**3GPP TSG-RAN WG3 Meeting#108-e R3-204299**

**1 – 12 June 2020**

**Agenda item:** 19.2.1.3

**Source:** Qualcomm Incorporated

**Title:** (TP to BL CR#0008 / 38.455 on NR Positioning) Addition of UL SRS Activation and Deactivation Procedures

**Document for:** Discussion and Agreement

1. Introduction

This TP provides new NRPPa procedures to support this request from RAN2.

**Proposal 1:** **A new Class 1 NRPPa procedure to support UL-SRS Activation and a new Class 2 NRPPa procedure to support UL-SRS Deactivation should be added to NRPPa to extend the Positioning Information Transfer function.**

2. Appendix / Text Proposal

**START OF CHANGES**

# 7 Functions of NRPPa

The NRPPa protocol provides the following functions:

- E-CID Location Information Transfer. This function allows the NG-RAN node to exchange location information with LMF for the purpose of E-CID positioning.

- OTDOA Information Transfer. This function allows the NG-RAN node to exchange information with the LMF for the purpose of OTDOA positioning.

- Reporting of General Error Situations. This function allows reporting of general error situations, for which function specific error messages have not been defined.

- Positioning Information Transfer. This function allows the NG-RAN node to exchange positioning information with the LMF for the purpose of positioning.

- Measurement Information Transfer. This function allows the LMF to exchange measurement information with the NG-RAN node for the purpose of positioning.

- TRP Information Transfer. This function allows an LMF to obtain TRP related information from an NG-RAN node.

The mapping between the above functions and NRPPa EPs is shown in the table below.

Table 7-1: Mapping between NRPPa functions and NRPPa EPs

| Function | Elementary Procedure(s) |
| --- | --- |
| E-CID Location Information Transfer | a) E-CID Measurement Initiation  b) E-CID Measurement Failure Indication  c) E-CID Measurement Report  d) E-CID Measurement Termination |
| OTDOA Information Transfer | OTDOA Information Exchange |
| Assistance Information Transfer | a) Assistance Information Control  b) Assistance Information Feedback |
| Reporting of General Error Situations | Error Indication |
| Positioning Information Transfer | a) Positioning Information Exchange  b) Positioning Information Update  c) Positioning Activation  d) Positioning Deactivation |
| TRP Information Transfer | TRP Information Exchange |
| Measurement Information Transfer | a) Measurement  b) Measurement Update  c) Measurement Report  d) Measurement Abort  e) Measurement Failure Indication |

**NEXT CHANGE**

## 8.1 Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs.

[Editor’s Notes: procedures and associated functions require further checking

It is also FFS if all the measurements should be aimed at specific TRPs or not]

Table 8.1-1: Class 1 Elementary Procedures

| Elementary Procedure | Initiating Message | Successful Outcome | Unsuccessful Outcome | |
| --- | --- | --- | --- | --- |
| Response message | Response message | |
| E-CID Measurement Initiation | E-CID MEASUREMENT INITIATION REQUEST | E-CID MEASUREMENT INITIATION RESPONSE | E-CID MEASUREMENT INITIATION FAILURE |
| OTDOA Information Exchange | OTDOA INFORMATION REQUEST | OTDOA INFORMATION RESPONSE | OTDOA INFORMATION FAILURE |
| Positioning Information Exchange | POSITIONING INFORMATION REQUEST | POSITIONING INFORMATION RESPONSE | POSITIONING INFORMATION FAILURE |
| TRP Information Exchange | TRP INFORMATION REQUEST | TRP INFORMATION RESPONSE | TRP INFORMATION FAILURE |
| Measurement | MEASUREMENT REQUEST | MEASUREMENT RESPONSE | MEASUREMENT FAILURE |
| Positioning Activation | POSITIONING ACTIVATION REQUEST | POSITIONING ACTIVATION RESPONSE | POSITIONING ACTIVATION  FAILURE |

