**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 Initiationb) E-CID Measurement Failure Indicationc) E-CID Measurement Reportd) E-CID Measurement Termination |
| OTDOA Information Transfer | OTDOA Information Exchange |
| Assistance Information Transfer | a) Assistance Information Controlb) Assistance Information Feedback |
| Reporting of General Error Situations | Error Indication |
| Positioning Information Transfer | a) Positioning Information Exchangeb) Positioning Information Updatec) Positioning Activationd) Positioning Deactivation |
| TRP Information Transfer | TRP Information Exchange |
| Measurement Information Transfer | a) Measurementb) Measurement Updatec) Measurement Reportd) Measurement Aborte) 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