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NR Positioning Protocol A (NRPPa)

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** 

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# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# 1 Scope

The present document specifies the control plane radio network layer signalling procedures between a NG-RAN node and the LMF. NRPPa supports the concerned functions by signalling procedures defined in this document.

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.413:"NG-RAN; NG Application Protocol (NGAP)".

[3] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[4] Void.

[5] 3GPP TR 25.921 (version.7.0.0): "Guidelines and principles for protocol description and error handling".

[6] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER) ".

[7] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Base Station (BS) radio transmission and reception".

[8] 3GPP TS 23.032:"Technical Specification Group Services and System Aspects; Universal Geographical Area Description (GAD)".

[9] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".

[10] 3GPP TS 36.211:"Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Physical Channels and Modulation".

[11] IEEE Std 802.11™-2012, IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area network.

[12] 3GPP TS 36.455: " Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa)".

[13] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[14] 3GPP TS 37.355: " Technical Specification Group Radio Access Network; LTE Positioning Protocol (LPP)".

[15] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".

[16] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".

[17] 3GPP TS 36:214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer (PHY); Measurements".

[18] 3GPP TS 38.305: "NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN".

[19] 3GPP TS 38.215: "NR; Physical layer (PHY); Measurements".

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**gNB:** as defined in TS 38.300 [3].

**NG-RAN node:** as defined in TS 38.300 [3].

**ng-eNB:** as defined in TS 38.300 [3].

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ARP Antenna Reference Point

BDS BeiDou Navigation Satellite System

CG-SDT Configured Grant Small Data Transmission

CID Cell-ID (positioning method)

DL-PRS Downlink Positioning Reference Signal

E-CID Enhanced Cell-ID (positioning method)

EGNOS European Geostationary Navigation Overlay Service

GAGAN GPS Aided Geo Augmented Navigation

GLONASS GLObal'naya NAvigatsionnaya Sputnikovaya Sistema (Engl.: Global Navigation Satellite System

GNSS Global Navigation Satellite System

GPS Global Positioning System

LMF Location Management Function

LPP LTE Positioning Protocol

MSAS Multi-functional Satellite Augmentation System

NavIC NAVigation with Indian Constellation

NRPPa NR Positioning Protocol A

OTDOA Observed Time Difference of Arrival

posSIB Positioning SIB

PRS Positioning Reference Signal (for E-UTRA)

QZSS Quasi-Zenith Satellite System

RSRP Reference Signal Received Power

RSSI Received Signal Strength Indicator

RSTD Reference Signal Time Difference

SBAS Space Based Augmentation System

SRS Sounding Reference Signal

TEG Timing Error group

TRP Transmission-Reception Point

UE User Equipment

UL-AoA Uplink Angle of Arrival

UL-RTOA Uplink Relative Time of Arrival

UL-SRS Uplink Sounding Reference Signal

UL SRS-RSRPP UL SRS reference signal received path power

WAAS Wide Area Augmentation System

Z-AoA Zenith Angles of Arrival

# 4 General

## 4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating NG-RAN Node exactly and completely. Any rule that specifies the behaviour of the originating NG-RAN Node shall be possible to be verified with information that is visible within the system.

The following specification principles have been applied for the procedure text in clause 8:

- The procedure text discriminates between:

1) Functionality which "shall" be executed

The procedure text indicates that the receiving node "shall" perform a certain function Y under a certain condition. If the receiving node supports procedure X but cannot perform functionality Y requested in the initiating message of a Class 1 EP, the receiving node shall respond with the message used to report unsuccessful outcome for this procedure, containing an appropriate cause value.

2) Functionality which "shall, if supported" be executed

The procedure text indicates that the receiving node "shall, if supported," perform a certain function Y under a certain condition. If the receiving node supports procedure X, but does not support functionality Y, the receiving node shall proceed with the execution of the EP, possibly informing the requesting node about the not supported functionality.

- Any required inclusion of an optional IE in a response message is explicitly indicated in the procedure text. If the procedure text does not explicitly indicate that an optional IE shall be included in a response message, the optional IE shall not be included. For requirements on including *Criticality Diagnostics* IE, see section 10.

## 4.2 Forwards and backwards compatibility

The forwards and backwards compatibility of the protocol is assured by a mechanism where all current and future messages, and IEs or groups of related IEs, include ID and criticality fields that are coded in a standard format that will not be changed in the future. These parts can always be decoded regardless of the standard version.

## 4.3 Specification notations

For the purposes of the present document, the following notations apply:

Procedure When referring to an elementary procedure in the specification the Procedure Name is written with the first letters in each word in upper case characters followed by the word "procedure", e.g. Handover Preparation procedure.

Message When referring to a message in the specification the MESSAGE NAME is written with all letters in upper case characters followed by the word "message", e.g. ERROR INDICATION message.

IE When referring to an information element (IE) in the specification the *Information Element Name* is written with the first letters in each word in upper case characters and all letters in Italic font followed by the abbreviation "IE", e.g. *Cause* IE.

Value of an IE When referring to the value of an information element (IE) in the specification the "Value" is written as it is specified in sub clause 9.2 enclosed by quotation marks, e.g. "Value".

# 5 NRPPa services

The present clause describes the services an NG -RAN Node offers to the LMF.

## 5.1 NRPPa procedure modules

The procedures are divided into two modules as follows:

1. NRPPa Location Information Transfer Procedures;

2. NRPPa Management Procedures;

The NRPPa Location Information Transfer Procedures module contains procedures used to handle the transfer of positioning related information between NG-RAN Node and LMF.

The Management Procedures module contains procedures that are not related specifically to positioning, i.e. error handling.

## 5.2 Parallel transactions

Unless explicitly indicated in the procedure specification, at any instance in time one protocol peer may have more than one ongoing NRPPa procedure.

# 6 Services expected from lower layer

Within 5G RAN, NRPPaprotocol uses the services providedby the NGAP protocol. An NRPPa message is carried inside an NGAP message.

NGAP signalling is described in TS 38.413 [2].

# 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 and NR 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.

- Assistance Information Transfer. This function allows the LMF to exchange information with the NG-RAN node for the purpose of assistance information broadcasting.

- 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.

- PRS Information Transfer. This function allows the LMF to exchange PRS related information with the NG-RAN node.

- Measurement Preconfiguration Information Transfer. This function allows the LMF to request the NG-RAN node to preconfigure and activate measurement gap and/or PRS processing window.

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 |
| PRS Information Transfer | PRS Configuration Exchange |
| Measurement Preconfiguration Information Transfer | Measurement Preconfiguration  Measurement Activation |

# 8 NRPPa procedures

## 8.1 Elementary procedures

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

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 |
| PRS Configuration Exchange | PRS CONFIGURATION REQUEST | PRS CONFIGURATION RESPONSE | PRS CONFIGURATION FAILURE |
| Measurement Preconfiguration | MEASUREMENT PRECONFIGURATION REQUIRED | MEASUREMENT PRECONFIGURATION CONFIRM | MEASUREMENT PRECONFIGURATION REFUSE |

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 |
| Measurement Activation | MEASUREMENT ACTIVATION |

## 8.2 Location Information Transfer Procedures

### 8.2.1 E-CID Measurement Initiation

#### 8.2.1.1 General

The purpose of E-CID Measurement Initiation procedure is to allow the LMF to request the NG-RAN node to report E-CID measurements used by LMF to compute the location of the UE.

#### 8.2.1.2 Successful Operation



Figure 8.2.1.2-1: E-CID Measurement Initiation procedure, successful operation

The LMF initiates the procedure by sending an E-CID MEASUREMENT INITIATION REQUEST message. If the NG-RAN node is able to initiate the requested E-CID measurements, it shall reply with the E-CID MEASUREMENT INITIATION RESPONSE message.

The *Measured Results* IE shall be included in the *E-CID Measurement Result* IE of the E-CID MEASUREMENT INITIATION RESPONSE message when measurement results other than the "Cell-ID" have been requested.

If the *Report Characteristics* IE is set to "OnDemand", the NG-RAN node shall return the result of the measurement in the E-CID MEASUREMENT INITIATION RESPONSE message including, if available, the *NG-RAN Access Point Position* IE in the *E-CID Measurement Result* IE, and the LMF shall consider that the E-CID measurements for the UE has been terminated by the NG-RAN node. If available, the NG-RAN node shall include the *Cell Portion ID* IE in the E-CID MEASUREMENT INITIATION RESPONSE message. Upon reception of the *Cell Portion ID* IE, the LMF may use the value as the cell portion for the measurement. If the *Report Characteristics* IE is set to "OnDemand" and the *Inter-RAT Measurement Quantities* IE is included in the E-CID MEASUREMENT INITIATION REQUEST message, the NG-RAN node shall, if supported, provide the corresponding measurements, if available in the NG-RAN node, in the *Inter-RAT Measurement Result* IE in E-CID MEASUREMENT INITIATION RESPONSE message. If the *Report Characteristics* IE is set to "OnDemand" and the *WLAN Measurement Quantities* IE is included in the E-CID MEASUREMENT INITIATION REQUEST message, the NG-RAN node shall, if supported, provide the corresponding measurements, if available in the NG-RAN node, in the *WLAN Measurement Result* IE in E-CID MEASUREMENT INITIATION RESPONSE message.

If the *Report Characteristics* IE is set to "Periodic", the NG-RAN node shall initiate the requested measurements and shall reply with the E-CID MEASUREMENT INITIATION RESPONSE message without including either the *E-CID Measurement Result* IE or the *Cell Portion ID* IE in this message. The NG-RAN node shall then periodically initiate the E-CID Measurement Report procedure for the measurements, with the requested reporting periodicity.

#### 8.2.1.3 Unsuccessful Operation



Figure 8.2.1.3-1: E-CID Measurement Initiation procedure, unsuccessful operation

If the NG-RAN node is not able to initiate at least one of the requested E-CID measurements, the NG-RAN node shall respond with an E-CID MEASUREMENT INITIATION FAILURE message.

#### 8.2.1.4 Abnormal Conditions

Void.

### 8.2.2 E-CID Measurement Failure Indication

#### 8.2.2.1 General

The purpose of the E-CID Measurement Failure Indication procedure is for the NG-RAN node to notify the LMF that the E-CID measurements previously requested with the E-CID Measurement Initiation procedure can no longer be reported.

#### 8.2.2.2 Successful Operation



Figure 8.2.2.2-1: E-CID Measurement Failure Indication, successful operation

Upon reception of the E-CID MEASUREMENT FAILURE INDICATION message, the LMF shall consider that the E-CID measurements for the UE have been terminated by the NG-RAN node.

#### 8.2.2.3 Unsuccessful Operation

Not applicable.

#### 8.2.2.4 Abnormal Conditions

Void.

### 8.2.3 E-CID Measurement Report

#### 8.2.3.1 General

The purpose of E-CID Measurement Report procedure is for the NG-RAN node to provide the E-CID measurements for the UE to the LMF.

#### 8.2.3.2 Successful Operation



Figure 8.2.3.2-1: E-CID Measurement Report procedure, successful operation

The NG-RAN node initiates the procedure by sending an E-CID MEASUREMENT REPORT message. The E-CID MEASUREMENT REPORT message contains the E-CID measurement results according to the measurement configuration in the respective E-CID MEASUREMENT INITIATION REQUEST message.

The *Measured Results* IE shall be included in the *E-CID Measurement Result* IE of the E-CID MEASUREMENT REPORT message when measurement results other than the "Cell-ID" have been requested.

If available, the NG-RAN node shall include the *NG-RAN Access Point Position* IE or the *Geographical Coordinates* IE which is the configured estimated serving antenna position in the *E-CID Measurement Result* IE within the E-CID MEASUREMENT REPORT message. Upon reception of this *NG-RAN Access Point Position* IE, the LMF may use the value as the geographical position of the NG-RAN access point.

If available, the NG-RAN node shall include the *Cell Portion ID* IE in the E-CID MEASUREMENT REPORT message. Upon reception of the *Cell Portion ID* IE, the LMF may use the value as the cell portion for the measurement.

#### 8.2.3.3 Unsuccessful Operation

Not applicable.

#### 8.2.3.4 Abnormal Conditions

Void.

### 8.2.4 E-CID Measurement Termination

#### 8.2.4.1 General

The purpose of E-CID Measurement Termination procedure is to terminate periodical E-CID measurements for the UE performed by the NG-RAN node.

#### 8.2.4.2 Successful Operation



Figure 8.2.4.2-1: E-CID Measurement Termination procedure, successful operation

The LMF initiates the procedure by generating an E-CID MEASUREMENT TERMINATION COMMAND message.

#### 8.2.4.3 Unsuccessful Operation

Not applicable.

#### 8.2.4.4 Abnormal Conditions

Void.

### 8.2.5 OTDOA Information Exchange

#### 8.2.5.1 General

The purpose of the OTDOA Information Exchange procedure is to allow the LMF to request the NG-RAN node to transfer OTDOA information to the LMF.

#### 8.2.5.2 Successful Operation



Figure 8.2.5.2-1: OTDOA Information Exchange procedure, successful operation

The LMF initiates the procedure by sending an OTDOA INFORMATION REQUEST message. The NG-RAN node responds with OTDOA INFORMATION RESPONSE message that contains the available OTDOA information applicable to the relevant cells/TPs.

#### 8.2.5.3 Unsuccessful Operation



Figure 8.2.5.3-1: OTDOA Information Exchange procedure, unsuccessful operation

If the NG-RAN node does not have any OTDOA information to report, the NG-RAN node shall respond with an OTDOA INFORMATION FAILURE message.

#### 8.2.5.4 Abnormal Conditions

Void.

### 8.2.6 Positioning Information Exchange

#### 8.2.6.1 General

The Positioning Information Exchange procedure is initiated by the LMF to request to the NG-RAN node positioning information for the UE. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.6.2 Successful Operation



Figure 8.2.6.2-1: Positioning Information Exchange procedure, successful operation

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

If the *Requested SRS Transmission Characteristics* IE is included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node may take this information into account when configuring SRS transmissions for the UE, and it shall include the *SRS Configuration* IE and the *SFN Initialisation Time* IE in the POSITIONING INFORMATION RESPONSE message.

If the *Spatial Relation Information per SRS Resource* IE and the *Periodicity List* IE are both included in the *Requested SRS Transmission Characteristics* IE, the NG-RAN node shall consider that the *Spatial Relation per SRS Resource Item* IE and the *Periodicity List Item* IE have one-to-one mapping relation.

If the *UE Reporting Information* IE is included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node may take this information into account for allocating proper CG-SDT resources when positioning a UE.

If the *UE TEG Information Request* IE is included in the POSITIONING INFORMATION REQUEST message and set to "onDemand", the NG-RAN node shall, if supported, provide the UE Tx TEG association in the POSITIONING INFORMATION RESPONSE message.

If the *UE TEG Information Request* IE is set to "periodic", the NG-RAN node shall, if supported, reply with the POSITIONING INFORMATION RESPONSE message without including any UE Tx TEG association in this message. The NG-RAN node shall then take the *UE TEG Reporting Periodicity* IE into account when configuring the UE’s periodic UE Tx TEG association reporting and initiate the Positioning Information Update procedure for reporting the UE Tx TEG association received from the UE, if any.

#### 8.2.6.3 Unsuccessful Operation



Figure 8.2.6.3-1: Positioning Information Exchange procedure, unsuccessful operation

If the *Requested SRS Transmission Characteristics* IE is included in the POSITIONING INFORMATION REQUEST message and the NG-RAN node is unable to configure any SRS transmissions for the UE, it shall respond with a POSITIONING INFORMATION FAILURE message. If a handover of the target UE has been triggered, the NG-RAN node shall send a POSITIONING INFORMATION FAILURE message with an appropriate cause value.

If the NG-RAN node is unable to provide any of the requested information, the NG-RAN node shall respond with a POSITIONING INFORMATION FAILURE message with an appropriate cause value.

#### 8.2.6.4 Abnormal Conditions

Void.

### 8.2.7 Positioning Information Update

#### 8.2.7.1 General

The Positioning Information Update procedure is initiated by the NG-RAN node to indicate to the LMF that a change has occurred in the SRS configuration or in the UE Tx TEG association. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.7.2 Successful Operation



Figure 8.2.7.2-1: Positioning Information Update procedure, successful operation

The NG-RAN node initiates the procedure by sending a POSITIONING INFORMATION UPDATE message to the LMF. If the *SRS Configuration* IE is included in the POSITIONING INFORMATION UPDATE message, the LMF shall consider this information as the updated SRS Configuration for the UE. If the *SFN Initialisation Time* IE is included in the POSITIONING INFORMATION UPDATE message, the LMF shall consider this information as the SFN Initialisation Time associated to the SRS Configuration.

If the *UE Tx TEG Association* *List* IE is included in the POSITIONING INFORMATION UPDATE message, the LMF shall consider it as the UE Tx TEG association for the SRS resources that have changed their TEG association during the latest reporting interval.

If the *SRS Transmission Status* IE is included in the POSITIONING INFORMATION UPDATE message and set to "stopped", the LMF shall consider that the SRS transmission has stopped.

#### 8.2.7.3 Unsuccessful Operation

Not Applicable.

#### 8.2.7.4 Abnormal Conditions

Void.

### 8.2.8 TRP Information Exchange

#### 8.2.8.1 General

The purpose of the TRP Information Exchange procedure is to allow the LMF to request the NG-RAN node to provide detailed information for TRPs hosted by the NG-RAN node. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.8.2 Successful Operation



Figure 8.2.8.2-1: TRP Information Exchange procedure, successful operation

The LMF initiates the procedure by sending a TRP INFORMATION REQUEST message. The NG-RAN node responds with a TRP INFORMATION RESPONSE message that contains the requested TRP information.

If the *TRP List* IE is included in the TRP INFORMATION REQUEST message, the NG-RAN node should include in the TRP INFORMATION RESPONSE message, the requested information for all TRPs included in the *TRP List* IE.

If the *TRP List* IE is not included in the TRP INFORMATION REQUEST message, the NG-RAN node should include the requested information for all TRPs hosted by the NG-RAN node in the TRP INFORMATION RESPONSE message

If the *PRS Muting* IE is included in the *PRS Configuration* IE in the TRP INFORMATION RESPONSE message, the LMF may take it into account as the muting information for the given PRS resource set.

If the *QCL Info* IE is included in the *PRS Configuration* IE in the TRP INFORMATION RESPONSE message, the LMF may take it into account for the given PRS resource list.

If the *DL-PRS Resource Coordinates* IE is included in the *Geographical Coordinates* IE in the *TRP Information* IE in the TRP INFORMATION RESPONSE message, the LMF may take it into account as the DL PRS Resource Coordinates relative to the TRP coordinate.

#### 8.2.8.3 Unsuccessful Operation



Figure 8.2.8.3-1: TRP Information Exchange procedure, unsuccessful operation

If the NG-RAN node cannot provide any of the requested information for any TRP, the NG-RAN node shall respond with a TRP INFORMATION FAILURE message.

#### 8.2.8.4 Abnormal Conditions

Void.

### 8.2.9 Positioning Activation

#### 8.2.9.1 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. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.9.2 Successful Operation

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**Figure 8.2.9.2-1: Positioning Activation procedure, successful operation**

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

For semi-persistent UL SRS, the POSITIONING ACTIVATION REQUEST message includes an indication of the UL SRS resource set to be activated and may include the spatial relation for the semi-persistent UL SRS resource to be activated. For aperiodic UL SRS, if the *SRS Resource Trigger* IE is included in the POSITIONING ACTIVATION REQUEST message, the NG-RAN node shall take the value of this IE into account when triggering aperiodic SRS transmission by the UE.

If the *Activation Time* IE is included in the POSITIONING ACTIVATION REQUEST message, the NG-RAN node shall take the indicated value as the LMF’s requested time for activation of the UE’s SRS transmission.

Following successful activation of UL SRS transmission in the UE, the NG-RAN node shall respond with a POSITIONING ACTIVATION RESPONSE message. If the POSITIONING ACTIVATION RESPONSE message includes the *System Frame Number* and/or the *Slot Number* IEs, the LMF shall consider that the respective information indicates the activation time of SRS transmission by the UE.

#### 8.2.9.3 Unsuccessful Operation

****

**Figure 8.2.9.3-1: 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.

If the NG-RAN node is unable to trigger the aperiodic SRS transmission with the indicated *SRS Resource Trigger* IE, it shall respond with a POSITIONING ACTIVATION FAILURE message with an appropriate cause value.

#### 8.2.9.4 Abnormal Conditions

Void.

### 8.2.10 Positioning Deactivation

#### 8.2.10.1 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. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.10.2 Successful Operation

****

**Figure 8.2.10.2-1: 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 or release all the related resources.

#### 8.2.10.3 Unsuccessful Operation

Not Applicable.

#### 8.2.10.4 Abnormal Conditions

Void.

### 8.2.11 PRS Configuration Exchange

#### 8.2.11.1 General

The PRS Configuration Exchange procedure is initiated by the LMF to request the NG-RAN node to configure or update (i.e., turn off) PRS transmission. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.11.2 Successful Operation



Figure 8.2.11.2-1: PRS Configuration Exchange procedure, successful operation

The LMF initiates the procedure by sending a PRS CONFIGURATION REQUEST message to the NG-RAN.

If the *PRS Configuration Request Type* IE is set to “configure”, the NG-RAN node should use the information in the *Requested DL PRS Transmission Characteristics* IE to configure DL-PRS transmission by the indicated TRP(s).

If the *PRS Configuration Request Type* IE is set to “off”, the NG-RAN node should, if supported, use the information in the *PRS Transmission Off Information* IE to turn off the DL-PRS transmission for the indicated TRP(s), PRS Resource Set(s), or PRS Resource(s).

If DL-PRS transmission is successfully configured or updated for at least one of the TRPs, the NG-RAN node shall respond with a PRS CONFIGURATION RESPONSE message.