Table 8.1-2: Class 2 Elementary Procedures

| Elementary Procedure | Initiating Message |
| --- | --- |
| E-CID Measurement Failure Indication | E-CID MEASUREMENT FAILURE INDICATION |
| E-CID Measurement Report | E-CID MEASUREMENT REPORT |
| E-CID Measurement Termination | E-CID MEASUREMENT TERMINATION COMMAND |
| Error Indication | ERROR INDICATION |
| Assistance Information Control | ASSISTANCE INFORMATION CONTROL |
| Assistance Information Feedback | ASSISTANCE INFORMATION FEEDBACK |
| Positioning Information Update | POSITIONING INFORMATION UPDATE |
| Measurement Report | MEASUREMENT REPORT |
| Measurement Update | MEASUREMENT UPDATE |
| Measurement Abort | MEASUREMENT ABORT |
| Measurement Failure Indication | MEASUREMENT FAILURE INDICATION |
| Positioning Deactivation | POSITIONING DEACTIVATION |

[Editor’s Note: further procedural details are FFS]

**NEXT CHANGE**

### 8.2.q Positioning Activation

#### 8.2.q.1 General

The Positioning Activation procedure is initiated by the LMF to request the NG-RAN NODE to activate semi-persistent or trigger aperiodic UL SRS transmission by the UE.

#### 8.2.q.2 Successful Operation



Figure 8.2.q.2-1: Positioning Activation procedure, successful operation

The LMF initiates the procedure by sending a POSITIONING ACTIVATION REQUEST message to the NG-RAN node.

The message includes an indication of the UL SRS resource set to be activated. For semi-persistent UL SRS, the message also indicates the spatial relation for the semi-persistent UL SRS resource to be activated.

Following successful activation of UL SRS transmission in the UE, the NG-RAN node shall respond with a POSITIONING ACTIVATION RESPONSE message.

#### 8.2.q.3 Unsuccessful Operation



Figure 8.2.q.3-1: Positioning Activation procedure, unsuccessful operation

If the NG-RAN node is unable to activate UL SRS transmission in the UE, it shall respond with a POSITIONING ACTIVATION FAILURE message.

#### 8.2.q.4 Abnormal Conditions

Void.

### 8.2.r Positioning Deactivation

#### 8.2.r.1 General

The Positioning Deactivation procedure is initiated by the LMF to indicate to the NG-RAN node that UL SRS transmission should be deactivated in the UE.

#### 8.2.r.2 Successful Operation



Figure 8.2.y.2-1: Positioning Deactivation procedure, successful operation

The LMF initiates the procedure by sending a POSITIONING DEACTIVATION message to the NG-RAN node. This message shall include an indication of the UL SRS resource set to be deactivated.

#### 8.2.y.3 Unsuccessful Operation

Not Applicable.

#### 8.2.y.4 Abnormal Conditions

Void.

**NEXT CHANGE**

#### 9.1.1.d1 POSITIONING ACTIVATION REQUEST

This message is sent by the LMF to cause the NG RAN node to activate/trigger UL SRS transmission by the UE.

Direction: LMF → NG-RAN node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | YES | reject |
| CHOICE *SRS type* |  |  |  |  | YES | reject |
| **>Semi-persistent** |  |  |  |  |  |  |
| >>SRS Resource Set ID | M (FFS) |  | 9.2.y1 |  | YES | reject |
| >>SRS Spatial Relation | O |  | 9.2.y2 |  | YES | ignore |
| **>Aperiodic** |  |  |  |  |  |  |
| >>SRS Resource Trigger | M |  | 9.2.y3 |  | YES | reject |
| Activation Time | O |  | 9.2.y4 |  | YES | ignore |

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

#### 9.1.1.d2 POSITIONING ACTIVATION RESPONSE

This message is sent by NG-RAN node to confirm successful UL SRS activation in the UE.

Direction: NG-RAN node → LMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

#### 9.1.1.d3 POSITIONING ACTIVATION FAILURE

This message is sent by NG-RAN node to indicate that activation of UL SRS transmission in the UE was unsuccessful.

Direction: NG-RAN node → LMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

#### 9.1.1.d4 POSITIONING DEACTIVATION

This message is sent by the LMF to cause the NG RAN node to deactivate UL SRS transmission by the UE.

