of Sidelink Positioning (Xiaomi)
21. R3-240576 (TP for F1AP BL CR) Support of Sidelink Positioning (Ericsson, Xiaomi)
22. R3-240240 Remaining issues on SL-PRS resource allocation (Samsung)
23. R3-240541 (TP to BL 38.423 etc ) Discussion on SL Positioning (Huawei)
24. R3-240224 (TP to BL CR for TS 38.455) SL Positioning and BW aggregation (CATT)
25. R3-240223 (TP to BL CR for TS 38.455) Support of Redcap Positioning (CATT)
26. R3-240332 (TP for TS 38.455 BL CR) Resolution of open issues for BW aggregation and RedCap UEs (Nokia, Nokia Shanghai Bell)
27. R3-240333 (TP for TS 38.473 BL CR) F1AP updates for NR positioning (Nokia, Nokia Shanghai Bell)
28. R3-240577 Support of RedCap Positioning (Ericsson)
29. R3-240542 (TP to 38.455 etc.) Discussion on Redcap positioning (Huawei)
30. R3-240519 [TP to 38.455 & 38.473] Bandwidth Aggregation (ZTE)
31. R3-240094 [TPs to BL CR for TS38.305, 38.455] Various Corrections to NR Positioning Enhancements (Qualcomm Incorporated)