#### 8.2.11.3 Unsuccessful Operation



Figure 8.2.11.3-1: PRS Configuration Exchange procedure, unsuccessful operation

If the NG-RAN node cannot configure or update DL-PRS transmission for any of the TRPs in the *PRS TRP List* IE of the PRS CONFIGURATION REQUEST message, it shall respond with a PRS CONFIGURATION FAILURE message with an appropriate cause value.

#### 8.2.11.4 Abnormal Conditions

Void.

### 8.2.12 Measurement Preconfiguration

#### 8.2.12.1 General

The Measurement Preconfiguration procedure allows the LMF to provide necessary information to the serving gNB and request the gNB to preconfigure measurement gap and/or PRS processing window for the UE. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.12.2 Successful Operation



Figure 8.2.12.2-1: Measurement Preconfiguration procedure, successful operation

The LMF initiates the procedure by sending a MEASUREMENT PRECONFIGURATION REQUIRED message.

If the NG-RAN node is able to configure measurement gap or PRS processing window, it shall reply with the MEASUREMENT PRECONFIGURATION CONFIRM message.

#### 8.2.12.3 Unsuccessful Operation



Figure 8.2.12.3-1: Measurement Preconfiguration procedure, unsuccessful operation

If the NG-RAN node cannot configure any of the measurement gap or PRS processing window, the NG-RAN node shall respond with a MEASUREMENT PRECONFIGURATION REFUSE message. Upon receiving the MEASUREMENT PRECONFIGURATION REFUSE message, the LMF shall release the reserved PPW resources.

#### 8.2.12.4 Abnormal Conditions

Void.

### 8.2.13 Measurement Activation

#### 8.2.13.1 General

The Measurement Activation procedure is initiated by the LMF to request the NG-RAN node to activate or deactivate the preconfigured measurement gap or PRS processing window for the UE. This procedure applies only if the NG-RAN node is a gNB.

#### 8.2.13.2 Successful Operation



Figure 8.2.13.2-1: Measurement Activation procedure, successful operation

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

If the *PRS Measurement Info List* IE is included in the MEASUREMENT ACTIVATION message, the NG-RAN node may take it into account when activating pre-configured measurement gap in the UE.

#### 8.2.13.3 Unsuccessful Operation

Not Applicable.

#### 8.2.13.4 Abnormal Conditions

Void.

## 8.3 Management Procedures

#### 8.3.1 Error Indication

#### 8.3.1.1 General

The Error Indication procedure is initiated by a node to report detected errors in one incoming message, provided they cannot be reported by an appropriate failure message.

#### 8.3.1.2 Successful Operation



Figure 8.3.1.2-1: Error Indication procedure, LMF originated, successful operation



Figure 8.3.1.2-2: Error Indication procedure, NG-RAN node originated, successful operation

When the conditions defined in clause 10 are fulfilled, the Error Indication procedure is initiated by an ERROR INDICATION message sent from the receiving node.

The ERROR INDICATION message shall contain at least either the *Cause* IE or the *Criticality Diagnostics* IE.

#### 8.3.1.3 Abnormal Conditions

Not applicable.

## 8.4 Assistance Information Transfer Procedures

### 8.4.1 Assistance Information Control

#### 8.4.1.1 General

The purpose of the Assistance Information Control procedure is to allow the LMF to signal positioning assistance information to the NG-RAN Node for assistance information broadcasting. This procedure applies only if the NG-RAN node is a gNB.

#### 8.4.1.2 Successful Operation



Figure 8.4.1.2-1: Assistance Information Control procedure

The LMF initiates the procedure by sending an ASSISTANCE INFORMATION CONTROL message.

If the *Assistance Information* IE is included in the ASSISTANCE INFORMATION CONTROL message, the NG-RAN Node shall, if supported, replace any previously stored assistance information and use the received information to configure assistance information broadcasting.

If the *Broadcast Priority* IE is included in the *Assistance Information* IE, the NG-RAN Node may take it into account when configuring broadcasting for the relevant information. Assistance information having the same Broadcast Priority value should receive the same treatment (i.e. broadcast by the NG-RAN Node or not broadcast).

If the *Broadcast* IE is included in the ASSISTANCE INFORMATION CONTROL message and set to "start", the NG-RAN Node may start broadcasting the assistance information. If the *Broadcast* IE is included in the ASSISTANCE INFORMATION CONTROL message and set to "stop", the NG-RAN Node may stop broadcasting the assistance information.

If the *Positioning Broadcast Cells* IE is included in the ASSISTANCE INFORMATION CONTROL message, the NG-RAN shall, if supported, consider that the received assistance information is applicable to the cells in this IE.

#### 8.4.1.3 Abnormal Conditions

If the *Broadcast* IE is included in the ASSISTANCE INFORMATION CONTROL message and set to "start", and no assistance information is available, the NG-RAN Node shall consider the procedure as failed.

If neither the *Assistance Information* IE nor the *Broadcast* IE are included in the ASSISTANCE INFORMATION CONTROL message, the NG-RAN Node shall consider the procedure as failed.

### 8.4.2 Assistance Information Feedback

#### 8.4.2.1 General

The purpose of the Assistance Information Feedback procedure is to allow the NG-RAN Node to give feedback to the LMF on assistance information broadcasting. This procedure applies only if the NG-RAN node is a gNB.

#### 8.4.2.2 Successful Operation



Figure 8.4.2.2-1: Assistance Information Feedback procedure

If the *Assistance Information Failure List* IE is included in the ASSISTANCE INFORMATION FEEDBACK message, the LMF shall consider that assistance information broadcasting could not be configured for the relevant information.

If the *Positioning Broadcast Cells* IE is included in the ASSISTANCE INFORMATION FEEDBACK message, the LMF shall consider that the feedback provided is applicable to the cells in this IE.

#### 8.4.2.3 Abnormal Conditions

Void.

## 8.5 Measurement Information Transfer

### 8.5.1 Measurement

#### 8.5.1.1 General

The Measurement procedure allows the LMF to request one or more TRPs in the NG-RAN node to perform and report positioning measurements. This procedure applies only if the NG-RAN node is a gNB.

#### 8.5.1.2 Successful Operation



Figure 8.5.1.2.1: Measurement procedure. Successful operation.

The LMF initiates the procedure by sending a MEASUREMENT REQUEST message to the NG-RAN node, indicating in the *TRP Measurement Request List* IE the TRP(s) from which measurements are requested. The NG-RAN node shall use the included information to configure positioning measurements by the indicated TRP(s). If at least one of the requested measurements has been successful for at least one of the TRPs, the NG-RAN node shall reply with a MEASUREMENT RESPONSE message including the *TRP Measurement Response List* IE.

If the *Report Characteristics* IE is set to "OnDemand", the NG-RAN node shall return the corresponding measurement results in the MEASUREMENT RESPONSE message, and the LMF shall consider that this reporting has been terminated by the NG-RAN node. If the *Report Characteristics* IE is set to "Periodic", the NG-RAN node shall initiate the corresponding measurements, and it shall reply with the MEASUREMENT RESPONSE message without including any measurement results in the message. The NG-RAN node shall then periodically initiate the Measurement Report procedure for the corresponding measurements, with the requested reporting periodicity.

If the *Measurement Beam Information Request* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall include the *Measurement Beam Information* IE in the *TRP Measurement Result* IE of the MEASUREMENT RESPONSE message.

If the *Measurement Quality* IE is included in the *TRP Measurement Result* IE in the MEASUREMENT RESPONSE message, the LMF may take it into account as the TRP estimate of the measurement quality. If the *Measurement Quality* IE includes the *Zenith Quality* IE, the LMF may take it into account within the angle measurement quality.

If the *Timing Reporting Granularity Factor* IE is included in the *TRP Measurement Quantities* IE in the MEASUREMENT REQUEST message, the NG-RAN node may take it into account when configuring measurements including UL RTOA and gNB Rx-Tx Time Difference.

If the *System Frame Number* IE and/or the *Slot Number* IE are included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, consider that the respective information indicates the activation time of SRS transmission.

If the *Report Characteristics* IE is set to "OnDemand" and the *Response Time* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, return the corresponding measurement results in the MEASUREMENT RESPONSE message within the indicated time.

If the *Measurement Characteristics Request Indicator* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, take the requested measurement characteristics into account when configuring measurements, and include the requested information, if available, in the MEASUREMENT RESPONSE message.

If the *Number of TRP Rx TEGs* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, use it to measure the same SRS resource with different TRP Rx TEGs for the indicated TRP, and report the corresponding UL-RTOA and/or gNB Rx-Tx time difference measurements.

If the *Number of TRP RxTx TEGs* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, use it to measure the same SRS resource with different TRP RxTx TEGs with the same TRP Tx TEG for the indicated TRP, and report the corresponding gNB Rx-Tx time difference measurements.

If the *Measurement Time Occasion* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node may take it into account as the number of SRS measurement time occasions for a measurement instance.

**Interaction with the** **Measurement Report procedure:**

If the *Report Characteristics* IE is set to "Periodic" and the *Measurement Amount* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, take it into account for sending the MEASUREMENT REPORT message.

#### 8.5.1.3 Unsuccessful Operation



Figure 8.5.1.3.1: Measurement procedure. Unsuccessful operation.

If the NG-RAN node cannot configure any of the requested measurements for any of the TRPs in the *TRP Measurement Request List* IE of the MEASUREMENT REQUEST message, it shall respond with a MEASUREMENT FAILURE message with an appropriate cause value.

#### 8.5.1.4 Abnormal Conditions

If the *Report Characteristics* IE is set to "OnDemand" and the *Response Time* IE is included in the MEASUREMENT REQUEST message but the NG-RAN node is unable to provide the measurement results within the indicated time, the NG-RAN node shall, if supported, respond with a MEASUREMENT FAILURE message with an appropriate cause value.

### 8.5.2 Measurement Report

#### 8.5.2.1 General

The Measurement Report procedure allows the NG-RAN node to report positioning measurements to the LMF. This procedure applies only if the NG-RAN node is a gNB.

#### 8.5.2.2 Successful Operation



Figure 8.5.2.2.1: Measurement Report procedure. Successful operation.

The NG-RAN node initiates the procedure by sending a MEASUREMENT REPORT message to the LMF. The MEASUREMENT REPORT message contains the measurement results according to the associated measurement configuration.

#### 8.5.2.3 Abnormal Conditions

Void.

### 8.5.3 Measurement Update

#### 8.5.3.1 General

The Measurement Update Procedure allows the LMF to notify the NG-RAN node of a change in a previously configured measurement. This procedure applies only if the NG-RAN node is a gNB.

#### 8.5.3.2 Successful Operation



Figure 8.5.3.2.1: Measurement Update: Successful Operation.

The LMF initiates the procedure by sending a MEASUREMENT UPDATE message.

If the *SRS Configuration* IE is included in the MEASUREMENT UPDATE message, the NG-RAN node shall overwrite the previously stored SRS configuration.

If the *AoA Search Window Information* IE is included in the *TRP Measurement Update List* IE in the MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored AoA search window information and store the newly received information.

If the *Number of TRP Rx TEGs* IE is included in the *TRP Measurement Update List* IE in the MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored information and store the newly received information.

If the *Number of TRP RxTx TEGs* IE is included in the *TRP Measurement Update List* IE in the MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored information and store the newly received information.

If the *Measurement Characteristics Request Indicator* IE is included in the MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored information and store the newly received information.

If the *Measurement Time Occasion* IE is included in the MEASUREMENT UPDATE message, the NG-RAN node shall clear any previously stored information and store the newly received information.

#### 8.5.3.3 Unsuccessful Operation

Not applicable.

#### 8.5.3.4 Abnormal Conditions

If the NG-RAN node cannot identify at least one of the previously requested measurement to be modified, it shall consider the procedure as failed and initiate local error handling.

### 8.5.4 Measurement Abort

#### 8.5.4.1 General

The purpose of the Measurement Abort Procedure is to enable the LMF to abort an on-going measurement. This procedure applies only if the NG-RAN node is a gNB.

#### 8.5.4.2 Successful Operation



Figure 8.5.4.2.1: Measurement Abort Procedure: Successful Operation.

The LMF initiates the procedure by sending a MEASUREMENT ABORT message.

Upon receiving this message, the NG-RAN node shall terminate the on-going measurement identified by the *LMF Measurement ID* IE and may release any resources previously allocated for the same measurement.

#### 8.5.4.3 Unsuccessful Operation

Not applicable.

#### 8.5.4.4 Abnormal Conditions

If the NG-RAN node cannot identify the previously requested measurement to be aborted, it shall ignore the MEASUREMENT ABORT message.

### 8.5.5 Measurement Failure Indication

#### 8.5.5.1 General

The Measurement Failure Indication procedure allows the NG-RAN node to notify the LMF that the measurements previously requested with the Measurement procedure can no longer be reported. This procedure applies only if the NG-RAN node is a gNB.

#### 8.5.5.2 Successful Operation



Figure 8.5.5.2.1: Measurement Report procedure. Successful operation.

Upon reception of the MEASUREMENT FAILURE INDICATION message, the LMF shall consider that the indicated measurements have been terminated by the NG-RAN node.

#### 8.5.5.3 Abnormal Conditions

Void.

# 9 Elements for NRPPa Communication

## 9.0 General

Sub clauses 9.1 and 9.2 describe the structure of the messages and information elements required for the NRPPa protocol in tabular format. Sub clause 9.3 provides the corresponding ASN.1 definition.

The following attributes are used for the tabular description of the messages and information elements: Presence, Range Criticality and Assigned Criticality. Their definition and use can be found in TS 38.413 [2].

NOTE: The messages have been defined in accordance to the guidelines specified in TR 25.921 [5].

## 9.1 Message Functional Definition and Content

### 9.1.1 Messages for Location Information Transfer Procedures

#### 9.1.1.1 E-CID MEASUREMENT INITIATION REQUEST

This message is sent by LMF to initiate E-CID measurements.

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 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15 ,…, 16..256) |  | YES | reject |
| Report Characteristics | M |  | ENUMERATED (OnDemand, Periodic,…) |  | YES | reject |
| Measurement Periodicity | C-ifReportCharacteristicsPeriodic |  | ENUMERATED (120ms, 240ms, 480ms, 640ms, 1024ms, 2048ms, 5120ms, 10240ms, 1min, 6min, 12min, 30min, 60min,…, 20480ms, 40960ms, extended) | The codepoint 60min applies only for ng-eNB.  The codepoint “extended” is not applicable.  This IE is not applicable to NR Angle of Arrival. | YES | reject |
| **Measurement Quantities** |  | *1* |  |  | EACH | reject |
| **>Measurement Quantities Item** |  | *1..<maxnoMeas>* |  |  | - |  |
| >>Measurement Quantities Value | M |  | ENUMERATED (Cell-ID, Angle of Arrival, Timing Advance Type 1, Timing Advance Type 2, RSRP, RSRQ,…, SS-RSRP, SS-RSRQ, CSI-RSRP, CSI-RSRQ, NR Angle of Arrival, NR Timing Advance) |  | - | - |
| Other-RAT Measurement Quantities |  | *0* |  |  | EACH | ignore |
| >Other-RAT Measurement Quantities Item |  | *0 .. <maxnoMeas>* |  |  | - |  |
| >>Other-RAT Measurement Quantities Value | M |  | ENUMERATED (GERAN, UTRAN,…, NR, EUTRA) |  | - |  |
| WLAN Measurement Quantities |  | *0* |  |  | EACH | ignore |
| >WLAN Measurement Quantities Item |  | *0 .. <maxnoMeas>* |  |  | - |  |
| >>WLAN Measurement Quantities Value | M |  | ENUMERATED (WLAN, ...) |  | - |  |
| Measurement Periodicity NR-AoA | C- ifReportCharacteristicsPeriodicAndMeasQuantityItemAoA |  | ENUMERATED (160ms, 320ms,  640ms,  1280ms, 2560ms,  5120ms,  10240ms, 20480ms,  40960ms,  61440ms,  81920ms, 368640ms, 737280ms, 1843200ms, …) |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoMeas | Maximum no. of measured quantities that can be configured and reported with one message. Value is 64. |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifReportCharacteristicsPeriodic | This IE shall be present if the *Report Characteristics* IE is set to the value "Periodic". |
| ifReportCharacteristicsPeriodicAndMeasQuantityItemAoA | This IE shall be present if the *Report Characteristics* IE is set to the value "Periodic" and the *Measurement Quantities* *Item* IE is set to the value "NR Angle of Arrival". |

#### 9.1.1.2 E-CID MEASUREMENT INITIATION RESPONSE

This message is sent by NG-RAN node to indicate that the requested E-CID measurement is successfully initiated.

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 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| RAN UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| E-CID Measurement Result | O |  | 9.2.5 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |
| Cell Portion ID | O |  | 9.2.12 |  | YES | ignore |
| Other-RAT Measurement Result | O |  | 9.2.13 |  | YES | ignore |
| WLAN Measurement Result | O |  | 9.2.14 |  | YES | ignore |

#### 9.1.1.3 E-CID MEASUREMENT INITIATION FAILURE

This message is sent by NG-RAN node to indicate that the requested E-CID measurement cannot be initiated.

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 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.4 E-CID MEASUREMENT FAILURE INDICATION

This message is sent by NG-RAN node to indicate that the previously requested E-CID measurement can no longer be reported.

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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| RAN UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |

#### 9.1.1.5 E-CID MEASUREMENT REPORT

This message is sent by NG-RAN node to report the results of the requested E-CID measurement.

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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| RAN UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| E-CID Measurement Result | M |  | 9.2.5 |  | YES | ignore |
| Cell Portion ID | O |  | 9.2.12 |  | YES | ignore |

#### 9.1.1.6 E-CID MEASUREMENT TERMINATION COMMAND

This message is sent by the LMF to terminate the requested E-CID measurement.

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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| LMF UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |
| RAN UE Measurement ID | M |  | INTEGER (1..15,…, 16..256) |  | YES | reject |

#### 9.1.1.7 OTDOA INFORMATION REQUEST

This message is sent by LMF to request OTDOA information.

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 |  | - |  |
| **OTDOA Information Type** |  | *1* |  |  | EACH | reject |
| **>OTDOA Information Type Item** |  | *1 .. <maxnoOTDOAtypes>* |  |  | - |  |
| >>OTDOA Information Item | M |  | ENUMERATED (pci, cellid, tac, earfcn, prsBandwidth, prsConfigIndex, cpLength, noDlFrames, noAntennaPorts, sFNInitTime, nG-RANAccessPointPosition, prsmutingconfiguration, prsid, tpid, tpType, crsCPlength, dlBandwidth, multipleprsConfigurationsperCell, prsOccasionGroup, prsFrequencyHoppingConfiguration, …,  tddConfig) |  | - | - |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoOTDOAtypes | Maximum no. of OTDOA information types that can be requested and reported with one message. Value is 63. |

#### 9.1.1.8 OTDOA INFORMATION RESPONSE

This message is sent by NG-RAN node to provide OTDOA information.

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 |  | - |  |
| OTDOA Cells |  | *1 .. <maxCellinRANnode>* |  | Served cells/TPs that broadcast PRS. May be used to signal multiple PRS configurations per cell/TPs (up to 3 are supported in this release). | GLOBAL | ignore |
| >OTDOA Cell Information | M |  | 9.2.15 |  | - | - |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxCellinRANnode | Maximum no. cells that can be served by a RAN Node. Value is 16384. |

#### 9.1.1.9 OTDOA INFORMATION FAILURE

This message is sent by NG-RAN node to indicate that the OTDOA information cannot be provided.

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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.10 POSITIONING INFORMATION REQUEST

This message is sent by the LMF to request positioning information.

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 |  | - |  |
| Requested SRS Transmission Characteristics | O |  | 9.2.27 |  | YES | ignore |
| UE Reporting Information | O |  | 9.2.70 |  | YES | ignore |
| UE TEG Information Request | O |  | ENUMERATED(onDemand, periodic, stop, …) |  | YES | ignore |
| UE TEG Reporting Periodicity | C-ifUeTegInfoReqPeriodic |  | ENUMERATED (160ms, 320ms, 1280ms, 2560ms, 61440ms, 81920ms, 368640ms, 737280ms, …) |  | YES | reject |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifUeTegInfoReqPeriodic | This IE shall be present if the *UE TEG Information Request* IE is set to the value "periodic". |

#### 9.1.1.11 POSITIONING INFORMATION RESPONSE

This message is sent by the NG-RAN node to provide positioning information.

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 |  | - |  |
| SRS Configuration | O |  | 9.2.28 |  | YES | ignore |
| SFN Initialisation Time | O |  | Relative Time 1900  9.2.36 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |
| UE Tx TEG Association List | O |  | 9.2.78 |  | YES | ignore |

#### 9.1.1.12 POSITIONING INFORMATION FAILURE

This message is sent by the NG-RAN node to indicate that the positioning information cannot be provided.

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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.13 POSITIONING INFORMATION UPDATE

This message is sent by the NG-RAN node to indicate that a change in the SRS configuration or UE Tx TEG association has occurred.

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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| SRS Configuration | O |  | 9.2.28 |  | YES | ignore |
| SFN Initialisation Time | O |  | Relative Time 1900  9.2.36 |  | YES | ignore |
| UE Tx TEG Association List | O |  | 9.2.78 |  | YES | ignore |
| SRS Transmission Status | O |  | ENUMERATED (stopped, ...) |  | YES | ignore |

9.1.1.14 TRP INFORMATION REQUEST

This message is sent by an LMF to request information for TRPs hosted by an NG-RAN node.

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 |  | - |  |
| **TRP List** |  | *0 ..1* |  |  | YES | ignore |
| **>TRP Item** |  | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| **TRP Information Type List** |  | *1* |  |  |  |  |
| **>TRP Information Type Item** |  | *1 .. <maxnoTRPInfoTypes>* |  |  | EACH | reject |
| >>TRP Information Type Item | M |  | ENUMERATED (nr pci, ng-ran cgi, nr arfcn, prs config, ssb config, sfn init time, spatial direction info, geo-coordinates, …, trp type, on-demand prs, trp tx teg, beam antenna info) |  |  |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535 |
| maxnoTRPInfoTypes | Maximum no of TRP information types that can be requested and reported with one message. Value is 64. |

#### 9.1.1.15 TRP INFORMATION RESPONSE

This message is sent by an NG-RAN node to convey TRP information to an LMF.