Direction: LMF → NG-RAN node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| SRS Resource Set ID | M |  | 9.2.y1 |  | YES | Ignore |

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

**NEXT CHANGE**

### 9.2.y1 SRS Resource Set ID

This information element indicates a resource set in the UE for UL SRS transmission.

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Positioning SRS Resource Set ID | M |  | INTEGER (0..15) | According to TS 38.331 [x] |

### 9.2.y2 SRS Spatial Relation

This information element indicates a spatial relation for transmission if UL SRS by a UE.

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Spatial Relation for Resource IDi** |  | *1..<maxnoSpatialRelations>* |  | According to TS 38.321 [y] |
| CHOICE *Reference Signal* | M |  |  |  |
| >*NZP CSI-RS* |  |  |  |  |
| >>NZP CSI-RS Resource ID | M |  | INTEGER (0..191) |  |
| >*SSB* |  |  |  |  |
| >>PCI | M |  | INTEGER (0..1007) |  |
| >>SSB Index | M |  | INTEGER (0..63) |  |
| >*SRS* |  |  |  |  |
| >>SRS Resource ID | M |  | INTEGER (0..63) |  |
| >*Positioning SRS* |  |  |  |  |
| >>SRS Pos Resource ID | M |  | INTEGER (0..63) |  |
| >*DL-PRS* |  |  |  |  |
| >>DL-PRS ID | M |  | INTEGER (0..255) |  |
| >>DL-PRS Resource Set ID | M |  | INTEGER (0..7) |  |
| >>DL PRS Resource ID | O |  | INTEGER (0..63) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoSpatialRelations | Maximum no. of Spatial Relations that can be configured. Value is 64. |

### 9.2.y3 SRS Resource Trigger

This information element indicates a DCI code point according to a SRS resource set configuration.

[Editor’s Note: further details on the IEs are FFS / pending RAN2]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Aperiodic SRS Resource Trigger List** |  | *1..<maxnoSRS-TriggerStates>* |  | According to TS 38.331 [x] |
| >Aperiodic SRS Resource Trigger |  |  | INTEGER (1..3) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoSRSTriggerStates | Maximum no. of SRS trigger states. Value is 3. |

### 9.2.y4 Activation Time

This information element indicates the start time when the SRS activation is requested.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SFN initialization time | M |  | BIT STRING (64) |  |

**END OF CHANGES**

### 9.3.3 Elementary Procedure Definitions

[Editor’s Note: the asn.1 below is FFS, pending to the IE contents and RAN2 progress mentioned in the above editor’s notes]

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedure definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

NRPPA-PDU-Descriptions {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) nrppa (4) version1 (1) nrppa-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

Criticality,

ProcedureCode,

NRPPATransactionID

FROM NRPPA-CommonDataTypes

ErrorIndication,

PrivateMessage,

E-CIDMeasurementInitiationRequest,

E-CIDMeasurementInitiationResponse,

E-CIDMeasurementInitiationFailure,

E-CIDMeasurementFailureIndication,

E-CIDMeasurementReport,

E-CIDMeasurementTerminationCommand,

OTDOAInformationRequest,

OTDOAInformationResponse,

OTDOAInformationFailure,

AssistanceInformationControl,

AssistanceInformationFeedback,

PositioningInformationRequest,

PositioningInformationResponse,

PositioningInformationFailure,

PositioningInformationUpdate,

MeasurementRequest,

MeasurementResponse,

MeasurementFailure,

MeasurementReport,

MeasurementUpdate,

MeasurementAbort,

MeasurementFailureIndication,

TRPInformationRequest,

TRPInformationResponse,

TRPInformationFailure,

Positioning Activation,

PositioningDeactivation

FROM NRPPA-PDU-Contents

id-errorIndication,

id-privateMessage,

id-e-CIDMeasurementInitiation,

id-e-CIDMeasurementFailureIndication,

id-e-CIDMeasurementReport,

id-e-CIDMeasurementTermination,

id-oTDOAInformationExchange,

id-assistanceInformationControl,

id-assistanceInformationFeedback,

id-positioningInformationExchange,

id-positioningInformationUpdate,

id-Measurement,

id-MeasurementReport,

id-MeasurementUpdate,

id-MeasurementAbort,

id-MeasurementFailureIndication,

id-tRPInformationExchange,

id-positioning Activation,

id-positioningDeactivation

\*\*\* skip unchanged asn \*\*\*

NRPPA-ELEMENTARY-PROCEDURES NRPPA-ELEMENTARY-PROCEDURE ::= {

NRPPA-ELEMENTARY-PROCEDURES-CLASS-1 |

NRPPA-ELEMENTARY-PROCEDURES-CLASS-2 ,

...

}

NRPPA-ELEMENTARY-PROCEDURES-CLASS-1 NRPPA-ELEMENTARY-PROCEDURE ::= {

e-CIDMeasurementInitiation |

oTDOAInformationExchange |

positioningInformationExchange |

measurement |

tRPInformationExchange |

positioningActivation,

...

}

NRPPA-ELEMENTARY-PROCEDURES-CLASS-2 NRPPA-ELEMENTARY-PROCEDURE ::= {

e-CIDMeasurementFailureIndication |

e-CIDMeasurementReport |

e-CIDMeasurementTermination |

errorIndication |

privateMessage |

assistanceInformationControl |

assistanceInformationFeedback |

positioningInformationUpdate |

measurementReport |

measurementUpdate |

measurementAbort |

measurementFailureIndication |

positioningDeactivation,

...

}

\*\*\* skip unchanged asn \*\*\*

measurementAbort NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementAbort

PROCEDURE CODE id-MeasurementAbort

CRITICALITY ignore

}

measurementFailureIndication NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementFailureIndication

PROCEDURE CODE id-MeasurementFailureIndication

CRITICALITY ignore

}

tRPInformationExchange NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE TRPInformationRequest

SUCCESSFUL OUTCOME TRPInformationResponse

UNSUCCESSFUL OUTCOME TRPInformationFailure

PROCEDURE CODE id-tRPInformationExchange

CRITICALITY reject

}

positioningActivation NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PositioningActivationRequest

SUCCESSFUL OUTCOME PositioningActivationResponse

UNSUCCESSFUL OUTCOME PositioningActivationFailure

PROCEDURE CODE id-positioningActivation

CRITICALITY reject

}

positioningDeactivation NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PositioningDeactivation

PROCEDURE CODE id-positioningDeactivation

CRITICALITY ignore

}

END

-- ASN1STOP

### 9.3.4 PDU Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PDU definitions for NRPPa.

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\* skip unchanged asn \*\*\*