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 |  | - |  |
| **TRP Information List** |  | *1* |  |  | YES | ignore |
| **>TRP Information Item** | M | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP Information | M |  | 9.2.25 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535. |

#### 9.1.1.16 TRP INFORMATION FAILURE

This message is sent by an NG-RAN node to indicate that the requested TRP information cannot be provided to an LMF.

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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.17 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 |  | - |  |
| CHOICE *SRS type* | M |  |  |  | YES | reject |
| >*Semi-persistent* |  |  |  |  |  |  |
| >>SRS Resource Set ID | M |  | 9.2.33 |  | - | - |
| >>SRS Spatial Relation | O |  | Spatial Relation Information  9.2.34 | This IE is ignored if the *Spatial Relation Information per SRS Resource* IE is present. | YES | ignore |
| >>Spatial Relation Information per SRS Resource | O |  | 9.2.60 |  | YES | ignore |
| >*Aperiodic* |  |  |  |  |  |  |
| >>Aperiodic | M |  | ENUMERATED(true,…) |  | - | - |
| >>SRS Resource Trigger | O |  | 9.2.35 |  | - | - |
| Activation Time | O |  | Relative Time 1900  9.2.36 | Indicates the start time when the SRS activation is requested | YES | ignore |

#### 9.1.1.18 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 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |
| System Frame Number | O |  | INTEGER(0..1023) |  | YES | ignore |
| Slot Number | O |  | INTEGER(0..79) |  | YES | ignore |

#### 9.1.1.19 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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.20 POSITIONING DEACTIVATION

This message is sent by the LMF to cause the NG RAN node to deactivate UL SRS transmission or release all the 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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| CHOICE *Abort Transmission* | M |  |  |  | YES | Ignore |
| >*Deactivate SRS Resource Set* |  |  |  |  |  |  |
| >>SRS Resource Set ID | M |  | 9.2.33 |  | - |  |
| >*Release ALL* |  |  | NULL | the NG-RAN node configures UE to stop transmitting SRS for the positioning purpose |  |  |

#### 9.1.1.21 PRS CONFIGURATION REQUEST

This message is sent by the LMF to request the NG-RAN node to configure or update PRS transmission.

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 |  | - |  |
| PRS Configuration Request Type | M |  | ENUMERATED(configure, off, …) |  | YES | reject |
| **PRS TRP List** |  | *1* |  |  | YES | ignore |
| **>PRS TRP Item** |  | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>Requested DL PRS Transmission Characteristics | C-ifConf |  | 9.2.61 |  | - |  |
| >>PRS Transmission Off Information | C-ifOff |  | 9.2.64 |  | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535 |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifConf | This IE shall be present if the *PRS Configuration Request Type* IE is set to the value "configure". |
| ifOff | This IE shall be present if the *PRS Configuration Request Type* IE is set to the value "off". |

#### 9.1.1.22 PRS CONFIGURATION RESPONSE

This message is sent by the NG-RAN node to acknowledge configuring or updating the PRS transmission.

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 |  | - |  |
| **PRS Transmission TRP List** |  | *0..1* |  |  | YES | ignore |
| **>PRS Transmission TRP Item** |  | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>PRS Configuration | M |  | 9.2.44 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535 |

#### 9.1.1.23 PRS CONFIGURATION FAILURE

This message is sent by the NG-RAN node to indicate that it cannot configure any PRS transmission.

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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.24 MEASUREMENT PRECONFIGURATION REQUIRED

This message is sent by the LMF to provide the PRS configuration information of multiple TRPs to the NG-RAN node and request to configure measurement gap or PRS processing window of 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 |  | - |  |
| **TRP PRS Information List** |  | *1* |  |  | YES | ignore |
| **>TRP PRS Information Item** |  | *1 .. <maxnoPRSTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>NR CGI | O |  | 9.2.9 |  | - |  |
| >>PRS Configuration | M |  | 9.2.44 |  | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoPRSTRPs | Maximum no. of TRPs for on-demand PRS in a NG-RAN node. Value is 256. |

#### 9.1.1.25 MEASUREMENT PRECONFIGURATION CONFIRM

This message is sent by the NG-RAN node to the LMF to confirm successful configuration of measurement gap or PRS processing window of 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 |  | - |  |
| Preconfiguration Result | M |  | BIT STRING (SIZE(8)) | Indicates what has been preconfigured in the UE. first bit: measurement gaps  second bit: PRS processing windows.  Other bits reserved for future use. Value '1' indicates 'has been preconfigured', Value '0' indicates 'not preconfigured'. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.26 MEASUREMENT PRECONFIGURATION REFUSE

This message is sent by the NG-RAN node to indicate that configuration of measurement gap or PRS processing window of 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 |  | - |  |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.1.27 MEASUREMENT ACTIVATION

This message is sent by the LMF to request the NG-RAN node to activate or deactivate the preconfigured measurement gap or PRS processing window for 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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| Request Type | M |  | ENUMERATED (activate, deactivate, …) |  | YES | reject |
| **PRS Measurement Info List** |  | *0..1* |  |  | YES | Ignore |
| **>PRS Measurement Info Item** |  | *1 .. <* *maxFreqLayers>* |  |  | - |  |
| >>Point A | M |  | INTEGER (0..3279165) |  | - |  |
| >>MeasPRS Periodicity | M |  | ENUMERATED (ms20, ms40, ms80, ms160, …) | Measurement gap periodicity in units of ms | - |  |
| >>MeasPRS Offset | M |  | INTEGER (0..159, …) | Measurement gap offset in units of subframes | - |  |
| >>Measurement PRS Length | M |  | ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20} |  | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxFreqLayers | Maximum no. of frequency layers. Value is 4 |

### 9.1.2 Messages for Management Procedures

#### 9.1.2.1 ERROR INDICATION

This message is used to indicate that some error has been detected in the NG-RAN node or in the LMF.

Direction: LMF → NG-RAN node and 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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | – |  |
| Cause | O |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

### 9.1.3 Messages for Assistance Information Transfer Procedures

#### 9.1.3.1 ASSISTANCE INFORMATION CONTROL

This message is sent by the LMF to transfer assistance information.

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 |  | - |  |
| Assistance Information | O |  | 9.2.19 |  | YES | reject |
| Broadcast | O |  | ENUMERATED (start, stop, …) |  | YES | reject |
| Positioning Broadcast Cells | O |  | 9.2.59 | The cell(s) that are requested to broadcast posSIB(s) according to the *Assistance Information* IE. | YES | reject |

#### 9.1.3.2 ASSISTANCE INFORMATION FEEDBACK

This message is sent by the NG-RAN Node to give feedback on assistance information broadcasting.

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 |  | - |  |
| Assistance Information Failure List | O |  | 9.2.23 |  | YES | reject |
| Positioning Broadcast Cells | O |  | 9.2.59 | The cells associated to the feedback provided in the *Assistance Information Failure List* IE. | YES | reject |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

### 9.1.4 Messages for Measurement Information Transfer Procedures

#### 9.1.4.1 MEASUREMENT REQUEST

This message is sent by the LMF to request the NG-RAN node to configure a positioning measurement.

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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| **TRP Measurement Request List** |  | *1* |  |  | YES | reject |
| **>TRP Measurement Request Item** |  | *1..<maxnoofMeasTRPs>* |  |  | EACH | reject |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>Search Window Information | O |  | 9.2.26 |  | - |  |
| >>Cell ID | O |  | NR CGI  9.2.9 | The Cell ID of the TRP identified by the *TRP ID* IE. | YES | ignore |
| >>AoA Search Window Information | O |  | UL-AoA Assistance Information 9.2.66 |  | YES | ignore |
| >>Number of TRP Rx TEGs | O |  | ENUMERATED (2, 3, 4, 6, 8, …) |  | YES | ignore |
| >>Number of TRP RxTx TEGs | O |  | ENUMERATED (2, 3, 4, 6, 8, …) |  | YES | ignore |
| Report Characteristics | M |  | ENUMERATED (OnDemand, Periodic, ...) |  | YES | reject |
| Measurement Periodicity | C-ifReportCharacteristicsPeriodic |  | ENUMERATED (120ms, 240ms, 480ms, 640ms, 1024ms, 2048ms, 5120ms, 10240ms, 1min, 6min, 12min, 30min, 60min,…, 20480ms, 40960ms, extended) | The codepoint 120ms, 240ms, 480ms, 1024ms, 2048ms, 1min, 6min, 12min, 30min, and 60min are not applicable | YES | reject |
| **TRP Measurement Quantities** |  | *1* |  |  | YES | reject |
| **>TRP Measurement Quantities Item** |  | *1 .. <maxnoPosMeas>* |  |  | EACH | reject |
| >TRP Measurement Type | M |  | ENUMERATED (gNB-RxTxTimeDiff, UL-SRS-RSRP, UL-AoA, UL-RTOA,…, Multiple UL-AoA, UL SRS-RSRPP) |  | - |  |
| >Timing Reporting Granularity Factor | O |  | INTEGER (0..5) | Value (0..5) corresponds to (k0..k5)  TS 38.133 [16] | - |  |
| SFN initialisation Time | O |  | Relative Time 1900  9.2.36 | If this IE is not present, the TRP may assume that the value is same as its own SFN initialisation time. | YES | ignore |
| SRS Configuration | O |  | 9.2.28 |  | YES | ignore |
| Measurement Beam Information Request | O |  | ENUMERATED (true,...) | This IE is ignored when the *Measurement Characteristics Request Indicator* IE is included. | YES | ignore |
| System Frame Number | O |  | INTEGER(0..1023) |  | YES | ignore |
| Slot Number | O |  | INTEGER(0..79) |  | YES | ignore |
| Measurement Periodicity Extended | C-ifMeasPerExt |  | ENUMERATED (160ms, 320ms, 1280ms, 2560ms, 61440ms, 81920ms, 368640ms, 737280ms, 1843200ms, …) |  | YES | reject |
| Response Time | O |  | 9.2.68 | This IE is ignored when the *Report Characteristics* IE is set to “periodic”. | YES | ignore |
| Measurement Characteristics Request Indicator | O |  | 9.2.81 |  | YES | ignore |
| Measurement Time Occasion | O |  | ENUMERATED (o1, o4, …) |  | YES | ignore |
| Measurement Amount | O |  | ENUMERATED (0, 1, 2, 4, 8, 16, 32, 64) | This IE is ignored if the *Report Characteristics* IE is set to ‘OnDemand’.  Value 0 represents an infinite number of periodic reporting. | YES | ignore |

| Condition | Explanation |
| --- | --- |
| ifReportCharacteristicsPeriodic | This IE shall be present if the *Report Characteristics* IE is set to the value "Periodic". |
| ifMeasPerExt | This IE shall be present if the *Measurement Periodicity* IE is set to the value "extended". |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoPosMeas | Maximum no. of measured quantities that can be configured and reported with one positioning measurement message. Value is 16384. |
| maxnoofMeasTRPs | Maximum no. of TRPs that can be included within one message. Value is 64. |

#### 9.1.4.2 MEASUREMENT RESPONSE

This message is sent by the NG-RAN node to report positioning measurements for the target 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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| **TRP Measurement Response List** |  | *0..1* |  |  | YES | reject |
| **>TRP Measurement Response Item** |  | *1..<maxnoofMeasTRPs>* |  |  | EACH | reject |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>TRP Measurement Result | M |  | 9.2.37 |  | - |  |
| >>Cell ID | O |  | NR CGI  9.2.9 | The Cell ID of the TRP identified by the *TRP ID* IE. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofMeasTRPs | Maximum no. of TRPs that can be included within one message. Value is 64. |

#### 9.1.4.3 MEASUREMENT FAILURE

This message is sent by the NG-RAN node to report measurement failure.

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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

#### 9.1.4.4 MEASUREMENT REPORT

This message is sent by the NG-RAN node to report positioning measurements for the target 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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| **TRP Measurement Response List** |  | *1* |  |  | YES | reject |
| **>TRP Measurement Response Item** |  | *1..<maxnoofMeasTRPs>* |  |  | EACH | reject |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>TRP Measurement Result | M |  | 9.2.37 |  | - |  |
| >>Cell ID | O |  | NR CGI  9.2.9 | The Cell ID of the TRP identified by the *TRP ID* IE. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofMeasTRPs | Maximum no. of TRPs that can be included within one message. Value is 64. |

#### 9.1.4.5 MEASUREMENT UPDATE

This message is sent by the LMF to update a previously configured measurement.

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 | ignore |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| SRS Configuration | O |  | 9.2.28 |  | YES | ignore |
| **TRP Measurement Update List** |  | *0..1* |  |  | YES | reject |
| **>TRP Measurement Update Item** |  | 1..<*maxnoofMeasTRPs*> |  |  | EACH | reject |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>AoA Search Window Information | O |  | UL-AoA Assistance Information 9.2.66 |  | YES | ignore |
| >>Number of TRP Rx TEGs | O |  | ENUMERATED (2, 3, 4, 6, 8, …) |  | YES | ignore |
| >>Number of TRP RxTx TEGs | O |  | ENUMERATED (2, 3, 4, 6, 8, …) |  | YES | ignore |
| Measurement Characteristics Request Indicator | O |  | 9.2.81 |  | YES | ignore |
| Measurement Time Occasion | O |  | ENUMERATED (o1, o4, …) |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofMeasTRPs | Maximum no. of TRPs that can be included within one message. Value is 64. |

#### 9.1.4.6 MEASUREMENT ABORT

This message is sent by the LMF to request the NG-RAN node to abort a measurement.

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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |

#### 9.1.4.7 MEASUREMENT FAILURE INDICATION

This message is sent by the NG-RAN node to indicate that the previously requested measurements can no longer be reported.

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 |  | - |  |
| LMF Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| RAN Measurement ID | M |  | INTEGER (1..65536, …) |  | YES | reject |
| Cause | M |  | 9.2.1 |  | YES | ignore |

## 9.2 Information Element definitions

### 9.2.0 General

When specifying information elements which are to be represented by bit strings, if not otherwise specifically stated in the semantics description of the concerned IE or elsewhere, the following principle applies with regards to the ordering of bits:

- The first bit (leftmost bit) contains the most significant bit (MSB);

- The last bit (rightmost bit) contains the least significant bit (LSB);

- When importing bit strings from other specifications, the first bit of the bit string contains the first bit of the concerned information.

### 9.2.1 Cause

The purpose of the cause information element is to indicate the reason for a particular event for the whole protocol.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *Cause Group* | M |  |  |  |
| *>Radio Network Layer* |  |  |  |  |
| >>Radio Network Layer Cause | M |  | ENUMERATED  (Unspecified, Requested Item not Supported, Requested Item Temporarily not Available,  ..., Serving NG-RAN node changed, Requested Item not Supported on Time  ) |  |
| >*Protocol* |  |  |  |  |
| >>Protocol Cause | M |  | ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State,  Semantic Error, Unspecified,  Abstract Syntax Error (Falsely Constructed Message),  ...) |  |
| *>Misc* |  |  |  |  |
| >>Miscellaneous Cause | M |  | ENUMERATED (Unspecified,  ...) |  |

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the concerned capability is missing. On the other hand, "not available" cause values indicate that the concerned capability is present, but insufficient resources were available to perform the requested action.

|  |  |
| --- | --- |
| Radio Network Layer cause | Meaning |
| Unspecified | Sent when none of the above cause values applies but still the cause is Radio Network Layer related |
| Requested Item not Supported | The NG-RAN node does not support the requested measurement object, or cannot provide the requested information item. |
| Requested Item Temporarily not Available | The NG-RAN node can temporarily not provide the requested measurement object or information item. |
| Serving NG-RAN node changed | The UE has moved to another serving NG-RAN node. |
| Requested Item not Supported on Time | The NG-RAN node is unable to provide the measurement results on time. |

| Protocol cause | Meaning |
| --- | --- |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerned criticality indicated "reject" (see sub clause 10.3 of TS 38.413) |
| Abstract Syntax Error (Ignore and Notify) | The received message included an abstract syntax error and the concerned criticality indicated "ignore and notify" (see sub clause 10.3 of TS 38.413) |
| Abstract syntax error (falsely constructed message) | The received message contained IEs or IE groups in wrong order or with too many occurrences (see sub clause 10.3 of TS 38.413) |
| Message not Compatible with Receiver State | The received message was not compatible with the receiver state (see sub clause 10.4 of TS 38.413) |
| Semantic Error | The received message included a semantic error (see sub clause 10.4 of TS 38.413) |
| Transfer Syntax Error | The received message included a transfer syntax error (see sub clause 10.2 of TS 38.413) |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related |

|  |  |
| --- | --- |
| Miscellaneous cause | Meaning |
| Unspecified | Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer or Protocol. |

### 9.2.2 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the NG-RAN node or LMF when parts of a received message have not been comprehended or were missing, or if the message contained logical errors. When applicable, it contains information about which IEs were not comprehended or were missing. The conditions for inclusion of the *NRPPa Transaction ID* IE are described in clause 10.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Procedure Code | O |  | INTEGER (0..255) | Procedure Code is to be used if Criticality Diagnostics is part of Error Indication procedure, and not within the response message of the same procedure that caused the error. |
| Triggering Message | O |  | ENUMERATED (initiating message, successful outcome, unsuccessful outcome) | The Triggering Message is used only if the Criticality Diagnostics is part of Error Indication procedure. |
| Procedure Criticality | O |  | ENUMERATED (reject, ignore, notify) | This Procedure Criticality is used for reporting the Criticality of the Triggering message (Procedure). |
| NRPPa Transaction ID | O |  | 9.2.4 |  |
| **Information Element Criticality Diagnostics** |  | *0 .. <maxNrOfErrors>* |  |  |
| >IE Criticality | M |  | ENUMERATED (reject, ignore, notify) | The IE Criticality is used for reporting the criticality of the triggering IE. The value "ignore'" shall not be used. |
| >IE ID | M |  | INTEGER (0..65535) | The IE ID of the not understood or missing IE. |
| >Type Of Error | M |  | ENUMERATED (not understood, missing, …) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNrOfErrors | Maximum no. of IE errors allowed to be reported with a single message. The value for maxNroOfErrors is 256. |

### 9.2.3 Message Type

The *Message Type* IE uniquely identifies the message being sent. It is mandatory for all messages.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Procedure Code | M |  | INTEGER (0..255) |  |
| Type of Message | M |  | CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome,  …) |  |

### 9.2.4 NRPPa Transaction ID

The *NRPPa* *Transaction ID* IE is used to associate all the messages belonging to the same procedure. Messages belonging to the same procedure shall use the same NRPPa Transaction ID.

The NRPPa Transaction ID is determined by the initiating peer of a procedure.

The NRPPa Transaction ID shall uniquely identify a procedure among all ongoing parallel procedures using the same procedure code, and initiated by the same protocol peer.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| NRPPa Transaction ID | M |  | INTEGER (0..32767) |  |

### 9.2.5 E-CID Measurement Result

The purpose of the E-CID Measurement Result information element is to provide the E-CID measurement result.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Serving Cell ID | M |  | NG-RAN CGI  9.2.6 | NG-RAN Cell Identifier of the serving cell | - |  |
| Serving Cell TAC | M |  | TAC  9.2.11 | Tracking Area Code of the serving cell | - |  |
| NG-RAN Access Point Position | O |  | 9.2.10 | The configured estimated geographical position of the antenna of the cell.  If the *Geographical Coordinates* IE is used, the *NG-RAN Access Point Position* IE shall be ignored. | - |  |
| **Measured Results** |  | *0..1* |  | Measurement results of the serving RAT. | - |  |
| **>CHOICE *Measured Results Value*** |  | *1 ..<maxnoMeas>* |  |  | - |  |
| >>Value Angle of Arrival EUTRA | M |  | INTEGER (0..719) | According to mapping in TS 36.133 [9] | - |  |
| >>Value Timing Advance Type 1 EUTRA | M |  | INTEGER (0..7690) | As defined in TS 36.214 [17] | - |  |
| >>Value Timing Advance Type 2 EUTRA | M |  | INTEGER (0..7690) | As defined in TS 36.214 [17] | - |  |
| >>**Result RSRP EUTRA** |  | *1* |  |  | - |  |
| >>>**Result RSRP EUTRA Item** |  | *1 .. <maxCellReport>* |  |  | - |  |
| >>>>PCI EUTRA | M |  | INTEGER (0..503) | Physical Cell Identifier of the reported E-UTRA cell | - |  |
| >>>>EARFCN | M |  | INTEGER (0.. 262143, …) | Corresponds to NDL for FDD and NDL/UL for TDD in ref. TS 36.104 [7] | - |  |
| >>>>CGI EUTRA | O |  | 9.2.7 | Cell Global Identifier of the reported E-UTRA cell | - |  |
| >>>>Value RSRP EUTRA | M |  | INTEGER (0..97, …) |  | - |  |
| >>**Result RSRQ EUTRA** |  | *1* |  |  | - |  |
| >>>Result RSRQ EUTRA Item |  | *1 . <maxCellReport>* |  |  | - |  |
| >>>>PCI EUTRA | M |  | INTEGER (0..503) | Physical Cell Identifier of the reported E-UTRA cell | - |  |
| >>>>EARFCN | M |  | INTEGER (0..262143, …) | Corresponds to NDL for FDD and NDL/UL for TDD in ref. TS 36.104 [7] | - |  |
| >>>>CGI EUTRA | O |  | 9.2.7 | Cell Global Identifier of the reported E-UTRA cell | - |  |
| >>>>Value RSRQ EUTRA | M |  | INTEGER (0..34, …) |  | - |  |
| **>>Result SS-RSRP** |  | *1* |  |  | YES | ignore |
| **>>>Result SS-RSRP Item** |  | *1 .. <maxCellReportNR>* |  |  | - |  |
| >>>>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>>>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>>>NR CGI | O |  | 9.2.9 |  | - |  |
| >>>>Value SS-RSRP Cell | O |  | INTEGER (0..127) | SS-RSRP measurement aggregated at cell level | - |  |
| **>>>>SS-RSRP per SSB Resource** |  | *0..1* |  |  | - |  |
| >>>>>SS-RSRP per SSB Resource Item |  | *1 .. <maxIndexesReport>* |  |  | - |  |
| >>>>>>SSB Index | M |  | INTEGER (0..63) |  | - |  |
| >>>>>>Value SS-RSRP | M |  | INTEGER (0..127) | SS-RSRP measurement per SSB resource | - |  |
| **>>Result SS-RSRQ** |  | *1* |  |  | YES | ignore |
| >>>ResultSS-RSRQ-Item |  | *1 .. <maxCellReportNR>* |  |  | - |  |
| >>>>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>>>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>>>NR CGI | O |  | 9.2.9 |  | - |  |
| >>>>Value SS-RSRQ Cell | O |  | INTEGER (0..127) | SS-RSRQ measurement aggregated at cell level | - |  |
| **>>>>SS-RSRQ per SSB Resource** |  | *0..1* |  |  | - |  |
| >>>>>SS-RSRQ PerSSB Resource Item |  | *1 .. <maxIndexesReport>* |  |  | - |  |
| >>>>>>SSB Index | M |  | INTEGER (0..63) |  | - |  |
| >>>>>>Value SS-RSRQ | M |  | INTEGER (0..127) | SS-RSRQ measurement per SSB resource | - |  |
| **>>Result CSI-RSRP** |  | *1* |  |  | YES | ignore |
| >>>Result CSI-RSRP Item |  | *1 .. <maxCellReportNR>* |  |  | - |  |
| >>>>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>>>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>>>NR CGI | O |  | 9.2.9 |  | - |  |
| >>>>Value CSI-RSRP Cell | O |  | INTEGER (0..127) | CSI-RSRP measurement aggregated at cell level | - |  |
| **>>>>CSI-RSRP per CSI-RS Resource** |  | *0..1* |  |  | - |  |
| >>>>>CSI-RSRP per CSI-RS Resource Item |  | *1.. <maxIndexesReport>* |  |  | - |  |
| >>>>>>CSI-RS Index | M |  | INTEGER (0..95) |  | - |  |
| >>>>>>Value CSI-RSRP | M |  | INTEGER (0..127) | CSI-RSRP measurement per CSI-RS resource | - |  |
| **>>Result CSI-RSRQ** |  | *1* |  |  | YES | ignore |
| >>>Result CSI-RSRQ Item |  | *1 .. <maxCellReportNR>* |  |  | - |  |
| >>>>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>>>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>>>NR CGI | O |  | 9.2.9 |  | - |  |
| >>>>Value CSI-RSRQ Cell | O |  | INTEGER (0..127) | CSI-RSRQ measurement aggregated at cell level | - |  |
| **>>>>CSI-RSRQ per CSI-RS Resource** |  | *0..1* |  |  | - |  |
| >>>>>CSI-RSRQ per CSI-RS Resource Item |  | *1 .. <maxIndexesReport>* |  |  | - |  |
| >>>>>>CSI-RS Index | M |  | INTEGER (0..95) |  | - |  |
| >>>>>>Value CSI-RSRQ | M |  | INTEGER (0..127) | CSI-RSRQ measurement per CSI-RS resource | - |  |
| >>Angle of Arrival NR | M |  | UL Angle of Arrival  9.2.38 |  | YES | ignore |
| >>Value Timing Advance NR | M |  | INTEGER (0.. 7690) | As defined in TS 38.215 [19] | YES | ignore |
| Geographical Coordinates | O |  | 9.2.46 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoMeas | Maximum no. of measured quantities that can be configured and reported with one message. Value is 64. |
| maxCellReport | Maximum no. of cells that can be reported with one message. Value is 9. |
| maxCellReportNR | Maximum no. of NR cells that can be reported with one message. Value is 9. |
| maxIndexesReport | Maximum no. of beam level measurement results that can be reported with one message. Value is 64. |

### 9.2.6 NG-RAN CGI

The NG-RAN Cell Global Identifier (CGI) is used to globally identify a cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| PLMN identity | M |  | 9.2.8 |  |
| CHOICE *NG-RAN Cell* | M |  |  |  |
| *>NR Cell* |  |  |  |  |
| NR Cell Identifier | M |  | BIT STRING (36) |  |
| *>E-UTRAN Cell* |  |  |  |  |
| E-UTRAN Cell Identifier | M |  | BIT STRING (28) |  |

### 9.2.7 CGI EUTRA

The Cell Global Identifier EUTRA is used to globally identify an E-UTRA cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| PLMN identity | M |  | 9.2.8 |  |
| E-UTRA Cell Identifier | M |  | BIT STRING (28) |  |

### 9.2.8 PLMN Identity

This IE indicates the PLMN Identity.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| PLMN Identity | M |  | OCTET STRING (SIZE(3)) | Digits 0 to 9 encoded 0000 to 1001, 1111 used as filler digit.  Two digits per octet:  - bits 4 to 1 of octet n encoding digit 2n-1  - bits 8 to 5 of octet n encoding digit 2n  PLMN Identity consists of 3 digits from MCC followed by either: - a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or - 3 digits from MNC (in case of 3 digit MNC). |

### 9.2.9 NR CGI

The Cell Global Identifier NR is used to globally identify an NR cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| PLMN Identity | M |  | 9.2.8 |  |
| NR Cell Identity | M |  | BIT STRING (SIZE(36)) |  |

### 9.2.10 NG-RAN Access Point Position

The *NG-RAN Access Point Position* IE is used to identify the geographical position of an NG-RAN Access Point. It is expressed as ellipsoid point with altitude and uncertainty ellipsoid according to TS 23.032 [8].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Latitude Sign | M |  | ENUMERATED (North, South) |  |
| Degrees Of Latitude | M |  | INTEGER  (0..223-1) | The IE value (N) is derived by this formula:  N223 X /90  N+1  X being the latitude in degrees (0°.. 90°). |
| Degrees Of Longitude | M |  | INTEGER  (-223..223-1) | The IE value (N) is derived by this formula:  N224 X /360  N+1  X being the longitude in degrees (-180°..+180°). |
| Direction of Altitude | M |  | ENUMERATED (Height, Depth) |  |
| Altitude | M |  | INTEGER  (0..215-1) | The relation between the value (N) and the altitude (a) in meters it describes is N ≤ a < N+1, except for N=215-1 for which the range is extended to include all greater values of (a). |
| Uncertainty semi-major | M |  | INTEGER (0..127) | The uncertainty "r" is derived from the "uncertainty code" k by r = 10x(1.1k-1). |
| Uncertainty semi-minor | M |  | INTEGER (0..127) | The uncertainty "r" is derived from the "uncertainty code" k by r = 10x(1.1k-1). |
| Orientation of major axis | M |  | INTEGER (0..179) |  |
| Uncertainty Altitude | M |  | INTEGER (0..127) | The uncertainty altitude "h" expressed in metres is derived from the "uncertainty code" k, by:  h=45x(1.025k-1). |
| Confidence | M |  | INTEGER (0..100) | In percentage |

### 9.2.11 TAC

This information element is used to uniquely identify a Tracking Area Code.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TAC | M |  | OCTET STRING (SIZE (3)) |  |

### 9.2.12 Cell Portion ID

This parameter gives the current Cell Portion associated with the target UE. The Cell Portion ID is the unique identifier for a cell portion within a cell.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Cell Portion ID | M |  | INTEGER (0..4095,…) |  |

### 9.2.13 Other-RAT Measurement Result

The purpose of the Other-RAT Measurement Result information element is to provide the measurement results of RATs other than the serving RAT.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **Other-RAT Measured Results** |  | *1* |  |  | - |  |
| >CHOICE *Other-RAT Measured Results Value* |  | *1.. <maxnoMeas>* |  |  | - |  |
| >>**Result GERAN** |  | *1* |  |  | - |  |
| >>>Result GERAN Item |  | *1..<maxGERANMeas>* |  |  | - |  |
| >>>>ARFCN of BCCH | M |  | INTEGER (0..1023, ...) |  | - |  |
| >>>>Physical CellId GERAN | M |  | INTEGER (0..63, ...) |  | - |  |
| >>>>RSSI | M |  | INTEGER (0..63, ...) |  | - |  |
| >>**Result UTRAN** |  | *1* |  |  | - |  |
| >>>Result UTRAN Item |  | *1..<maxUTRANMeas>* |  |  | - |  |
| >>>>UARFCN | M |  | INTEGER (0..16383, ...) |  | - |  |
| >>>>CHOICE Physical CellId UTRA | M |  |  |  | - |  |
| >>>>>Physical CellId UTRA FDD | M |  | INTEGER (0..511, ...) |  | - |  |
| >>>>>Physical CellId UTRA TDD | M |  | INTEGER (0..127, ...) |  | - |  |
| >>>>UTRA RSCP | O |  | INTEGER (-5..91, ...) |  | - |  |
| >>>>UTRA EcNo | O |  | INTEGER (0..49, ...) | This IE applies to FDD only. | - |  |
| **>>Result NR** |  | *1* |  |  | YES | ignore |
| >>>Result NR Item |  | *1..<maxNRMeas>* |  |  | - |  |
| >>>>NR PCI | M |  | INTEGER (0..1007) |  | - |  |
| >>>>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>>>SS-RSRP Cell | O |  | INTEGER (0..127) | SS-RSRP measurement aggregated at cell level | - |  |
| >>>>SS-RSRQ Cell | O |  | INTEGER (0..127) | SS-RSRQ measurement aggregated at cell level | - |  |
| >>>>**SS-RSRP per SSB Resource** |  | *0..1* |  |  | - |  |
| >>>>>Result SS-RSRP Per SSB Item |  | *1..<maxIndexesReport)>* |  |  | - |  |
| >>>>>>SSB Index | M |  | INTEGER (0..63) |  | - |  |
| >>>>>>Value SS-RSRP | M |  | INTEGER (0..127) | SS-RSRP measurement per SSB resource | - |  |
| >>>>**SS-RSRQ per SSB Resource** |  | *0..1* |  |  | - |  |
| >>>>>Result SS-RSRQ Per SSB Item |  | *1..<maxIndexesReport>* |  |  | - |  |
| >>>>>>SSB Index | M |  | INTEGER (0..63) |  | - |  |
| >>>>>>Value SS-RSRQ | M |  | INTEGER (0..127) | SS-RSRQ measurement per SSB resource | - |  |
| >>>>CGI NR | O |  | 9.2.9 | Cell Global Identifier of the reported NR cell | - |  |
| **>>Result EUTRA** |  | *1* |  |  | YES | ignore |
| **>>>Result EUTRA Item** |  | *1..<maxEUTRAMeas>* |  |  | - |  |
| >>>>PCI EUTRA | M |  | INTEGER (0..503) |  | - |  |
| >>>>EARFCN | M |  | INTEGER (0..262143) |  | - |  |
| >>>>RSRP EUTRA | O |  | INTEGER (0..97) |  | - |  |
| >>>>RSRQ EUTRA | O |  | INTEGER (0..34) |  | - |  |
| >>>>CGI EUTRA | O |  | 9.2.7 | Cell Global Identifier of the reported E-UTRA cell | - |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoMeas | Maximum no. of measured quantities that can be configured and reported with one message. Value is 64. |
| maxGERANMeas | Maximum no. of GERAN cells that can be reported with one message. Value is 8. |
| maxUTRANMeas | Maximum no. of UTRAN cells that can be reported with one message. Value is 8. |
| maxNRMeas | Maximum no. of NR cells that can be reported with one message. Value is 8. |
| maxEUTRAMeas | Maximum no. of EUTRA cells that can be reported with one message. Value is 8. |
| maxIndexesReport | Maximum no. of beam level measurement results that can be reported with one message. Value is 64. |

### 9.2.14 WLAN Measurement Result

The WLAN Measurement Result information element provides the WLAN measurement results.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **WLAN Measured Results** |  | *1* |  |  |
| **>WLAN Measurement Result Item** |  | *1.. <maxnoMeas>* |  |  |
| >>WLAN RSSI | M |  | INTEGER (0..141, ...) |  |
| >>SSID | O |  | OCTET STRING (SIZE(1..32)) | Includes the SSID field as defined in subclause 8.4.2.2 of IEEE 802.11™ [11]. |
| >>BSSID | M |  | OCTET STRING (SIZE(6)) | Includes the BSSID field as defined in subclause 8.2.4.3.4 of IEEE 802.11™ [11]. |
| >>HESSID | O |  | OCTET STRING (SIZE(6)) | Includes the HESSID field as defined in subclause 8.4.2.94 of IEEE 802.11™ [11]. |
| >>Operating Class | O |  | INTEGER (0..255) | Indicates the WLAN Operating Class as defined in IEEE 802.11™ [11]. |
| >>Country Code | O |  | ENUMERATED (unitedStates, europe, japan, global, …) | Indicates the WLAN country code as defined in IEEE 802.11™ [11]. |
| **>>WLAN Channel List** |  | *0..1* |  |  |
| >>>WLAN Channel List Item |  | *1..<maxWLANchannels>* |  |  |
| >>>>WLAN Channel | M |  | INTEGER (0..255) | Indicates the WLAN channel number as defined in IEEE 802.11™ [11]. |
| >>WLAN Band | O |  | ENUMERATED (band2dot4, band5, …) | Indicates the WLAN band as defined in IEEE 802.11™ [11]. |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoMeas | Maximum no. of measured quantities that can be configured and reported with one message. Value is 63. |
| maxWLANchannels | Maximum no. of WLAN channels that can be reported within one list. Value is 16. |

### 9.2.15 OTDOA Cell Information

This IE contains OTDOA information of a cell/TP.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **CHOICE *OTDOA Cell Information item*** |  | *1 <maxnoOTDOAtypes>* |  |  |  |  |
| >>PCI EUTRA | M |  | INTEGER (0..503, …) | Physical Cell ID of the reported E-UTRA cell. |  |  |
| >>CGI EUTRA | M |  | 9.2.7 | Cell Global Identifier of the E-UTRA cell. |  |  |
| >>TAC | M |  | 9.2.11 | Tracking Area Code |  |  |
| >>EARFCN | M |  | INTEGER (0.. 262143, …) | Corresponds to NDL for FDD and NDL/UL for TDD in ref. TS 36.104 [7]. |  |  |
| >>PRS Bandwidth EUTRA | M |  | ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...) | Transmission bandwidth of PRS |  |  |
| >>PRS Configuration Index EUTRA | M |  | INTEGER (0..4095, ...) | PRS Configuration Index, ref TS 36.211 [10] |  |  |
| >>CP Length EUTRA | M |  | ENUMERATED (Normal, Extended, ...) | Cyclic prefix length of the PRS |  |  |
| >>Number of DL Frames EUTRA | M |  | ENUMERATED (sf1, sf2, sf4, sf6, …) | Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10] |  |  |
| >>Number of Antenna Ports EUTRA | M |  | ENUMERATED(n1-or-n2, n4, …) | Number of used antenna ports, where n1-or-n2 corresponds to 1 or 2 ports, n4 corresponds to 4 ports |  |  |
| >>SFN Initialisation Time EUTRA | M |  | BIT STRING (64) | Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of 1 /2\*\*32 second. |  |  |
| >>NG-RAN Access Point Position | M |  | 9.2.10 | The configured estimated geographical position of the antenna of the cell/TP. |  |  |
| >>PRS Muting Configuration EUTRA | M |  | 9.2.16 | The configuration of positioning reference signals muting pattern. |  |  |
| >>PRS-ID EUTRA | M |  | INTEGER (0..4095, …) | PRS ID, ref TS 36.211 [10]. |  |  |
| >>TP-ID EUTRA | M |  | INTEGER (0..4095, …) | Identity of the transmission point. This IE together with the *PCI* and/or *PRS-ID* may be used to identify the transmission point in case the same physical cell ID is shared by multiple transmission points. |  |  |
| >>TP Type EUTRA | M |  | ENUMERATED (prs-only-tp, …) | A TP which transmits PRS only. |  |  |
| >>Number of DL Frames-Extended EUTRA | M |  | INTEGER (1..160, …) | Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10]. |  |  |
| >>CRS CP Length EUTRA | M |  | ENUMERATED (Normal, Extended, ...) | Cyclic prefix length of the CRS. |  |  |
| >>DL Bandwidth EUTRA | M |  | ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...) | DL transmission bandwidth expressed in units of resource blocks NRB, ref TS 36.104 [7]. |  |  |
| >>PRS Occasion Group EUTRA | M |  | ENUMERATED (og2, og4, og8, og16, og32, og64, og128, ...) | PRS occasion group in a PRS period, ref TS 36.211 [10]. |  |  |
| >>PRS Frequency Hopping Configuration EUTRA | M |  | 9.2.17 | PRS frequency hopping configuration. |  |  |
| >>TDD Configuration EUTRA | M |  | 9.2.18 | TDD specific physical channel configuration. | YES | ignore |
| >>NR CGI | M |  | 9.2.9 | Cell Global Identifier of the NR cell. | YES | ignore |
| >>SFN Initialisation Time NR | M |  | BIT STRING (64) | Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of 1 /2\*\*32 second. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoOTDOAtypes | Maximum no. of OTDOA information types that can be requested and reported with one message. Value is 63. |

### 9.2.16 PRS Muting Configuration EUTRA

The *PRS Muting Configuration EUTRA* IE is used to describe the configuration of PRS muting patterns for the concerned cell/TP, according to TS 36.211 [10] and TS 36.133 [9].

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE *PRS Muting Configuration* | M |  |  |  |
| >Two | M |  | BIT STRING (2) | If a bit is set to "0", it indicates that the PRS is muted in the corresponding PRS positioning occasion (numbering from any sub frame for which SFN=0) in a periodic cycle of length equal to the length of the bit string |
| >Four | M |  | BIT STRING (4) | Same as above |
| >Eight | M |  | BIT STRING (8) | Same as above |
| >Sixteen | M |  | BIT STRING (16) | Same as above |
| >thirty-two | M |  | BIT STRING (32) | Same as above |
| >sixty-four | M |  | BIT STRING (64) | Same as above |
| >one-hundred-and-twenty-eight | M |  | BIT STRING (128) | Same as above |
| >two-hundred-and-fifty-six | M |  | BIT STRING (256) | Same as above |
| >five-hundred-and-twelve | M |  | BIT STRING (512) | Same as above |
| >one-thousand-and-twenty-four | M |  | BIT STRING (1024) | Same as above |

### 9.2.17 PRS Frequency Hopping Configuration EUTRA

The *PRS Frequency Hopping Configuration EUTRA* IE is used to describe the configuration of PRS frequency hopping for the concerned cell/TP, according to TS 36.211 [10].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Number of Frequency Hopping Bands | M |  | ENUMERATED (twobands, fourbands, ...) | Number of bands for frequency hopping. |
| **Band Positions** |  | *1..* <*maxnoFreqHoppingBandsMinusOne,...>* |  |  |
| >NarrowBand Index | M |  | INTEGER (0..15, ...) | Narrowband Index |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoFreqHoppingBandsMinusOne | Maximum no. of frequency hopping bands minus one. Value is 7. |

### 9.2.18 TDD Configuration EUTRA

The *TDD Configuration EUTRA* IE is used to specify the TDD specific physical channel configuration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Subframe Assignment | M |  | ENUMERATED ( sa0, sa1, sa2, sa3, sa4, sa5, sa6, … ) | sa0 points to Configuration 0, sa1 to Configuration 1 etc. as specified in TS 36.211 [6, table 4.2-2]. |

### 9.2.19 Assistance Information

This IE contains the assistance information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **Assistance Information** | M |  |  |  |
| >**System Information** |  | *1..<maxNrOfPosSImessage>* |  | Corresponds to the number of SI messages with posSIBs to be scheduled |
| >>Broadcast Periodicity | M |  | ENUMERATED (ms80, ms160, ms320, ms640, ms1280, ms2560, ms5120, ...) | Corresponds to information provided in *posSI-Periodicity* contained in the *PosSI-SchedulingInfo* IE as defined in TS 38.331 [13] |
| >>**Pos SIBs** |  | *1..<maxNrOfPosSIBs>* |  | Number of posSIBs in the System Information. |
| >>>PosSIB-Type | M |  | 9.2.22 |  |
| >>>PosSIB Segments | M |  | 9.2.20 |  |
| >>>Assistance Information Meta Data | O |  | 9.2.21 |  |
| >>>Broadcast Priority | O |  | INTEGER (1..16, ...) | The priority of the assistance Information where 1 represents the highest priority and 16 the lowest priority |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNrOfPosSImessage | Maximum number of positioning system information messages. Value is 32. |
| maxNrOfPosSIBs | Maximum number of positioning system information blocks included in the message. Value is 32. |

### 9.2.20 PosSIB Segments

This IE provides one posSIB or two or more posSIB segments which must be scheduled in series in consecutive transmissions of the same SI message.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **PosSIB Segments** |  | *1..<maxNrOfSegments>* |  |  |
| >Assistance Data SIB Element | M |  | OCTET STRING | Includes the *assistanceDataSIBElement* IE as defined in TS 37.355 [14] |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNrOfSegments | Maximum number of positioning SIB segments (in case of *Assistance Information Element* contains segmented data according to TS 37.355 [14]). Value is 64. |

### 9.2.21 Assistance Information Meta Data

This parameter contains meta data for an assistance information element.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Encrypted | O |  | ENUMERATED (true, …) | Corresponds to information provided in *encrypted* contained in the *PosSI-SchedulingInfo* IE as defined in TS 38.331 [13] |
| GNSS ID | O |  | ENUMERATED (gps, sbas, qzss, galileo, glonass, bds, navic ...) | Corresponds to information provided in *gnss-id* contained in the *PosSI-SchedulingInfo* IE as defined in TS 38.331 [13] |
| SBAS ID | O |  | ENUMERATED (waas, egnos, msas, gagan, ...) | Corresponds to to information provided in *sbas-id* contained in the *PosSI-SchedulingInfo* IE as defined in TS 38.331 [13] |