IMPORTS

Cause,

CriticalityDiagnostics,

E-CID-MeasurementResult,

OTDOACells,

OTDOA-Information-Item,

Measurement-ID,

MeasurementPeriodicity,

MeasurementQuantities,

ReportCharacteristics,

RequestedSRSTransmissionCharacteristics,

Cell-Portion-ID,

OtherRATMeasurementQuantities,

OtherRATMeasurementResult,

WLANMeasurementQuantities,

WLANMeasurementResult,

Assistance-Information,

Broadcast,

AssistanceInformationFailureList,

SRSConfiguration,

MeasurementQuantities,

TRPMeasurementResult,

TRP-ID,

TRPInformationType,

TRPInformationList

FROM NRPPA-IEs

PrivateIE-Container{},

ProtocolExtensionContainer{},

ProtocolIE-Container{},

ProtocolIE-ContainerList{},

ProtocolIE-Single-Container{},

NRPPA-PRIVATE-IES,

NRPPA-PROTOCOL-EXTENSION,

NRPPA-PROTOCOL-IES

FROM NRPPA-Containers

maxnoOTDOAtypes,

id-Cause,

id-CriticalityDiagnostics,

id-LMF-UE-Measurement-ID,

id-OTDOACells,

id-OTDOA-Information-Type-Group,

id-OTDOA-Information-Type-Item,

id-ReportCharacteristics,

id-MeasurementPeriodicity,

id-MeasurementQuantities,

id-RAN-UE-Measurement-ID,

id-E-CID-MeasurementResult,

id-RequestedSRSTransmissionCharacteristics,

id-Cell-Portion-ID,

id-OtherRATMeasurementQuantities,

id-OtherRATMeasurementResult,

id-WLANMeasurementQuantities,

id-WLANMeasurementResult,

id-Assistance-Information,

id-Broadcast,

id-AssistanceInformationFailureList,

id-SRSConfiguration,

id-MeasurementQuantities,

id-MeasurementResult,

id-TRP-ID,

id-TRPInformationType,

id-TRPInformationList

\*\*\* skip unchanged asn \*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- TRP INFORMATION FAILURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

TRPInformationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{TRPInformationFailure-IEs}},

...

}

TRPInformationFailure-IEs NRPPA-PROTOCOL-IES ::= {

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

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- POSITONING ACTIVATION PROCEDURE

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Positioning Activation Request

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PositioningActivationRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningActivationRequestIEs} },

...

}

PositioningActivationRequestIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory } |

{ ID id-SRSType CRITICALITY reject TYPE SRSType PRESENCE mandatory }

{ ID id-ActivationTime CRITICALITY reject TYPE ActivationTime PRESENCE mandatory },

...

}

SRSType ::= CHOICE {

semipersistentSRS SemipersistentSRS,

aperiodicSRS AperiodicSRS,

choice-extension ProtocolIE-SingleContainer { { SRSType-ExtIEs} }

}

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

...

}

SemipersistentSRS ::= SEQUENCE {

sRSResourceSetID SRSResourceSetID,

sRSSpatialRelation SRSSpatialRelation,

iE-Extensions ProtocolExtensionContainer { {SemipersistentSRS-ExtIEs} } OPTIONAL,

...

}

SemipersistentSRS-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

AperiodicSRS ::= SEQUENCE {

sRSResourceTrigger SRSResourceTrigger,

iE-Extensions ProtocolExtensionContainer { {AperiodicSRS-ExtIEs} } OPTIONAL,

...

}

AperiodicSRS-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Positioning Activation Response

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PositioningActivationResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningActivationResponseIEs} },

...

}

PositioningActivationResponseIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Positioning Activation Failure

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

PositioningActivationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningActivationFailureIEs} },

...

}

PositioningActivationFailureIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

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

{ ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

...

}

END

-- ASN1STOP

### 9.3.5 Information Element definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Information Element Definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\* skip unchanged asn \*\*\*

id-MeasurementQuantities-Item,

maxCellinRANnode,

maxCellReport,

maxNrOfErrors,

maxNoMeas,

maxnoOTDOAtypes,

maxServCell,

id-OtherRATMeasurementQuantities-Item,

id-WLANMeasurementQuantities-Item,

maxGERANMeas,

maxUTRANMeas,

maxWLANchannels,

maxnoFreqHoppingBandsMinusOne,

id-TDD-Config-EUTRA-Item,

maxNrOfPosSImessage,

maxnoAssistInfoFailureListItems,

maxNrOfSegments,

maxNrOfPosSIBs,

maxnoMeas,

maxnoTRPs,

maxnoTRPInfoTypes,

maxNoOfMeasTRPs,

maxNoPath,

maxnoSRSTriggerStates,

maxnoSpatialRelations

FROM NGAP-Constants

\*\*\* skip unchanged asn \*\*\*

-- A

-- Editor’s Note: Details of the following IEs are FFS pending RAN2 progress

ActivationTime ::= BIT STRING (SIZE (64))

AdditionalPathLoss ::= SEQUENCE (SIZE (1.. maxNoPath)) OF AdditionalPathLossItem

AdditionalPathLossItem ::= SEQUENCE {

relativeTimeOfPath FFS,

pathQuality FFS OPTIONAL,

...