### 9.2.22 Positioning SIB Type

This parameter defines a specific positioning SIB, as defined in TS 38.331 [13].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Positioning SIB Type | M |  | ENUMERATED ( posSibType1-1,  posSibType1-2,  posSibType1-3,  posSibType1-4,  posSibType1-5,  posSibType1-6,  posSibType1-7,  posSibType1-8,  posSibType2-1,  posSibType2-2,  posSibType2-3,  posSibType2-4,  posSibType2-5,  posSibType2-6,  posSibType2-7,  posSibType2-8,  posSibType2-9,  posSibType2-10,  posSibType2-11,  posSibType2-12,  posSibType2-13,  posSibType2-14,  posSibType2-15,  posSibType2-16,  posSibType2-17,  posSibType2-18,  posSibType2-19,  posSibType2-20,  posSibType2-21,  posSibType2-22,  posSibType2-23,  posSibType2-24,  posSibType2-25,  posSibType3-1,  posSibType4-1,  posSibType5-1,  posSibType6-1,  posSibType6-2,  posSibType6-3,  ...,  posSibType1-9, posSibType1-10,  posSibType6-4, posSibType6-5, posSibType6-6) |  |

### 9.2.23 Assistance Information Failure List

This parameter identifies the assistance information for which the NG-RAN Node failed to configure broadcasting.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **Assistance Information Failure List** |  | *1..<maxnoAssistInfoFailureListItems>* |  |  |
| >PosSIB-Type | M |  | 9.2.22 |  |
| >Outcome | M |  | ENUMERATED (failed, ...) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoAssistInfoFailureListItems | Maximum no. of assistance information failure list items that can be signaled with one message. Value is 32. |

### 9.2.24 TRP ID

The *TRP ID* IE is used to identify a TRP uniquely within an NG-RAN node.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| TRP Identifier | M |  | INTEGER (1..65535,…) | Identifies a TRP within an NG-RAN node |

### 9.2.25 TRP Information

The *TRP Information* IE contains information for one TRP within an NG-RAN node.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| TRP ID | M |  | 9.2.24 |  | - |  |
| **TRP Information Type** |  | *1 .. <maxnoTRPInfoTypes>* |  |  | - |  |
| >CHOICE *TRP Information Item* | M |  |  |  | - |  |
| >>NR PCI | M |  | INTEGER (0..1007) | NR Physical Cell ID | - |  |
| >>NR CGI | M |  | 9.2.9 |  | - |  |
| >>NR ARFCN | M |  | INTEGER (0..3279165) |  | - |  |
| >>PRS Configuration | M |  | 9.2.44 |  | - |  |
| >>SSB Information | M |  | 9.2.54 |  | - |  |
| >>SFN Initialisation Time | M |  | Relative Time 1900  9.2.36 |  | - |  |
| >>Spatial Direction Information | M |  | 9.2.45 |  | - |  |
| >>Geographical Coordinates | M |  | 9.2.46 |  | - |  |
| >>TRP type | M |  | ENUMERATED (prs-only-tp, srs-only-rp, tp, rp, trp…) | TS 38.305 [18] | YES | reject |
| >>On-demand PRS TRP Information | M |  | 9.2.65 |  | YES | reject |
| >>TRP Tx TEG Association | M |  | 9.2.79 |  | YES | reject |
| >>TRP Beam Antenna Information | M |  | 9.2.82 |  | YES | reject |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPInfoTypes | Maximum no of TRP information types that can be requested and reported with one message. Value is 64. |

9.2.26 Search Window Information

This information element contains search window information for the TRP.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Expected Propagation Delay | M |  | INTEGER  (-3841..3841,…) | Indicates when the SRS is expected to arrive in time at the TRP relative to the UL RTOA Reference Time.  The UL RTOA Reference Time for a target SRS is defined as , where  -     is the SFN Initialisation Time  -     , where and are the system frame number and the subframe number of the SRS, respectively.  Granularity 4Ts, where Ts=1/(15⋅103 ⋅2048) seconds.  Centre of the search window. |
| Delay Uncertainty | M |  | INTEGER  (1..246,…) | Indicates the uncertainty of the expected SRS arrival time at the TRP  Granularity 4Ts, where Ts=1/(15⋅103⋅2048) seconds.  Single-sided search window. |

### 9.2.27 Requested SRS Transmission Characteristics

This IE contains the requested SRS configuration for the UE.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Number Of Periodic Transmissions | C-ifResourceTypePeriodic |  | INTEGER (0..500,…) | The number of periodic SRS transmissions requested. The value of ‘0’ represents an infinite number of periodic SRS transmissions. |  |  |
| Resource Type | M |  | ENUMERATED (periodic, semi-persistent, aperiodic, …) |  |  |  |
| CHOICE *Bandwidth* | M |  |  |  |  |  |
| >FR1 |  |  | ENUMERATED (5mHz, 10mHz, 20mHz, 40mHz, 50mHz, 80mHz, 100mHz, ...) |  |  |  |
| >FR2 |  |  | ENUMERATED (50mHz, 100mHz, 200mHz, 400mHz,…) |  |  |  |
| **SRS Resource Set List** |  | *0.. 1* |  |  |  |  |
| **>SRS Resource Set Item** |  | *1..<* *maxnoSRS-ResourceSets>* |  |  |  |  |
| >>Number of SRS Resources Per Set | O |  | INTEGER (1..16,...) | The number of SRS Resources per resource set for SRS transmission. |  |  |
| **>>Periodicity List** |  | *0.. 1* |  |  |  |  |
| **>>>Periodicity List Item** |  | *1..<maxnoSRS-ResourcePerSet>* |  |  |  |  |
| >>>>PeriodicitySRS | M |  | ENUMERATED (0.125, 0.25, 0.5, 0.625, 1, 1.25, 2, 2.5, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 160, 320, 640, 1280, 2560, 5120, 10240, …) | Milli-seconds |  |  |
| >>Spatial Relation Information | O |  | 9.2.34 | This IE is ignored if the *Spatial Relation Information per SRS Resource* IE is present. |  |  |
| >>Pathloss Reference Information | O |  | 9.2.53 |  |  |  |
| >>Spatial Relation Information per SRS Resource | O |  | 9.2.60 |  |  |  |
| SSB Information | O |  | 9.2.54 |  |  |  |
| SRS Frequency | O |  | INTEGER(0..3279165) | NR ARFCN  The carrier frequency of SRS transmission bandwidth. | YES | ignore |

|  |  |
| --- | --- |
| Condition | Explanation |
| ifResourceTypePeriodic | This IE shall be present if the *Resource Type* IE is set to the value "Periodic". |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoSRS-ResourceSets | Maximum no of requested SRS Resource Sets for SRS transmission. Value is 16. |
| maxnoSRS-ResourcePerSet | Maximum no of SRS Resources per set. Value is 16. |

### 9.2.28 SRS Configuration

This information element contains the SRS configuration configured by the NG-RAN node for the UE.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **SRS Carrier List** |  | *1* |  |  |
| **>SRS Carrier List Item** |  | *1..<maxnoSRS-Carriers>* |  |  |
| >>Point A | M |  | INTEGER (0..3279165) | NR ARFCN |
| **>>Uplink Channel BW-PerSCS-List** |  | *1* |  | Corresponds to *sCS-SpecificCarrierList* in TS 38.331 [13] |
| **>>>SCS Specific Carrier** |  | *1. .<maxnoSCSs>* |  |  |
| >>>>Offset To Carrier | M |  | INTEGER(0..2199,…) | First usable RB to Point A in the number of PRBs |
| >>>>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120,…, kHz480, kHz960) |  |
| >>>>Carrier Bandwidth | M |  | INTEGER(1..275,…) |  |
| **>>Active UL BWP** | M |  |  | Only the configuration in the active UL BWP is needed. |
| >>>Location And Bandwidth | M |  | INTEGER(0..37949,…) | Corresponds to information provided in *locationAndBandwidth* contained in *BWP* IE as defined in TS 38.331 [13] |
| >>>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120,…, kHz480, kHz960) |  |
| >>>Cyclic Prefix | M |  | ENUMERATED(Normal, Extended) |  |
| >>>Tx Direct Current Location | M |  | INTEGER(0..3301,…) |  |
| >>>Shift7dot5kHz | O |  | ENUMERATED(true,…) |  |
| >>>SRS Config | M |  |  | Corresponds to information provided in *SRS-Config* IE as defined in TS 38.331 [13] |
| **>>>>SRS Resource List** |  | *0..<maxnoSRS-Resources>* |  |  |
| >>>>>SRS Resource | M |  | 9.2.29 | Corresponds to information provided in *SRS-Resource* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| **>>>>Positioning SRS Resource List** |  | *0..< maxnoSRS-PosResources>* |  |  |
| >>>>>Positioning SRS Resource | M |  | 9.2.30 | Corresponds to information provided in *SRS-PosResource* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| **>>>>SRS Resource Set List** |  | *0..<maxnoSRS-ResourceSets>* |  |  |
| >>>>>SRS Resource Set | M |  | 9.2.31 | Corresponds to information provided in *SRS-ResourceSet* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| **>>>>Positioning SRS Resource Set List** |  | *0..<maxnoSRS-PosResourceSets>* |  |  |
| >>>>>Positioning SRS Resource Set | M |  | 9.2.32 | Corresponds to information provided in *SRS-PosResourceSet* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| >>NR PCI | O |  | INTEGER (0..1007) | Physical Cell ID of the cell that contains the SRS carrier |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoSRS-Carriers | Maximum no of carriers for SRS. Value is 32. |
| maxnoSCSs | Maximum no of SCS spacings for a carrier. Value is 5. |
| maxnoSRS-Resources | Maximum no of SRS resources per UL BWP. Value is 64. |
| maxnoSRS-PosResources | Maximum no of positioning SRS resources per UL BWP. Value is 64. |
| maxnoSRS-ResourceSets | Maximum no of SRS resource sets per UL BWP. Value is 16. |
| maxnoSRS-PosResourceSets | Maximum no of positioning SRS resource sets per UL BWP. Value is 16. |

### 9.2.29 SRS Resource

This information element contains the SRS resource.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| SRS Resource ID | M |  | INTEGER(0..63) |  | - |  |
| Number of Ports | M |  | ENUMERATED(port1, ports2, ports4) |  | - |  |
| CHOICE *Transmission Comb* | M |  |  |  | - |  |
| >*Comb Two* |  |  |  |  |  |  |
| >>Comb Offset | M |  | INTEGER(0..1) |  | - |  |
| >>Cyclic Shift | M |  | INTEGER(0..7) |  | - |  |
| >*Comb Four* |  |  |  |  |  |  |
| >>Comb Offset | M |  | INTEGER(0..3) |  | - |  |
| >>Cyclic Shift | M |  | INTEGER(0..11) |  | - |  |
| >*Comb Eight* | M |  |  |  | YES | reject |
| >>Comb Offset | M |  | INTEGER(0..7) |  | - | - |
| >>Cyclic Shift | M |  | INTEGER(0..5) |  | - | - |
| Start Position | M |  | INTEGER(0..13) |  | - |  |
| Number of Symbols | M |  | ENUMERATED(n1,n2,n4) | This IE is ignored if the *Number of Symbols* *Extended* IE is included | - |  |
| Repetition Factor | M |  | ENUMERATED(r1,r2,r4) | This IE is ignored if the *Repetition Factor* *Extended* IE is included | - |  |
| Frequency Domain Position | M |  | INTEGER(0..67) |  | - |  |
| Frequency Domain Shift | M |  | INTEGER(0..268) |  | - |  |
| C-SRS | M |  | INTEGER(0..63) |  | - |  |
| B-SRS | M |  | INTEGER(0..3) |  | - |  |
| B-Hop | M |  | INTEGER(0..3) |  | - |  |
| Group or Sequence Hopping | M |  | ENUMERATED(neither, groupHopping, sequenceHopping) |  | - |  |
| CHOICE *Resource Type* | M |  |  |  | - |  |
| >*Periodic* |  |  |  |  | - |  |
| >>Periodicity | M |  | ENUMERATED(slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, …) |  | - |  |
| >>Offset | M |  | INTEGER(0..2559, …) |  | - |  |
| >*Semi-persistent* |  |  |  |  |  |  |
| >>Periodicity | M |  | ENUMERATED(slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, …) |  | - |  |
| >>Offset | M |  | INTEGER(0..2559, …) |  | - |  |
| >*Aperiodic* |  |  |  |  |  |  |
| >>Aperiodic Resource Type | M |  | ENUMERATED(true,…) |  | - |  |
| Sequence ID | M |  | INTEGER(0..1023) |  | - |  |
| Number of Symbols Extended | O |  | ENUMERATED(n8,n10,n12, n14, …) |  | YES | ignore |
| Repetition Factor Extended | O |  | ENUMERATED(r3, r5, r6, r7, r8, r10, r12, r14, …) |  | YES | ignore |
| Start RB Hopping | O |  | ENUMERATED(enable) |  | YES | ignore |
| CHOICE Start RB Index | O |  |  |  | YES | ignore |
| >FreqScalingFactor2 | M |  | INTEGER (0..1) |  | - | - |
| >FreqScalingFactor4 | M |  | INTEGER (0..3) |  | - | - |

### 9.2.30 Positioning SRS Resource

This information element contains the SRS resource for positioning.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Positioning SRS Resource ID | M |  | INTEGER(0..63) |  |
| CHOICE *Transmission Comb* | M |  |  |  |
| >*Comb Two* |  |  |  |  |
| >>Comb Offset | M |  | INTEGER(0..1) |  |
| >>Cyclic Shift | M |  | INTEGER(0..7) |  |
| >*Comb Four* |  |  |  |  |
| >>Comb Offset | M |  | INTEGER(0..3) |  |
| >>Cyclic Shift | M |  | INTEGER(0..11) |  |
| >*Comb Eight* |  |  |  |  |
| >>Comb Offset | M |  | INTEGER(0..7) |  |
| >>Cyclic Shift | M |  | INTEGER(0..5) |  |
| Start Position | M |  | INTEGER(0..13) |  |
| Number of Symbols | M |  | ENUMERATED(n1,n2,n4, n8, n12} |  |
| Frequency Domain Shift | M |  | INTEGER(0..268) |  |
| C-SRS | M |  | INTEGER(0..63) |  |
| Group or Sequence Hopping | M |  | ENUMERATED(Neither, groupHopping, sequenceHopping) |  |
| CHOICE *Resource Type Positioning* | M |  |  |  |
| >*periodic* |  |  |  |  |
| >>Periodicity | M |  | ENUMERATED(slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, slot5120, slot10240, slot40960, slot81920,…, slot128, slot256, slot512, slot20480) |  |
| >>Offset | M |  | INTEGER(0..81919,…) |  |
| >*semi-persistent* |  |  |  |  |
| >>Periodicity | M |  | ENUMERATED(slot 1, slot 2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, slot5120, slot10240, slot40960, slot81920,…, slot128, slot256, slot512, slot20480) |  |
| >>Offset | M |  | INTEGER(0..81919,…) |  |
| >*aperiodic* |  |  |  |  |
| >>slot offset | M |  | INTEGER(0..32) |  |
| Sequence ID | M |  | INTEGER(0..65535) |  |
| CHOICE *Spatial Relation Positioning* | O |  |  |  |
| >*SSB* |  |  |  |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |
| >>SSB index | O |  | INTEGER(0..63) |  |
| >*PRS* |  |  |  |  |
| >>PRS ID | M |  | INTEGER(0..255) |  |
| >>PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| >>PRS Resource ID | O |  | INTEGER(0..63) |  |

### 9.2.31 SRS Resource Set

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SRS Resource Set ID | M |  | INTEGER(0..15) |  |
| **SRS Resource ID List** |  | *1..<maxnoSRS-ResourcePerSet>* |  |  |
| >SRS Resource ID | M |  | INTEGER(0..63) |  |
| CHOICE *Resource Set Type* | M |  |  |  |
| >*periodic* |  |  |  |  |
| >>periodicSet | M |  | ENUMERATED(true,…) |  |
| >*semi-persistent* |  |  |  |  |
| >>semi-persistentSet | M |  | ENUMERATED(true,…) |  |
| >*aperiodic* |  |  |  |  |
| >>SRS Resource Trigger | M |  | INTEGER(1..3) |  |
| >>Slot offset | M |  | INTEGER(0..32) | Offset in number of slots, where value 0 indicates no offset. |

| **Range bound** | **Explanation** |
| --- | --- |
| maxnoSRS-ResourcePerSet | Maximum no of SRS resources per SRS resource set. Value is 16. |

### 9.2.32 Positioning SRS Resource Set

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Positioning SRS Resource Set ID | M |  | INTEGER(0..15) |  |
| Positioning SRS Resource ID List |  | 1..<*maxnoSRS-PosResourcePerSet*> |  |  |
| >Positioning SRS Resource ID | M |  | INTEGER(0..63) |  |
| CHOICE *Resource Type* | M |  |  |  |
| >periodic |  |  |  |  |
| >>PosperiodicSet | M |  | ENUMERATED(true,…) |  |
| >semi-persistent |  |  |  |  |
| >>Possemi-persistentSet | M |  | ENUMERATED(true,…) |  |
| >aperiodic |  |  |  |  |
| >>SRS Resource Trigger | M |  | INTEGER(1..3) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoSRS-PosResourcePerSet | Maximum no of positioning SRS resources per positioning SRS resource set. Value is 16. |

### 9.2.33 SRS Resource Set ID

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| SRS Resource Set ID | M |  | INTEGER (0..15) | Corresponds to information provided in *SRS-ResourceSetId* contained in *SRS-Config* IE as defined in TS 38.331 [13] |

### 9.2.34 Spatial Relation Information

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

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **Spatial Relation for Resource ID** |  | *1..<maxnoSpatialRelations>* |  | According to TS 38.321 [15] and corresponds to information provided in *SRS-SpatialRelationInfoPos* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| CHOICE *Reference Signal* | M |  |  |  |
| >*NZP CSI-RS* |  |  |  |  |
| >>NZP CSI-RS Resource ID | M |  | INTEGER (0..191) |  |
| >*SSB* |  |  |  |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |
| >>SSB Index | O |  | INTEGER (0..63) |  |
| >*SRS* |  |  |  |  |
| >>SRS Resource ID | M |  | INTEGER (0..63) |  |
| >*Positioning SRS* |  |  |  |  |
| >>Positioning SRS 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. |

### 9.2.35 SRS Resource Trigger

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Aperiodic SRS Resource Trigger List** |  | *1..<maxnoSRS-TriggerStates>* |  | Corresponds to information provided in a*periodicSRS-ResourceTriggerList* contained in *SRS-Config* IE as defined in TS 38.331 [13] |
| >Aperiodic SRS Resource Trigger |  |  | INTEGER (1..3) |  |

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

### 9.2.36 Relative Time 1900

This information element indicates the initialisation time (e.g. SFN Initalisation Time for a cell, requested time for an action, etc).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Relative Time 1900 | M |  | BIT STRING (SIZE(64)) | Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of 1 /2\*\*32 second |

### 9.2.37 TRP Measurement Result

This information element contains the measurement result.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **Measured Result Item** |  | *1 .. <maxnoPosMeas>* |  |  |  |  |
| >CHOICE *Measured Results Value* | M |  |  |  |  |  |
| >>UL Angle of Arrival | M |  | 9.2.38 |  | - |  |
| >>UL SRS-RSRP | M |  | INTEGER (0..126) |  | - |  |
| >>UL RTOA | M |  | 9.2.39 |  | - |  |
| >>gNB Rx-Tx Time Difference | M |  | 9.2.40 |  | - |  |
| >>Z-AoA | M |  | 9.2.67 |  | YES | reject |
| >>Multiple UL-AoA | M |  | 9.2.71 |  | YES | reject |
| >>UL SRS-RSRPP | M |  | 9.2.72 |  | YES | reject |
| >Time Stamp | M |  | 9.2.42 |  | - |  |
| >Measurement Quality | O |  | 9.2.43 |  | - |  |
| >Measurement Beam Information | O |  | 9.2.57 |  | - |  |
| >SRS Resource type | O |  | 9.2.73 |  | YES | ignore |
| >ARP ID | O |  | 9.2.75 |  | YES | ignore |
| >LoS/NLoS Information | O |  | 9.2.77 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoPosMeas | Maximum no. of measured quantities that can be configured and reported with one positioning measurement message. Value is 16384. |

### 9.2.38 UL Angle of Arrival

This information element contains the uplink Angle of Arrival measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Azimuth Angle of Arrival | M |  | INTEGER(0..3599) | TS 38.133 [16] |
| Zenith Angle of Arrival | O |  | INTEGER(0..1799) | TS 38.133 [16] |
| LCS to GCS Translation | O |  | 9.2.69 | If absent, the azimuth and zenith are provided in GCS. |

### 9.2.39 UL RTOA Measurement

This information element contains the uplink RTOA measurement.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| CHOICE *UL RTOA Measurement* | M |  |  |  | - |  |
| >k0 | M |  | INTEGER (0.. 1970049) | TS 38.133 [16] | - |  |
| >k1 | M |  | INTEGER (0.. 985025) | TS 38.133 [16] | - |  |
| >k2 | M |  | INTEGER (0.. 492513) | TS 38.133 [16] | - |  |
| >k3 | M |  | INTEGER (0.. 246257) | TS 38.133 [16] | - |  |
| >k4 | M |  | INTEGER (0.. 123129) | TS 38.133 [16] | - |  |
| >k5 | M |  | INTEGER (0.. 61565) | TS 38.133 [16] | - |  |
| Additional Path List | O |  | 9.2.41 | This IE is ignored if the *Extended Additional Path List* IE is included | - |  |
| Extended Additional Path List | O |  | 9.2.74 |  | YES | ignore |
| TRP Rx TEG Information | O |  | 9.2.85 |  | YES | ignore |