}

AperiodicSRSResourceTriggerList ::= SEQUENCE (SIZE(1..maxnoSRSTriggerStates)) OF AperiodicSRSResourceTrigger

AperiodicSRSResourceTrigger ::= INTEGER (0..3, ...)

\*\*\* skip unchanged asn \*\*\*

-- D

DL-Bandwidth-EUTRA ::= ENUMERATED {

bw6,

bw15,

bw25,

bw50,

bw75,

bw100,

...

}

DL-PRS ::= SEQUENCE {

prsid INTEGER (0..255),

dl-PRSResourceSetID INTEGER (0..7),

dl-PRSResourceID INTEGER (0..63) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { {DL-PRS-ExtIEs} } OPTIONAL,

...

}

DL-PRS-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

\*\*\* skip unchanged asn \*\*\*

NumberOfFrequencyHoppingBands ::= ENUMERATED {

twobands,

fourbands,

...

}

NZP-CSI-RS-ResourceID::= INTEGER (0..191, ...)

-- O

\*\*\* skip unchanged asn \*\*\*

-- R

ReferenceSignal ::= CHOICE {

nZP-CSI-RS NZP-CSI-RS-ResourceID,

sSB SSB,

sRS SRSResourceID,

positioningSRS SRSPosResourceID,

dL-PRS DL-PRS,

ReferenceSignal-Extension ProtocolIE-Single-Container {{ReferenceSignal-ExtensionIE }}

}

ReferenceSignal-ExtensionIE NRPPA-PROTOCOL-IES ::= {

...

}

\*\*\* skip unchanged asn \*\*\*

-- S

SRSConfiguration ::= SEQUENCE {

-- IE contents are FFS pending RAN2

...

}

SFNInitialisationTime-EUTRA ::= BIT STRING (SIZE (64))

SpatialDirectionInformation ::= SEQUENCE {

-- IE contents are FFS pending RAN2

...

}

SpatialRelationforResourceID ::= SEQUENCE (SIZE(1..maxnoSpatialRelations)) OF ReferenceSignal

SRSPosResourceID ::= INTEGER (0..63, ...)

SRSResourceID ::= INTEGER (0..63, ...)

SRSResourceSetID ::= INTEGER (0..15, ...)

SRSResourceTrigger ::= SEQUENCE {

aperiodicSRSResourceTriggerList AperiodicSRSResourceTriggerList,

iE-Extensions ProtocolExtensionContainer { {SRSResourceTrigger-ExtIEs} } OPTIONAL,

...

}

SRSResourceTrigger-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

SRSSpatialRelation ::= SEQUENCE {

spatialRelationforResourceID SpatialRelationforResourceID,

iE-Extensions ProtocolExtensionContainer { {SRSSpatialRelation-ExtIEs} } OPTIONAL,

...

}

SRSSpatialRelation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

SRSSpatialRelation-ExtensionIE NRPPA-PROTOCOL-IES ::= {

...

}

SSB ::= SEQUENCE {

pCI-NR INTEGER (0..1007),

ssb-index INTEGER (0..63),

iE-Extensions ProtocolExtensionContainer { {SSB-ExtIEs} } OPTIONAL,

...

}

SSB-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

SSBConfiguration ::= SEQUENCE {

-- IE contents are FFS pending RAN2

...

}

SSID ::= OCTET STRING (SIZE(1..32))

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

NRPPA-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) nrppa (4) version1 (1) nrppa-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

ProcedureCode,

ProtocolIE-ID

FROM NRPPA-CommonDataTypes;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedures

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-errorIndication ProcedureCode ::= 0

id-privateMessage ProcedureCode ::= 1

id-e-CIDMeasurementInitiation ProcedureCode ::= 2

id-e-CIDMeasurementFailureIndication ProcedureCode ::= 3

id-e-CIDMeasurementReport ProcedureCode ::= 4

id-e-CIDMeasurementTermination ProcedureCode ::= 5

id-oTDOAInformationExchange ProcedureCode ::= 6

id-assistanceInformationControl ProcedureCode ::= a

id-assistanceInformationFeedback ProcedureCode ::= b

id-positioningInformationExchange ProcedureCode ::= c

id-positioningInformationUpdate ProcedureCode ::= d

id-Measurement ProcedureCode ::= e

id-MeasurementReport ProcedureCode ::= f

id-MeasurementUpdate ProcedureCode ::= g

id-MeasurementAbort ProcedureCode ::= h

id-MeasurementFailureIndication ProcedureCode ::= i

id-tRPInformationExchange ProcedureCode ::= j

id-positioningActivation ProcedureCode ::= k

id-positioningDeactivation ProcedureCode ::= l

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Lists

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxNrOfErrors INTEGER ::= 256

maxCellinRANnode INTEGER ::= 3840

maxNoMeas INTEGER ::= 63

maxNoPath INTEGER ::= 2

maxCellReport INTEGER ::= 9

maxnoOTDOAtypes INTEGER ::= 63

maxServCell INTEGER ::= 5

maxGERANMeas INTEGER ::= 8

maxUTRANMeas INTEGER ::= 8

maxWLANchannels INTEGER ::= 16

maxnoFreqHoppingBandsMinusOne INTEGER ::= 7

maxNrOfPosSImessage INTEGER ::= 32

maxnoAssistInfoFailureListItems INTEGER ::= 32

maxNrOfSegments INTEGER ::= 64

maxNrOfPosSIBs INTEGER ::= 32

maxnoMeas INTEGER ::= 999 -- dummy value, real value is FFS

maxNoOfMeasTRPs INTEGER ::= 16

maxnoTRPs INTEGER ::= 16384

maxnoTRPInfoTypes INTEGER ::= 999 -- dummy value, real value is FFS

maxnoSRSTriggerStates INTEGER ::= 3

maxnoSpatialRelations INTEGER ::= 64

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IEs

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-Cause ProtocolIE-ID ::= 0

id-CriticalityDiagnostics ProtocolIE-ID ::= 1

id-LMF-UE-Measurement-ID ProtocolIE-ID ::= 2

id-ReportCharacteristics ProtocolIE-ID ::= 3

id-MeasurementPeriodicity ProtocolIE-ID ::= 4

id-MeasurementQuantities ProtocolIE-ID ::= 5

id-RAN-UE-Measurement-ID ProtocolIE-ID ::= 6

id-E-CID-MeasurementResult ProtocolIE-ID ::= 7

id-OTDOACells ProtocolIE-ID ::= 8

id-OTDOA-Information-Type-Group ProtocolIE-ID ::= 9

id-OTDOA-Information-Type-Item ProtocolIE-ID ::= 10

id-MeasurementQuantities-Item ProtocolIE-ID ::= 11

id-RequestedSRSTransmissionCharacteristics ProtocolIE-ID ::= 12

id-Cell-Portion-ID ProtocolIE-ID ::= 14

id-OtherRATMeasurementQuantities ProtocolIE-ID ::= 15

id-OtherRATMeasurementQuantities-Item ProtocolIE-ID ::= 16

id-OtherRATMeasurementResult ProtocolIE-ID ::= 17

id-WLANMeasurementQuantities ProtocolIE-ID ::= 19

id-WLANMeasurementQuantities-Item ProtocolIE-ID ::= 20

id-WLANMeasurementResult ProtocolIE-ID ::= 21

id-TDD-Config-EUTRA-Item ProtocolIE-ID ::= 22

id-Assistance-Information ProtocolIE-ID ::= xx

id-Broadcast ProtocolIE-ID ::= xy

id-AssistanceInformationFailureList ProtocolIE-ID ::= xz

id-SRSConfiguration ProtocolIE-ID ::= yx

id-UL-RTOAMeasurement ProtocolIE-ID ::= yy

id-MeasurementResult ProtocolIE-ID ::= z5

id-TRP-ID ProtocolIE-ID ::= z1

id-TRPInformationType ProtocolIE-ID ::= z2

id-TRPInformationList ProtocolIE-ID ::= z3

id-SRSType ProtocolIE-ID ::= z4

id-ActivationTime ProtocolIE-ID ::= z5