### 9.2.40 gNB Rx-Tx Time Difference

This information element contains the gNB Rx-Tx Time Difference measurement.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| CHOICE g*NB Rx-Tx Time Difference Measurement* | M |  |  |  | - |  |
| >k0 | M |  | INTEGER (0.. 1970049) | TS 38.133 [16] | - |  |
| >k1 | M |  | INTEGER (0.. 985025) | TS 38.133 [16] | - |  |
| >k2 | M |  | INTEGER (0.. 492513) | TS 38.133 [16] | - |  |
| >k3 | M |  | INTEGER (0.. 246257) | TS 38.133 [16] | - |  |
| >k4 | M |  | INTEGER (0.. 123129) | TS 38.133 [16] | - |  |
| >k5 | M |  | INTEGER (0.. 61565) | TS 38.133 [16] | - |  |
| Additional Path List | O |  | 9.2.41 | This IE is ignored if the *Extended Additional Path List* IE is included | - |  |
| Extended Additional Path List | O |  | 9.2.74 |  | YES | ignore |
| TRP TEG Information | O |  | 9.2.80 |  | YES | ignore |

### 9.2.41 Additional Path List

This information element contains the additional path results of time measurement.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **Additional Path Item** |  | *1..<maxnopath>* |  |  | - |  |
| >CHOICE *Relative Path Delay* | M |  |  |  | - |  |
| >>k0 | M |  | INTEGER(0..16351) |  | - |  |
| >>k1 | M |  | INTEGER(0..8176) |  | - |  |
| >>k2 | M |  | INTEGER(0..4088) |  | - |  |
| >>k3 | M |  | INTEGER(0..2044) |  | - |  |
| >>k4 | M |  | INTEGER(0..1022) |  | - |  |
| >>k5 | M |  | INTEGER(0..511) |  | - |  |
| >Path Quality | O |  | Measurement Quality  9.2.43 |  | - |  |
| >Multiple UL-AoA | O |  | 9.2.71 |  | YES | ignore |
| >Path Power | O |  | UL SRS-RSRPP  9.2.72 |  | YES | ignore |

| Range bound | Explanation |
| --- | --- |
| maxnopath | Maximum no. of additional path measurement. Value is 2. |

### 9.2.42 Time Stamp

This information element contains the time stamp.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| System Frame Number | M |  | INTEGER(0..1023) |  |
| CHOICE *Slot Index* | M |  |  |  |
| >SCS-15 | M |  | INTEGER(0..9) |  |
| >SCS-30 | M |  | INTEGER(0..19) |  |
| >SCS-60 | M |  | INTEGER(0..39) |  |
| >SCS-120 | M |  | INTEGER(0..79) |  |
| Measurement time | O |  | Relative Time 1900  9.2.36 |  |

### 9.2.43 Measurement Quality

This information element contains the TRP’s best estimate of the quality of the measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *Measurement Quality* | M |  |  |  |
| >Timing Measurement Quality |  |  |  | Corresponds to information provided in *NR-TimingQuality* IE as defined in TS 37.355 [14] |
| >>Measurement Quality | M |  | INTEGER(0..31) |  |
| >>Resolution | M |  | ENUMERATED(0.1m, 1m, 10m, 30m, …) |  |
| >Angle Measurement Quality |  |  |  |  |
| >>Azimuth Quality | M |  | INTEGER(0..255) |  |
| >>Zenith Quality | O |  | INTEGER(0..255) |  |
| >>Resolution | M |  | ENUMERATED (0.1deg, …) |  |

### 9.2.44 PRS Configuration

This information element contains the DL PRS configuration for the TRP.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **PRS Resource Set List** |  | 1 |  |  |
| **>PRS Resource Set Item** |  | *1..<maxnoofPRSresourceSet>* |  |  |
| >>PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| >>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120, …) |  |
| >>PRS bandwidth | M |  | INTEGER(1..63) | 24,28,…,272 PRBs |
| >>Start PRB | M |  | INTEGER(0..2176) | Starting PRB to Point A |
| >>Point A | M |  | INTEGER (0..3279165) | NR ARFCN |
| >>Comb Size | M |  | ENUMERATED(2, 4, 6, 12, …) |  |
| >>CP Type | M |  | ENUMERATED(normal, extended, …) |  |
| >>Resource Set Periodicity | M |  | ENUMERATED(4,5,8,10,16,20,32,40,64,80,160,320,640,1280,2560,5120,10240,20480,40960,81920,…) |  |
| >>Resource Set Slot Offset | M |  | INTEGER(0..81919,…) |  |
| >>Resource Repetition Factor | M |  | ENUMERATED(rf1,rf2,rf4,rf6,rf8,rf16,rf32,…) |  |
| >>Resource Time Gap | M |  | ENUMERATED(tg1,tg2,tg4,tg8,tg16,tg32,…) |  |
| >>Resource Number of Symbols | M |  | ENUMERATED(n2,n4,n6,n12,…) |  |
| >>PRS Muting | O |  |  |  |
| >>>Option1 | O |  |  |  |
| >>>>Muting Pattern | M |  | DL-PRS Muting Pattern  9.2.56 | Muting pattern option 1 is used to mute the whole PRS resource set (within a period) |
| >>>>Muting Bit Repetition Factor | M |  | ENUMERATED(1,2,4,8,…) |  |
| >>>Option2 | O |  |  |  |
| >>>>Muting Pattern | M |  | DL-PRS Muting Pattern  9.2.56 | Muting pattern option 2 is used to mute the selected repetition of the resource set (within the period) |
| >>PRS Resource Transmit Power | M |  | INTEGER(-60..50) |  |
| >**>PRS Resource List** |  | 1 |  | Corresponds to information provided in *NR-DL-PRS-Resource* contained in *NR-DL-PRS-Info* IE as defined in TS 37.355 [14] |
| **>>>PRS Resource Item** |  | *1..<maxnoofPRSresources>* |  |  |
| >>>>PRS Resource ID | M |  | INTEGER(0..63) |  |
| >>>>Sequence ID | M |  | INTEGER(0..4095) |  |
| >>>>RE Offset | M |  | INTEGER(0..11,…) |  |
| >>>>Resource Slot Offset | M |  | INTEGER(0..511) |  |
| >>>>Resource Symbol Offset | M |  | INTEGER(0..12) |  |
| >>>>CHOICE *QCL Info* | O |  |  |  |
| >>>>>*SSB* |  |  |  |  |
| >>>>>>NR PCI | M |  | INTEGER(0..1007) |  |
| >>>>>>SSB Index | O |  | INTEGER(0..63) |  |
| >>>>>*DL-PRS* |  |  |  |  |
| >>>>>>QCL Source PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| >>>>>>QCL Source PRS Resource ID | O |  | INTEGER(0..63) | If it is absent, the QCL source PRS resource ID is the same as the PRS resource ID |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPRSresourceSet | Maximum no of PRS resources set. Value is 8. |
| maxnoofPRSresource | Maximum no of PRS resources per PRS resource set. Value is 64. |

### 9.2.45 Spatial Direction Information

This information element contains the spatial direction information of the DL PRS resources for the TRP.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| NR-PRS Beam Information | M |  | 9.2.58 | The spatial directions of DL-PRS Resources for TRP |

### 9.2.46 Geographical Coordinates

This information element contains the geographical coordinates for the TRP and any associated ARP(s).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| CHOICE *TRP Position Definition Type* | M |  |  |  | - |  |
| >*Direct* |  |  |  |  |  |  |
| >>CHOICE *Accuracy* | M |  |  |  |  |  |
| >>>*normal accuracy* |  |  |  |  |  |  |
| >>>>TRP Position | M |  | NG-RAN Access Point Position  9.2.10 | The configured estimated geographical position of the antenna of the cell/TRP. |  |  |
| >>>*high accuracy* |  |  |  |  |  |  |
| >>>>TRP High Accuracy Access Position | M |  | NG-RAN High Accuracy Access Point Position  9.2.49 | The configured estimated geographical high accuracy position of the antenna of the cell/TRP. |  |  |
| >*Referenced* |  |  |  |  |  |  |
| >>Reference Point | M |  | 9.2.51 | The reference point is used to derive the TRP position |  |  |
| >>CHOICE *Type* | M |  |  |  |  |  |
| >>>*Geodetic* |  |  |  |  |  |  |
| >>>>TRP Position Relative Geodetic | M |  | Relative Geodetic Location  9.2.48 | The configured estimated relative geodetic coordinate of the antenna of the cell/TRP |  |  |
| >>>*Cartesian* |  |  |  |  |  |  |
| >>>>TRP Position Relative Cartesian | M |  | Relative Cartesian Location  9.2.50 | The configured estimated relative Cartesian coordinate of the antenna of the cell/TRP |  |  |
| DL-PRS Resource Coordinates | O |  | 9.2.47 | DL-PRS Resource Coordinates relative to the TRP coordinate | - |  |
| ARP Location Information | O |  | 9.2.76 |  | Yes | ignore |

### 9.2.47 DL-PRS Resource Coordinates

This information element contains the geographical coordinates of the antenna reference points (ARP) for the DL-PRS Resources of a TRP.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **DL-PRS Resource Set ARP List** | M | *1..<maxPRS-ResourceSets>* |  |  |
| >DL-PRS Resource Set ID | M |  | INTEGER (0..7) |  |
| >CHOICE *DL-PRS Resource Set ARP Location* | M |  |  | Relative to the geographical coordinates for the TRP. If this IE is absent, the Relative Location is zero for the indicated DL-PRS Resource Set ID. |
| *>>Geodetic* |  |  |  |  |
| >>>TRP Position Relative Geodetic | M |  | Relative Geodetic Location 9.2.48 |  |
| *>>Cartesian* |  |  |  |  |
| >>>TRP Position Relative Cartesian | M |  | Relative Cartesian Location 9.2.50 |  |
| **>DL-PRS Resource ARP List** | M | *1..<maxPRS-ResourcesPerSet>* |  |  |
| >>DL-PRS Resource ID | M |  | INTEGER (0..63) |  |
| >>CHOICE *DL-PRS Resource ARP Location* | M |  |  | Relative to the DL-PRS Resource Set ARP Location.  If this IE is absent, the Relative Location is zero for the indicated DL-PRS Resource ID. |
| >>>*Geodetic* |  |  |  |  |
| >>>TRP Position Relative Geodetic | M |  | Relative Geodetic Location 9.2.48 |  |
| *>>>Cartesian* |  |  |  |  |
| >>>TRP Position Relative Cartesian | M |  | Relative Cartesian Location 9.2.50 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxPRS-ResourceSets | Maximum no of DL-PRS resource sets per TRP. Value is 2. |
| maxPRS-ResourcesPerSet | Maximum no of DL-PRS resources of the DL-PRS resource set of the TRP. Value is 64. |

### 9.2.48 Relative Geodetic Location

This information element provides a location relative to some known reference location in a relative geodetic coordinate system. Corresponds to information provided in *RelativeLocation* IE as defined in TS 37.355 [14].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Milli-Arc-Second Units | M |  | ENUMERATED (0.03, 0.3, 3, ...) | Units and scale factor for the delta-latitude and delta-longitude fields. 0.03, 0.3, 3, milliarcseconds. |
| Height Units | M |  | ENUMERATED (mm, cm, m, ...) | Units and scale factor for the delta-height field.  10-3 metre, 10-2 metre. |
| Delta Latitude | M |  | INTEGER (-1024..1023) | Delta value in latitude in the unit provided in Milli-Arc-Second Units. |
| Delta Longitude | M |  | INTEGER (-1024..1023) | Delta value in longitude in the unit provided in Milli-Arc-Second Units. |
| Delta Height | M |  | INTEGER (-1024..1023) | Delta value in ellipsoidal height in the unit provided in Height Units. |
| Location uncertainty | M |  | 9.2.52 |  |

### 9.2.49 NG-RAN High Accuracy Access Point Position

The *NG-RAN High Accuracy Access Point Position* IE is used to identify the geographical position of an NG-RAN Access Point. It is expressed as High Accuracy Ellipsoid point with altitude and uncertainty ellipsoid according to TS 23.032 [8].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Degrees of Latitude | M |  | INTEGER(-2147483648..2147483647) |  |
| Degrees of Longitude | M |  | INTEGER(-2147483648..2147483647) |  |
| Altitude | M |  | INTEGER(-64000..1280000) |  |
| Uncertainty Semi Major | M |  | INTEGER (0..255) |  |
| Uncertainty Semi Minor | M |  | INTEGER (0..255) |  |
| Orientation Major Axis | M |  | INTEGER (0..179) |  |
| Horizontal Confidence | M |  | INTEGER (0..100) |  |
| Uncertainty Altitude | M |  | INTEGER (0..255) |  |
| Vertical Confidence | M |  | INTEGER (0..100) |  |

### 9.2.50 Relative Cartesian Location

This information element provides a location relative to some known reference location in a relative Cartesian coordinate system.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| XYZ unit | M |  | ENUMERATED (mm, cm, dm,..) |  |
| X value | M |  | INTEGER  (-216.. 216-1) | Positive value represents easting from reference point, in units of *XYZ Unit* IE. |
| Y value | M |  | INTEGER  (-216.. 216-1) | Positive value represents northing from reference point in units of *XYZ Unit* IE. |
| Z value | M |  | INTEGER  (-215.. 215-1) | Height with respect to reference point in units of *XYZ Unit* IE, where the XY-plane is horizontal and the Z-axis points up. |
| Location uncertainty | M |  | 9.2.52 |  |

### 9.2.51 Reference Point

This information element provides a reference point information.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE *ReferencePoint* | M |  |  | Reference point to which relative location information is related to |
| >Coordinate ID |  |  |  |  |
| >>Coordinate ID | M |  | INTEGER(0.. 29-1,..) | Referential ID mapped via OAM |
| >Reference Point Coordinates |  |  |  |  |
| >>Reference Point Position | M |  | NG-RAN Access Point Position  9.2.10 |  |
| >Reference Point Coordinates High Accuracy |  |  |  |  |
| >>Reference Point High Accuracy Access Position | M |  | NG-RAN High Accuracy Access Point Position  9.2.49 |  |

### 9.2.52 Location Uncertainty

This information element provides the location uncertainty information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| >Horizontal Uncertainty | M |  | INTEGER (0..255) | Horizontal uncertainty of the ARP latitude/longitude. Corresponds to the encoded high accuracy uncertainty as defined in TS 23.032 [8] |
| >Horizontal Confidence | M |  | INTEGER (0..100) | Corresponds to confidence as defined in TS 23.032 [8]. |
| >Vertical Uncertainty | M |  | INTEGER (0..255) | Vertical uncertainty of the ARP altitude. Corresponds to the encoded high accuracy uncertainty as defined in TS 23.032 [8] |
| >Vertical Confidence | M |  | INTEGER (0..100) | Corresponds to confidence as defined in TS 23.032 [8]. |

### 9.2.53 Pathloss Reference Information

This information element indicates a pathloss reference for transmission of UL SRS by a UE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE Pathloss Reference Signal | M |  |  |  |
| >*SSB* |  |  |  |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |
| >>SSB Index | O |  | 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) |  |

### 9.2.54 SSB Information

This information element contains the SSB time/frequency information for the TRPs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **SSB Info List** |  | *1* |  |  |
| **>SSB Info Item** |  | *1…<maxNoSSBs>* |  |  |
| >>SSB Configuration | M |  | SSB Time/Frequency Configuration  9.2.55 |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |

| Range bound | Explanation |
| --- | --- |
| maxNoSSBs | Maximum no of SSBs for which the configuration can be provided. Value is 255. |

### 9.2.55 SSB Time/Frequency Configuration

This information element contains the time and frequency configuration of an SSB.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| SSB frequency | M |  | INTEGER (0..3279165) | ARFCN |
| SSB subcarrier spacing | M |  | ENUMERATED(15kHz, 30kHz, 60kHz, 120kHz, 240kHz,... , kHz480, kHz960) | The value 60kHz is not supported in this version of the specification. |
| SSB Transmit power | M |  | INTEGER (-60..50) | EPRE of SSS |
| SSB periodicity | M |  | ENUMERATED(5ms, 10ms, 20ms, 40ms, 80ms, 160ms, …) |  |
| SSB half frame index | M |  | INTEGER(0..1) |  |
| SSB SFN offset | M |  | INTEGER(0..15) |  |
| CHOICE SSB Position in Burst | O |  |  |  |
| >Short Bitmap |  |  | BIT STRING (SIZE(4)) |  |
| >Medium Bitmap |  |  | BIT STRING (SIZE(8)) |  |
| >Long Bitmap |  |  | BIT STRING (SIZE(64)) |  |
| SFN initialisation time | O |  | Relative Time 1900  9.2.36 |  |

### 9.2.56 DL-PRS Muting Pattern

This information element contains the DL-PRS muting pattern.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE DL-*PRS Muting Pattern* | M |  |  |  |
| >Two | M |  | BIT STRING (SIZE(2)) |  |
| >Four | M |  | BIT STRING (SIZE(4)) |  |
| >Six | M |  | BIT STRING (SIZE(6)) |  |
| >Eight | M |  | BIT STRING (SIZE(8)) |  |
| >Sixteen | M |  | BIT STRING (SIZE(16)) |  |
| >Thirty-two | M |  | BIT STRING (SIZE(32)) |  |

### 9.2.57 Measurement Beam Information

This information element contains the receiving beam information when measuring UL signals.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| PRS Resource ID | O |  | INTEGER(0..63) |  |
| PRS Resource Set ID | O |  | INTEGER(0..7) |  |
| SSB Index | O |  | INTEGER(0..63) |  |

### 9.2.58 NR-PRS Beam Information

This IE contains spatial direction information of the DL-PRS Resources.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **NR-PRS Beam Information** |  | *1* |  |  |  |  |
| **>NR-PRS Beam Information Item** |  | *1.. < maxPRS-ResourceSets >* |  |  |  |  |
| >>PRS Resource Set ID | M |  | INTEGER (0..7) | The resource set in which the resources are associated with the angle. |  |  |
| **>>PRS Angle** |  | *1* |  |  |  |  |
| **>>>PRS Angle Item** |  | *1.. ..<* *maxPRS-ResourcesPerSet >* |  |  |  |  |
| >>>>NR PRS Azimuth | M |  | INTEGER (0..359) |  | - |  |
| >>>>NR PRS Azimuth fine | O |  | INTEGER (0..9) | Fine angles | - |  |
| >>>>NR PRS Elevation | O |  | INTEGER (0..180) |  | - |  |
| >>>>NR PRS Elevation fine | O |  | INTEGER (0..9) | Fine angles | - |  |
| >>>>PRS Resource ID | O |  | INTEGER(0..63) |  | YES | ignore |
| **LCS to GCS Translation List** |  | *0..1* |  | If absent, the azimuth and elevation are provided in GCS. |  |  |
| **>LCS to GCS Translation Item** |  | *1..<maxnolcs-gcs-translation>* |  |  |  |  |
| >>Alpha | M |  | INTEGER (0..359) |  |  |  |
| >>Alpha-fine | O |  | INTEGER (0..9) | Fine angles |  |  |
| >>Beta | M |  | INTEGER (0..359) |  |  |  |
| >>Beta-fine | O |  | INTEGER (0..9) | Fine angles |  |  |
| >>Gamma | M |  | INTEGER (0..359) |  |  |  |
| >>Gamma-fine | O |  | INTEGER (0..9) | Fine angles |  |  |

| Range bound | Explanation |
| --- | --- |
| maxPRS-ResourceSets | Maximum no of DL-PRS resource sets per TRP. Value is 2. |
| maxPRS-ResourcesPerSet | Maximum no of DL-PRS resources of the DL-PRS resource set of the TRP. Value is 64. |
| maxnolcs-gcs-translation | Maximum no. of LCS-GS-Translation-Parameters that can reported with one message. Value is 3. The current version of the specification supports 1. |

### 9.2.59 Positioning Broadcast Cells

This IE is used to indicate the cells that are requested to broadcast, or failed to broadcast, the associated posSIB(s).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **Positioning Broadcast Cells** |  | *1 .. <maxnoBcastCell>* |  |  |
| >NG-RAN-CGI | M |  | 9.2.6 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoBcastCells | Maximum no. of cells broadcasting a posSIB in a NG-RAN node. Value is 16384. |

### 9.2.60 Spatial Relation Information per SRS Resource

This information element indicates a spatial relation for transmission of each UL SRS resource recommended by LMF.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Spatial Relation per SRS Resource List** |  | *1* |  |  |
| >Spatial Relation per SRS Resource Item |  | *1..<maxnoSRS-ResourcePerSet>* |  |  |
| >CHOICE *Reference Signal* | M |  |  |  |
| >*NZP CSI-RS* |  |  |  |  |
| >>NZP CSI-RS Resource ID | M |  | INTEGER (0..191) |  |
| >*SSB* |  |  |  |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |
| >>SSB Index | O |  | INTEGER (0..63) |  |
| >*SRS* |  |  |  |  |
| >>SRS Resource ID | M |  | INTEGER (0..63) |  |
| >*Positioning SRS* |  |  |  |  |
| >>Positioning SRS 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 |
| maxnoSRS-ResourcePerSet | Maximum no of SRS resources per SRS resource set. Value is 16. |

### 9.2.61 Requested DL PRS Transmission Characteristics

This IE contains the requested PRS configuration for transmission by the LMF.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **Requested DL-PRS Resource Set List** |  | *1* |  |  |
| **>Requested DL-PRS Resource Set Item** |  | *1..<maxnoofPRSresourceSet>* |  |  |
| >>PRS bandwidth | O |  | INTEGER(1..63) | 24,28,…,272 PRBs |
| >>Comb Size | O |  | ENUMERATED(2, 4, 6, 12, …) |  |
| >>Resource Set Periodicity | O |  | ENUMERATED(4,5,8,10,16,20,32,40,64,80,160,320,640,1280,2560,5120,10240,20480,40960,81920,…) |  |
| >>Resource Repetition Factor | O |  | ENUMERATED(rf1,rf2,rf4,rf6,rf8,rf16,rf32,…) |  |
| >>Resource Number of Symbols | O |  | ENUMERATED(n2,n4,n6,n12,…) |  |
| >>Requested DL-PRS Resource List | O |  | 9.2.62 |  |
| >>Resource Set Start Time and Duration | O |  | Start Time and Duration  9.2.63 | This IE is ignored if the *Start Time and Duration* IE is present |
| Number of Frequency Layers | O |  | INTEGER(1..4) |  |
| Start Time and Duration | O |  | 9.2.63 |  |

| Range bound | Explanation |
| --- | --- |
| maxnoofPRSresourceSet | Maximum no of PRS resources set. Value is 8. |

### 9.2.62 Requested DL-PRS Resource List

This IE contains the requested DL-PRS resource list.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Requested DL-PRS Resource List** |  | *1* |  | Corresponds to information provided in *NR-DL-PRS-Resource* contained in *NR-DL-PRS-Info* IE as defined in TS 37.355 [14] |
| **>Requested DL-PRS Resource Item** |  | *1..<maxnoofPRSresource>* |  |  |
| >>CHOICE QCL Info | O |  |  |  |
| >>>SSB |  |  |  |  |
| >>>>NR PCI | M |  | INTEGER(0..1007) |  |
| >>>>SSB Index | O |  | INTEGER(0..63) |  |
| >>>DL-PRS |  |  |  |  |
| >>>>QCL Source PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| >>>>QCL Source PRS Resource ID | O |  | INTEGER(0..63) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPRSresource | Maximum no of PRS resources per PRS resource set. Value is 64. |

### 9.2.63 Start Time and Duration

This IE contains the start time and/or duration for the on-demand DL-PRS.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Start Time | O |  | Relative Time 1900  9.2.36 |  |
| Duration | O |  | INTEGER (0..90060, …) | Unit: seconds |

### 9.2.64 PRS Transmission Off Information

This IE contains the information to turn off particular PRS transmissions.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE *level* | M |  |  |  |
| >*TRP level* |  |  | NULL |  |
| >*PRS resource set level* |  |  |  |  |
| **>>PRS Resource Set List** |  | *1* |  |  |
| **>>>PRS Resource Set Item** |  | *1..<maxnoofPRSresourceSet>* |  |  |
| >>>>PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| >*PRS resource level* |  |  |  |  |
| **>>PRS Resource Set List** |  | *1* |  |  |
| **>>>PRS Resource Set Item** |  | *1..<maxnoofPRSresourceSet>* |  |  |
| >>>>PRS Resource Set ID | M |  | INTEGER(0..7) |  |
| **>>>>PRS Resource List** |  | *1* |  |  |
| **>>>>>PRS Resource Item** |  | *1..<maxnoofPRSresource>* |  |  |
| >>>>>>PRS Resource ID | M |  | INTEGER(0..63) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofPRSresourceSet | Maximum no of PRS resources set. Value is 8. |
| maxnoofPRSresource | Maximum no of PRS resources per PRS resource set. Value is 64. |

### 9.2.65 On-demand PRS TRP Information

This IE contains on-demand PRS information for the TRP.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| On-demand PRS Request Allowed | M |  | BIT STRING (SIZE(16)) | Each position in the bitmap represents an on-demand PRS transmission parameter:  first bit: Resource Set Periodicity  second bit: PRS Bandwidth  third bit: Resource Repetition Factor  fourth bit: Resource Number of Symbols  fifth bit: Comb Size  sixth bit: Number of Frequency Layers  seventh bit: Start Time and Duration  eighth bit: Off Indication  ninth bit: QCL Information  Other bits reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. |
| Allowed Resource Set Periodicity Values | O |  | BIT STRING (SIZE(24)) | This IE applies only if the first bit of the On-demand PRS Request Allowed IE is set to ‘1’.  Each position in the bitmap represents a value of the Resource Set Periodicity IE defined in subclause 9.2.61, first bit = 4 and so on. Bits 21-24 are reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. If this IE is absent, all Resource Set Periodicity values are allowed to be requested. |
| Allowed PRS Bandwidth Values | O |  | BIT STRING (SIZE(64)) | This IE applies only if the second bit of the On-demand PRS Request Allowed IE is set to ‘1’.  Each position in the bitmap represents a value of the PRS Bandwidth IE defined in subclause 9.2.61, first bit = 1 and so on. Bit 64 is reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. If this IE is absent, all PRS Bandwidth values are allowed to be requested. |
| Allowed Resource Repetition Factor Values | O |  | BIT STRING (SIZE(8)) | This IE applies only if the third bit of the On-demand PRS Request Allowed IE is set to ‘1’.  Each position in the bitmap represents a value of the Resource Repetition Factor IE defined in subclause 9.2.61, first bit = rf1 and so on. Bit 8 is reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. If this IE is absent, all Resource Repetition Factor values are allowed to be requested. |
| Allowed Resource Number of Symbols Values | O |  | BIT STRING (SIZE(8)) | This IE applies only if the fourth bit of the On-demand PRS Request Allowed IE is set to ‘1’.  Each position in the bitmap represents a value of the Resource Number of Symbols IE defined in subclause 9.2.61, first bit = n2 and so on. Bits 5-8 are reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. If this IE is absent, all Resource Number of Symbols values are allowed to be requested. |
| Allowed Comb Size Values | O |  | BIT STRING (SIZE(8)) | This IE applies only if the fifth bit of the On-demand PRS Request Allowed IE is set to ‘1’.  Each position in the bitmap represents a value of the Comb Size IE defined in subclause 9.2.61, first bit = 2 and so on. Bits 5-8 are reserved for future use. Value ‘1’ indicates ‘request allowed’, Value ‘0’ indicates ‘request not allowed’. If this IE is absent, all Comb Size values are allowed to be requested. |

### 9.2.66 UL-AoA assistance information

This information element contains the expected uplink Angle of Arrival and uncertainty range.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| CHOICE *AngleMeasurement* | M |  |  |  |
| >*Expected UL Angle of Arrival* |  |  |  |  |
| **>>Expected Azimuth AoA** |  | *1* |  | Defined as  (φAOA - ΔφAOA/2, φAOA + ΔφAOA/2) |
| >>>Expected Azimuth AoA Value | M |  | INTEGER(0..3599) | φAOA component of Expected Azimuth AoA |
| >>>Expected Azimuth AoA Uncertainty Range | M |  | INTEGER(0..3599) | ΔφAOA component of Expected Azimuth AoA |
| **>>Expected Zenith AoA** |  | *0..1* |  | Defined as  (θZOA – ΔθZOA/2, θZOA + ΔθZOA/2) |
| >>>Expected Zenith AoA Value | M |  | INTEGER(0..1799) | θZOA component of Expected Zenith AoA |
| >>>Expected Zenith AoA Uncertainty Range | M |  | INTEGER(0..1799) | ΔθZOA component of Expected Zenith AoA |
| >*Expected UL Angle of Arrival Zenith Only* |  |  |  | Defined as  (θZOA – ΔθZOA/2, θZOA + ΔθZOA/2) |
| >>Expected Zenith AoA Value | M |  | INTEGER(0..1799) | θZOA component of Expected Zenith AoA |
| >>Expected Zenith AoA Uncertainty Range | M |  | INTEGER(0..1799) | ΔθZOA component of Expected Zenith AoA |
| LCS to GCS Translation | O |  | 9.2.69 | If absent, the azimuth and zenith are provided in GCS. In case of zenith only, the z-axis of LCS is defined along the linear array axis. |

### 9.2.67 Z-AoA

This information element contains the Zenith Angle of Arrival information, which can correspond to linear array measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Zenith Angle of Arrival | M |  | INTEGER(0..1799) | TS 38.133 [16] |
| LCS to GCS Translation | O |  | 9.2.69 | If absent, the zenith is provided in GCS. the z-axis of LCS is defined along the linear array axis |

### 9.2.68 Response Time

This information element contains the response time of the measurement results reporting.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Time | M |  | INTEGER(1..128,…) |  |
| Time Unit | M |  | ENUMERATED (second, ten-seconds, ten-milliseconds, …) |  |

### 9.2.69 LCS to GCS Translation

This information element contains the LCS to GCS Translation information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| Alpha | M |  | INTEGER (0..3599) |  |
| Beta | M |  | INTEGER (0..3599) |  |
| Gamma | M |  | INTEGER (0..3599) |  |

### 9.2.70 UE Reporting Information

This IE contains the UE Reporting Information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Reporting Amount | M |  | ENUMERATED (0, 1, 2, 4, 8, 16, 32, 64) | Value 0 represents an infinite number of periodic reporting |
| Reporting Interval | M |  | ENUMERATED (none, 1, 2, 4, 8, 10, 16, 20, 32, 64) | Unit: seconds |

### 9.2.71 Multiple UL-AoA

This information element contains the list of the multiple UL-AOAs values.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **UL AoA List** |  | *1* |  |  |
| **>UL AoA item** |  | *1..<maxnoofULAoAs* > |  |  |
| >>CHOICE *AngleMeasurement* | M |  |  |  |
| >>>*UL Angle of Arrival* |  |  |  |  |
| >>>>UL Angle of Arrival | M |  | 9.2.38 |  |
| *>>>UL Zenith Angle of Arrival* |  |  |  |  |
| >>>>UL Zenith Angle of Arrival | M |  | Z-AoA  9.2.67 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofULAoAs | Maximum no of UL-AOAs values (pair of AOA & ZOA values) that can be reported. Value is 8 |

### 9.2.72 UL SRS-RSRPP

This information element contains the UL SRS RSRPP measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| First Path RSRP Power | M |  | INTEGER (0..126) |  |

### 9.2.73 SRS Resource type

This IE contains the SRS resource type.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| CHOICE *Reference Signal* | M |  |  |  |  |  |
| >SRS |  |  |  |  |  |  |
| >>SRS Resource ID | M |  | INTEGER(0..63) |  |  |  |
| >*Positioning SRS* |  |  |  |  |  |  |
| >>Positioning SRS Resource ID | M |  | INTEGER(0..63) |  |  |  |
| SRS Port Index | O |  | ENUMERATED(id1000, id1001, id1002, id1003, …) | This IE may be present if the *SRS Resource ID* IE is present, and is ignored otherwise. | YES | ignore |

### 9.2.74 Extended Additional Path List

This IE contains the extended additional path results of time measurement.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| **Additional Path Item** |  | *1..<maxNoPathExtended>* |  |  |
| >CHOICE *Relative Path Delay* | M |  |  |  |
| >>k0 | M |  | INTEGER(0..16351) |  |
| >>k1 | M |  | INTEGER(0..8176) |  |
| >>k2 | M |  | INTEGER(0..4088) |  |
| >>k3 | M |  | INTEGER(0..2044) |  |
| >>k4 | M |  | INTEGER(0..1022) |  |
| >>k5 | M |  | INTEGER(0..511) |  |
| >Path Quality | O |  | Measurement Quality  9.2.43 |  |
| >Multiple UL-AoA | O |  | 9.2.71 |  |
| >Path Power | O |  | UL SRS-RSRPP  9.2.72 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNoPathExtended | Maximum no. of additional path measurement. Value is 8. |

### 9.2.75 ARP ID

This IE is used to uniquely identify an ARP associated with a TRP.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| ARP Identifier | M |  | INTEGER (1..16, …) |  |

### 9.2.76 ARP Location Information

This IE contains the relative position of ARP(s) to the TRP.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **ARP Location Information** |  | *1* |  |  |
| **>ARP Location Information Item** |  | *1..<maxnoARPs>* |  |  |
| >>ARP ID | M |  | 9.2.75 |  |
| >>CHOICE *ARP Location Type* | M |  |  |  |
| >>>*geodetic* |  |  |  |  |
| >>>>ARP Position Relative Geodetic | M |  | Relative Geodetic Location  9.2.48 |  |
| >>>*cartesian* |  |  |  |  |
| >>>>ARP Position Relative Cartesian | M |  | Relative Cartesian Location  9.2.50 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoARPs | Maximum no. of ARPs associated with a TRP. Value is 16. |

9.2.77 LoS/NLoS Information

This IE contains the LoS/NLoS information for UL measurement.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| CHOICE *LoS/NLoS Indicator* | M |  |  |  |
| >*Soft Indicator* |  |  |  |  |
| >>LoS/NLoS Indicator Soft | M |  | INTEGER (0..10) | Values provide the likelihood of a LOS propagation path in the range between 0 and 1 with 0.1 steps resolution. Value '0' indicates NLOS and value '1' indicates LOS. |
| >*Hard Indicator* |  |  |  |  |
| >>LoS/NLoS Indicator Hard | M |  | ENUMERATED (NLoS, LoS) |  |

### 9.2.78 UE Tx TEG Association List

This information element contains the list of UE Tx TEG associations.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| **UE Tx TEG Association item** |  | *1..<maxnoUETEGs>* |  |  | - |  |
| >UE Tx TEG ID | M |  | INTEGER (0..7) |  | - |  |
| **>Positioning SRS Resource ID List** |  | *1* |  |  | - |  |
| **>>Positioning SRS Resource ID Item** |  | *1..<maxnoSRS-PosResources>* |  |  | - |  |
| >>>Positioning SRS Resource ID | M |  | INTEGER(0..63) |  | - |  |
| >Time Stamp | M |  | 9.2.42 |  | - |  |
| **>Carrier Frequency** |  | *0..1* |  | Indicates the frequency of the positioning SRS resources | - |  |
| >>Point A | M |  | INTEGER (0..3279165) | NR ARFCN | - |  |
| >>Offset to Carrier | M |  | INTEGER (0.2199, …) |  | - |  |
| >UE Tx Timing Error Margin | O |  | Timing Error Margin  9.2.84 | Timing error margin associated to the UE Tx TEG ID. | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoUETEGs | Maximum no of reported UE Tx TEG associations. Value is 256. |
| maxnoSRS-PosResources | Maximum no of positioning SRS resources. Value is 64. |

### 9.2.79 TRP Tx TEG Association

This information element contains the TRP Tx TEG information.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **TRP TEG item** |  | *1..<maxnoTRPTEGs>* |  |  |
| >TRP Tx TEG Information | M |  | 9.2.86 |  |
| >DL-PRS Resource Set ID | M |  | INTEGER (0..7) |  |
| **>DL-PRS Resource ID List** |  | *0..1* |  |  |
| **>>DL-PRS Resource ID Item** |  | *1..<maxPRS-ResourcesPerSet>* |  |  |
| >>>DL-PRS Resource ID | M |  | INTEGER (0..63) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPTEGs | Maximum no of reported TRP Tx TEG association. Value is 8. |
| maxPRS-ResourcesPerSet | Maximum no of DL-PRS resources of the DL-PRS resource set of the TRP. Value is 64. |

### 9.2.80 TRP TEG Information

This information element contains the TRP TEG information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *TRP TEG* | M |  |  |  |
| >*RxTx TEG* |  |  |  |  |
| >>TRP RxTx TEG Information | M |  | 9.2.87 |  |
| >>TRP Tx TEG Information | O |  | 9.2.86 |  |
| >*Rx TEG* |  |  |  |  |
| >>TRP Rx TEG Information | M |  | 9.2.85 |  |
| >>TRP Tx TEG Information | M |  | 9.2.86 |  |

### 9.2.81 Measurement Characteristics Request Indicator

This IE contains the measurement characteristic information requested by LMF.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Measurement characteristic request indicator | M |  | BIT STRING (SIZE(16)) | Each position in the bitmap represents a requested measurement characteristic:  first bit: Measurement Beam Information  Second bit: Extended Additional Path List  Third bit: Additional Path Power  Fourth Bit: Multiple UL AoA of Additional Path  Fifth bit: LoS/NLoS Information  Sixth bit: TRP Rx TEG association for UL-TDOA  Seventh bit: TRP RxTxTEG-ID information for DL+UL positioning.  Eighth bit: SRS Resource Type  Ninth bit: Multiple Measurement Instances  Other bits reserved for future use. Value ‘1’ indicates ‘requested measurement characteristic’, Value ‘0’ indicates ‘not requested’. |

### 9.2.82 TRP Beam Antenna Information

The IE provides the beam antenna information of the TRP. It includes either the explicit beam antenna information, or a reference to another TRP’s signalled configuration, or the indication that no change has occurred with respect to previously signalled configuration.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *TRP Beam Antenna Info Item* | M |  |  |  |
| >*Reference* |  |  |  |  |
| >>Associated TRP ID | M |  | TRP ID  9.2.24 | This IE specifies the *TRP ID* of the associated TRP from which the beam information parameters are adopted in Local Coordinate System (LCS). |
| >*Explicit* |  |  |  |  |
| >>TRP Beam Antenna Angles | M |  | 9.2.83 |  |
| >>LCS to GCS Translation | O |  | 9.2.69 | Included if the azimuth and elevation are not provided in GCS. |
| *>No Change* |  |  | NULL | No change compared to the previously signalled configuration for this TRP. |

### 9.2.83 TRP Beam Antenna Angles

The IE provides the beam antenna information of the TRP.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| **TRP Beam Antenna Angles Item** |  | *1..< maxnoAzimuthAngles>* |  |  |
| >TRP Azimuth Angle | M |  | INTEGER (0..359) | For GCS, the azimuth angle is measured counter-clockwise from geographical North.  For LCS, the azimuth angle is measured counter-clockwise from the x-axis of the LCS. |
| >TRP Azimuth Angle fine | O |  | INTEGER (0..9) | Fine angle |
| **>TRP Elevation Angle List** |  | *1* |  |  |
| **>>TRP Elevation Angle Item** |  | *1..<maxnoElevationAngles>* |  |  |
| >>>TRP Elevation Angle | M |  | INTEGER (0..180) | For GCS, the elevation angle is measured relative to zenith and positive to the horizontal direction (elevation 0 deg. points to zenith, 90 deg to the horizon).  For LCS, the elevation angle is measured relative to the z-axis of the LCS (elevation 0 deg. points to the z-axis, 90 deg to the x-y plane). |
| >>>TRP Elevation Angle fine | O |  | INTEGER (0..9) | Fine angle |
| **>>>TRP Beam Power List** |  | *1* |  | Relative power between DL-PRS Resources for the given Azimuth and Elevation Angle.  The first Relative Power element in this list provides the peak power for this Azimuth/Elevation angle and is defined as 0dB power. All the remaining Relative Power Element's in this list provide the relative DL-PRS Resource power relative to this first element in the list. |
| **>>>>TRP Beam Power Item** |  | *2..< maxNumResourcesPerAngle>* |  |  |
| >>>>>PRS Resource Set ID | O |  | INTEGER (0..7) | DL-PRS Resource Set ID of the DL-PRS Resource for which the Relative Power is provided. If this field is absent, the DL-PRS Resource Set ID for this instance of the Beam Power List is the same as the DL-PRS Resource Set ID of the previous instance in the Beam Power List. This field shall be included at least in the first instance of the Beam Power List. |
| >>>>>PRS Resource ID | M |  | INTEGER (0..63) | DL-PRS Resource for which the Relative Power is provided. |
| >>>>>TRP Beam Relative Power | M |  | INTEGER (0..30) | The power values span from -30 to 0dB |
| >>>>>TRP Beam Relative Power "fine" | O |  | INTEGER (0..9) | Relative Power with 0.1dB resolution. The power spans from -0.9 to 0dB |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNumResourcesPerAngle | Maximum number of DL-PRS Resources per angle per TRP. Value is 24. |
| maxnoAzimuthAngles | Maximum number of azimuth angles per TRP. Value is 3600. |
| maxnoElevationAngles | Maximum number of elevation angles per azimuth angle/TRP. Value is 1801. |

### 9.2.84 Timing Error Margin

This information element contains the Timing error margin for the UE Tx TEG, TRP Rx TEG, or TRP Tx TEG.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Timing Error Margin | M |  | ENUMERATED(Tc0, Tc2, Tc4, Tc6, Tc8, Tc12, Tc16, Tc20, Tc24, Tc32, Tc40, Tc48, Tc56, Tc64, Tc72, Tc80, …) |  |

### 9.2.85 TRP Rx TEG Information

This information element contains the TRP Rx TEG information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TRP Rx TEG ID | M |  | INTEGER (0..31) |  |
| TRP Rx Timing Error Margin | M |  | Timing Error Margin 9.2.84 | Timing error margin associated to the TRP Rx TEG ID. |

### 9.2.86 TRP Tx TEG Information

This information element contains the TRP Tx TEG information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TRP Tx TEG ID | M |  | INTEGER (0..7) |  |
| TRP Tx Timing Error Margin | M |  | Timing Error Margin 9.2.84 | Timing error margin associated to the TRP Tx TEG ID. |

### 9.2.87 TRP RxTx TEG Information

This information element contains the TRP RxTx TEG information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| TRP RxTx TEG ID | M |  | INTEGER (0..255) |  |
| TRP RxTx Timing Error Margin | M |  | ENUMERATED (Tc0dot5, Tc1, Tc2, Tc4, Tc8, Tc12, Tc16, Tc20, Tc24, Tc32, Tc40, Tc48, Tc64, Tc80, Tc96, Tc128, …) | Timing error margin associated to the TRP RxTx TEG ID. |

## 9.3 Message and Information Element Abstract Syntax (with ASN.1)

### 9.3.1 General

Sub clause 9.3 presents the Abstract Syntax of the NRPPa protocol with ASN.1. In case there is contradiction between the ASN.1 definition in this sub clause and the tabular format in sub clause 9.1 and 9.2, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional elements, in which the tabular format shall take precedence.

The ASN.1 definition specifies the structure and content of NRPPa messages. NRPPa messages can contain any IEs specified in the object set definitions for that message without the order or number of occurrence being restricted by ASN.1. However, for this version of the standard, a sending entity shall construct an NRPPa message according to the PDU definitions module and with the following additional rules (Note that in the following, "IE" means an IE in the object set with an explicit id. If one IE needs to appear more than once in one object set, then the different occurrences have different IE ids):

- IEs shall be ordered (in an IE container) in the order they appear in object set definitions.

- Object set definitions specify how many times IEs may appear. An IE shall appear exactly once if the presence field in an object has value "mandatory". An IE may appear at most once if the presence field in an object has value "optional" or "conditional". If in a tabular format there is multiplicity specified for an IE (i.e. an IE list) then in the corresponding ASN.1 definition the list definition is separated into two parts. The first part defines an IE container list in which the list elements reside. The second part defines list elements. The IE container list appears as an IE of its own. For this version of the standard an IE container list may contain only one kind of list elements.

If an NRPPa message that is not constructed as defined above is received, this shall be considered as Abstract Syntax Error, and the message shall be handled as defined for Abstract Syntax Error in clause 10.

### 9.3.2 Usage of Private Message Mechanism for Non-standard Use

The private message mechanism for non-standard use may be used:

- for special operator (and/or vendor) specific features considered not to be part of the basic functionality, i.e. the functionality required for a complete and high-quality specification in order to guarantee multivendor inter-operability.

- by vendors for research purposes, e.g. to implement and evaluate new algorithms/features before such features are proposed for standardisation.

The private message mechanism shall not be used for basic functionality. Such functionality shall be standardised.

### 9.3.3 Elementary Procedure Definitions

-- 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,

PositioningActivationRequest,

PositioningActivationResponse,

PositioningActivationFailure,

PositioningDeactivation,

PRSConfigurationRequest,

PRSConfigurationResponse,

PRSConfigurationFailure,

MeasurementPreconfigurationRequired,

MeasurementPreconfigurationConfirm,

MeasurementPreconfigurationRefuse,

MeasurementActivation

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-positioningActivation,

id-positioningDeactivation,

id-pRSConfigurationExchange,

id-measurementPreconfiguration,

id-measurementActivation

FROM NRPPA-Constants;

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

--

-- Interface Elementary Procedure Class

--

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

NRPPA-ELEMENTARY-PROCEDURE ::= CLASS {

&InitiatingMessage ,

&SuccessfulOutcome OPTIONAL,

&UnsuccessfulOutcome OPTIONAL,

&procedureCode ProcedureCode UNIQUE,

&criticality Criticality DEFAULT ignore

}

WITH SYNTAX {

INITIATING MESSAGE &InitiatingMessage

[SUCCESSFUL OUTCOME &SuccessfulOutcome]

[UNSUCCESSFUL OUTCOME &UnsuccessfulOutcome]

PROCEDURE CODE &procedureCode

[CRITICALITY &criticality]

}

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

--

-- Interface PDU Definition

--

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

NRPPA-PDU ::= CHOICE {

initiatingMessage InitiatingMessage,

successfulOutcome SuccessfulOutcome,

unsuccessfulOutcome UnsuccessfulOutcome,

...

}

InitiatingMessage ::= SEQUENCE {

procedureCode NRPPA-ELEMENTARY-PROCEDURE.&procedureCode ({NRPPA-ELEMENTARY-PROCEDURES}),

criticality NRPPA-ELEMENTARY-PROCEDURE.&criticality ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode}),

nrppatransactionID NRPPATransactionID,

value NRPPA-ELEMENTARY-PROCEDURE.&InitiatingMessage ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode})

}

SuccessfulOutcome ::= SEQUENCE {

procedureCode NRPPA-ELEMENTARY-PROCEDURE.&procedureCode ({NRPPA-ELEMENTARY-PROCEDURES}),

criticality NRPPA-ELEMENTARY-PROCEDURE.&criticality ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode}),

nrppatransactionID NRPPATransactionID,

value NRPPA-ELEMENTARY-PROCEDURE.&SuccessfulOutcome ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode})

}

UnsuccessfulOutcome ::= SEQUENCE {

procedureCode NRPPA-ELEMENTARY-PROCEDURE.&procedureCode ({NRPPA-ELEMENTARY-PROCEDURES}),

criticality NRPPA-ELEMENTARY-PROCEDURE.&criticality ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode}),

nrppatransactionID NRPPATransactionID,

value NRPPA-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ({NRPPA-ELEMENTARY-PROCEDURES}{@procedureCode})

}

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

--

-- Interface Elementary Procedure List

--

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

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 |

pRSConfigurationExchange |

measurementPreconfiguration,

...

}

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

e-CIDMeasurementFailureIndication |

e-CIDMeasurementReport |

e-CIDMeasurementTermination |

errorIndication |

privateMessage |

assistanceInformationControl |

assistanceInformationFeedback |

positioningInformationUpdate |

measurementReport |

measurementUpdate |

measurementAbort |

measurementFailureIndication |

positioningDeactivation |

measurementActivation,

...

}

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

--

-- Interface Elementary Procedures

--

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

e-CIDMeasurementInitiation NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E-CIDMeasurementInitiationRequest

SUCCESSFUL OUTCOME E-CIDMeasurementInitiationResponse

UNSUCCESSFUL OUTCOME E-CIDMeasurementInitiationFailure

PROCEDURE CODE id-e-CIDMeasurementInitiation

CRITICALITY reject

}

e-CIDMeasurementFailureIndication NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E-CIDMeasurementFailureIndication

PROCEDURE CODE id-e-CIDMeasurementFailureIndication

CRITICALITY ignore

}

e-CIDMeasurementReport NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E-CIDMeasurementReport

PROCEDURE CODE id-e-CIDMeasurementReport

CRITICALITY ignore

}

e-CIDMeasurementTermination NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE E-CIDMeasurementTerminationCommand

PROCEDURE CODE id-e-CIDMeasurementTermination

CRITICALITY reject

}

oTDOAInformationExchange NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE OTDOAInformationRequest

SUCCESSFUL OUTCOME OTDOAInformationResponse

UNSUCCESSFUL OUTCOME OTDOAInformationFailure

PROCEDURE CODE id-oTDOAInformationExchange

CRITICALITY reject

}

assistanceInformationControl NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE AssistanceInformationControl

PROCEDURE CODE id-assistanceInformationControl

CRITICALITY reject

}

assistanceInformationFeedback NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE AssistanceInformationFeedback

PROCEDURE CODE id-assistanceInformationFeedback

CRITICALITY reject

}

errorIndication NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ErrorIndication

PROCEDURE CODE id-errorIndication

CRITICALITY ignore

}

privateMessage NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PrivateMessage

PROCEDURE CODE id-privateMessage

CRITICALITY ignore

}

positioningInformationExchange NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PositioningInformationRequest

SUCCESSFUL OUTCOME PositioningInformationResponse

UNSUCCESSFUL OUTCOME PositioningInformationFailure

PROCEDURE CODE id-positioningInformationExchange

CRITICALITY reject

}

positioningInformationUpdate NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PositioningInformationUpdate

PROCEDURE CODE id-positioningInformationUpdate

CRITICALITY ignore

}

measurement NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementRequest

SUCCESSFUL OUTCOME MeasurementResponse

UNSUCCESSFUL OUTCOME MeasurementFailure

PROCEDURE CODE id-Measurement

CRITICALITY reject

}

measurementReport NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementReport

PROCEDURE CODE id-MeasurementReport

CRITICALITY ignore

}

measurementUpdate NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementUpdate

PROCEDURE CODE id-MeasurementUpdate

CRITICALITY ignore

}

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

}

pRSConfigurationExchange NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE PRSConfigurationRequest

SUCCESSFUL OUTCOME PRSConfigurationResponse

UNSUCCESSFUL OUTCOME PRSConfigurationFailure

PROCEDURE CODE id-pRSConfigurationExchange

CRITICALITY reject

}

measurementPreconfiguration NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementPreconfigurationRequired

SUCCESSFUL OUTCOME MeasurementPreconfigurationConfirm

UNSUCCESSFUL OUTCOME MeasurementPreconfigurationRefuse

PROCEDURE CODE id-measurementPreconfiguration

CRITICALITY reject

}

measurementActivation NRPPA-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE MeasurementActivation

PROCEDURE CODE id-measurementActivation

CRITICALITY ignore

}

END

-- ASN1STOP

### 9.3.4 PDU Definitions

-- ASN1START

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

--

-- PDU definitions for NRPPa

--

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

NRPPA-PDU-Contents {

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- IE parameter types from other modules

--

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

IMPORTS

Cause,

CriticalityDiagnostics,

E-CID-MeasurementResult,

OTDOACells,

OTDOA-Information-Item,

Measurement-ID,

UE-Measurement-ID,

MeasurementPeriodicity,

MeasurementQuantities,

ReportCharacteristics,

RequestedSRSTransmissionCharacteristics,

Cell-Portion-ID,

OtherRATMeasurementQuantities,

OtherRATMeasurementResult,

WLANMeasurementQuantities,

WLANMeasurementResult,

Assistance-Information,

Broadcast,

AssistanceInformationFailureList,

SRSConfiguration,

TRPMeasurementQuantities,

TrpMeasurementResult,

TRP-ID,

TRPInformationTypeListTRPReq,

TRPInformationListTRPResp,

TRP-MeasurementRequestList,

TRP-MeasurementResponseList,

TRP-MeasurementUpdateList,

MeasurementBeamInfoRequest,

PositioningBroadcastCells,

SRSResourceSetID,

SpatialRelationInfo,

SRSResourceTrigger,

TRPList,

AbortTransmission,

SystemFrameNumber,

SlotNumber,

RelativeTime1900,

SpatialRelationPerSRSResource,

MeasurementPeriodicityExtended,

PRSTRPList,

PRSTransmissionTRPList,

ResponseTime,

UEReportingInformation,

UETxTEGAssociationList,

TRP-PRS-Information-List,

PRS-Measurements-Info-List,

UE-TEG-Info-Request,

MeasurementCharacteristicsRequestIndicator,

MeasurementTimeOccasion,

PRSConfigRequestType,

MeasurementAmount,

PreconfigurationResult,

RequestType,

UE-TEG-ReportingPeriodicity,

MeasurementPeriodicityNR-AoA,

SRSTransmissionStatus

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-Measurement-ID,

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-Measurement-ID,

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-TRPMeasurementQuantities,

id-MeasurementResult,

id-TRP-ID,

id-TRPInformationTypeListTRPReq,

id-TRPInformationListTRPResp,

id-TRP-MeasurementRequestList,

id-TRP-MeasurementResponseList,

id-TRP-MeasurementReportList,

id-TRP-MeasurementUpdateList,

id-MeasurementBeamInfoRequest,

id-PositioningBroadcastCells,

id-SRSType,

id-ActivationTime,

id-SRSResourceSetID,

id-TRPList,

id-SRSSpatialRelation,

id-AbortTransmission,

id-SystemFrameNumber,

id-SlotNumber,

id-SRSResourceTrigger,

id-SFNInitialisationTime,

id-SRSSpatialRelationPerSRSResource,

id-MeasurementPeriodicityExtended,

id-PRSTRPList,

id-PRSTransmissionTRPList,

id-ResponseTime,

id-UEReportingInformation,

id-UETxTEGAssociationList,

id-TRP-PRS-Information-List,

id-PRS-Measurements-Info-List,

id-UE-TEG-Info-Request,

id-MeasurementCharacteristicsRequestIndicator,

id-MeasurementTimeOccasion,

id-PRSConfigRequestType,

id-MeasurementAmount,

id-PreconfigurationResult,

id-RequestType,

id-UE-TEG-ReportingPeriodicity,

id-MeasurementPeriodicityNR-AoA,

id-SRSTransmissionStatus

FROM NRPPA-Constants;

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

--

-- E-CID MEASUREMENT INITIATION REQUEST

--

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

E-CIDMeasurementInitiationRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementInitiationRequest-IEs}},

...

}

E-CIDMeasurementInitiationRequest-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

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

{ ID id-MeasurementPeriodicity CRITICALITY reject TYPE MeasurementPeriodicity PRESENCE conditional}|

-- The IE shall be present if the Report Characteritics IE is set to “periodic” --

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

{ ID id-OtherRATMeasurementQuantities CRITICALITY ignore TYPE OtherRATMeasurementQuantities PRESENCE optional}|

{ ID id-WLANMeasurementQuantities CRITICALITY ignore TYPE WLANMeasurementQuantities PRESENCE optional}|

{ ID id-MeasurementPeriodicityNR-AoA CRITICALITY reject TYPE MeasurementPeriodicityNR-AoA PRESENCE conditional},

-- The IE shall be present if the Report Characteritics IE is set to “periodic” and the MeasurementQuantities-Item IE in the MeasurementQuantities IE is set to the value "angleOfArrivalNR" --

...

}

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

--

-- E-CID MEASUREMENT INITIATION RESPONSE

--

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

E-CIDMeasurementInitiationResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementInitiationResponse-IEs}},

...

}

E-CIDMeasurementInitiationResponse-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-E-CID-MeasurementResult CRITICALITY ignore TYPE E-CID-MeasurementResult PRESENCE optional}|

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

{ ID id-Cell-Portion-ID CRITICALITY ignore TYPE Cell-Portion-ID PRESENCE optional}|

{ ID id-OtherRATMeasurementResult CRITICALITY ignore TYPE OtherRATMeasurementResult PRESENCE optional}|

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

...

}

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

--

-- E-CID MEASUREMENT INITIATION FAILURE

--

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

E-CIDMeasurementInitiationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementInitiationFailure-IEs}},

...

}

E-CIDMeasurementInitiationFailure-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

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

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

...

}

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

--

-- E-CID MEASUREMENT FAILURE INDICATION

--

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

E-CIDMeasurementFailureIndication ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementFailureIndication-IEs}},

...

}

E-CIDMeasurementFailureIndication-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

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

...

}

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

--

-- E-CID MEASUREMENT REPORT

--

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

E-CIDMeasurementReport ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementReport-IEs}},

...

}

E-CIDMeasurementReport-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-E-CID-MeasurementResult CRITICALITY ignore TYPE E-CID-MeasurementResult PRESENCE mandatory}|

{ ID id-Cell-Portion-ID CRITICALITY ignore TYPE Cell-Portion-ID PRESENCE optional},

...

}

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

--

-- E-CID MEASUREMENT TERMINATION

--

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

E-CIDMeasurementTerminationCommand ::= SEQUENCE {

protocolIEs ProtocolIE-Container {{E-CIDMeasurementTerminationCommand-IEs}},

...

}

E-CIDMeasurementTerminationCommand-IEs NRPPA-PROTOCOL-IES ::= {

{ ID id-LMF-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-UE-Measurement-ID CRITICALITY reject TYPE UE-Measurement-ID PRESENCE mandatory},

...

}

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

--

-- OTDOA INFORMATION REQUEST

--

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

OTDOAInformationRequest ::= SEQUENCE {

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

...

}

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

{ ID id-OTDOA-Information-Type-Group CRITICALITY reject TYPE OTDOA-Information-Type PRESENCE mandatory},

...

}

OTDOA-Information-Type ::= SEQUENCE (SIZE(1..maxnoOTDOAtypes)) OF ProtocolIE-Single-Container { { OTDOA-Information-Type-ItemIEs} }

OTDOA-Information-Type-ItemIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-OTDOA-Information-Type-Item CRITICALITY reject TYPE OTDOA-Information-Type-Item PRESENCE mandatory},

...

}

OTDOA-Information-Type-Item ::= SEQUENCE {

oTDOA-Information-Item OTDOA-Information-Item,

iE-Extensions ProtocolExtensionContainer { { OTDOA-Information-Type-ItemExtIEs} } OPTIONAL,

...

}

OTDOA-Information-Type-ItemExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

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

--

-- OTDOA INFORMATION RESPONSE

--

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

OTDOAInformationResponse ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- OTDOA INFORMATION FAILURE

--

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

OTDOAInformationFailure ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- ASSISTANCE INFORMATION CONTROL

--

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

AssistanceInformationControl ::= SEQUENCE {

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

...

}

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

{ ID id-Assistance-Information CRITICALITY reject TYPE Assistance-Information PRESENCE optional}|

{ ID id-Broadcast CRITICALITY reject TYPE Broadcast PRESENCE optional}|

{ ID id-PositioningBroadcastCells CRITICALITY reject TYPE PositioningBroadcastCells PRESENCE optional},

...

}

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

--

-- ASSISTANCE INFORMATION FEEDBACK

--

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

AssistanceInformationFeedback ::= SEQUENCE {

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

...

}

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

{ ID id-AssistanceInformationFailureList CRITICALITY reject TYPE AssistanceInformationFailureList PRESENCE optional}|

{ ID id-PositioningBroadcastCells CRITICALITY reject TYPE PositioningBroadcastCells PRESENCE optional}|

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

...

}

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

--

-- ERROR INDICATION

--

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

ErrorIndication ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- PRIVATE MESSAGE

--

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

PrivateMessage ::= SEQUENCE {

privateIEs PrivateIE-Container {{PrivateMessage-IEs}},

...

}

PrivateMessage-IEs NRPPA-PRIVATE-IES ::= {

...

}

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

--

-- POSITIONING INFORMATION REQUEST

--

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

PositioningInformationRequest ::= SEQUENCE {

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

...

}

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

{ ID id-RequestedSRSTransmissionCharacteristics CRITICALITY ignore TYPE RequestedSRSTransmissionCharacteristics PRESENCE optional }|

{ ID id-UEReportingInformation CRITICALITY ignore TYPE UEReportingInformation PRESENCE optional }|

{ ID id-UE-TEG-Info-Request CRITICALITY ignore TYPE UE-TEG-Info-Request PRESENCE optional }|

{ ID id-UE-TEG-ReportingPeriodicity CRITICALITY reject TYPE UE-TEG-ReportingPeriodicity PRESENCE conditional },

-- The IE shall be present if the UE TEG Info Request IE is set to “periodic”

...

}

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

--

-- POSITIONING INFORMATION RESPONSE

--

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

PositioningInformationResponse ::= SEQUENCE {

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

...

}

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

{ ID id-SRSConfiguration CRITICALITY ignore TYPE SRSConfiguration PRESENCE optional}|

{ ID id-SFNInitialisationTime CRITICALITY ignore TYPE RelativeTime1900 PRESENCE optional}|

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

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

...

}

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

--

-- POSITIONING INFORMATION FAILURE

--

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

PositioningInformationFailure ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- POSITIONING INFORMATION UPDATE

--

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

PositioningInformationUpdate ::= SEQUENCE {

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

...

}

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

{ ID id-SRSConfiguration CRITICALITY ignore TYPE SRSConfiguration PRESENCE optional}|

{ ID id-SFNInitialisationTime CRITICALITY ignore TYPE RelativeTime1900 PRESENCE optional}|

{ ID id-UETxTEGAssociationList CRITICALITY ignore TYPE UETxTEGAssociationList PRESENCE optional}|

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

...

}

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

--

-- MEASUREMENT REQUEST

--

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

MeasurementRequest ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-TRP-MeasurementRequestList CRITICALITY reject TYPE TRP-MeasurementRequestList PRESENCE mandatory}|

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

{ ID id-MeasurementPeriodicity CRITICALITY reject TYPE MeasurementPeriodicity PRESENCE conditional}|

-- The IE shall be present if the Report Characteritics IE is set to “periodic” –

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

{ ID id-SFNInitialisationTime CRITICALITY ignore TYPE RelativeTime1900 PRESENCE optional}|

{ ID id-SRSConfiguration CRITICALITY ignore TYPE SRSConfiguration PRESENCE optional}|

{ ID id-MeasurementBeamInfoRequest CRITICALITY ignore TYPE MeasurementBeamInfoRequest PRESENCE optional}|

{ ID id-SystemFrameNumber CRITICALITY ignore TYPE SystemFrameNumber PRESENCE optional}|

{ ID id-SlotNumber CRITICALITY ignore TYPE SlotNumber PRESENCE optional}|

{ ID id-MeasurementPeriodicityExtended CRITICALITY reject TYPE MeasurementPeriodicityExtended PRESENCE conditional}|

-- The IE shall be present the MeasurementPeriodicity IE is set to the value "extended"

{ ID id-ResponseTime CRITICALITY ignore TYPE ResponseTime PRESENCE optional}|

{ ID id-MeasurementCharacteristicsRequestIndicator CRITICALITY ignore TYPE MeasurementCharacteristicsRequestIndicator PRESENCE optional}|

{ ID id-MeasurementTimeOccasion CRITICALITY ignore TYPE MeasurementTimeOccasion PRESENCE optional}|

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

...

}

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

--

-- MEASUREMENT RESPONSE

--

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

MeasurementResponse ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-TRP-MeasurementResponseList CRITICALITY reject TYPE TRP-MeasurementResponseList PRESENCE optional}|

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

...

}

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

--

-- MEASUREMENT FAILURE

--

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

MeasurementFailure ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

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

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

...

}

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

--

-- MEASUREMENT REPORT

--

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

MeasurementReport ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-TRP-MeasurementReportList CRITICALITY reject TYPE TRP-MeasurementResponseList PRESENCE mandatory},

...

}

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

--

-- MEASUREMENT UPDATE

--

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

MeasurementUpdate ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-SRSConfiguration CRITICALITY ignore TYPE SRSConfiguration PRESENCE optional}|

{ ID id-TRP-MeasurementUpdateList CRITICALITY reject TYPE TRP-MeasurementUpdateList PRESENCE optional}|

{ ID id-MeasurementCharacteristicsRequestIndicator CRITICALITY ignore TYPE MeasurementCharacteristicsRequestIndicator PRESENCE optional}|

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

...

}

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

--

-- MEASUREMENT ABORT

--

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

MeasurementAbort ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory},

...

}

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

--

-- MEASUREMENT FAILURE INDICATION

--

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

MeasurementFailureIndication ::= SEQUENCE {

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

...

}

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

{ ID id-LMF-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

{ ID id-RAN-Measurement-ID CRITICALITY reject TYPE Measurement-ID PRESENCE mandatory}|

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

...

}

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

--

-- TRP INFORMATION REQUEST

--

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

TRPInformationRequest ::= SEQUENCE {

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

...

}

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

{ ID id-TRPList CRITICALITY ignore TYPE TRPList PRESENCE optional}|

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

...

}

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

--

-- TRP INFORMATION RESPONSE

--

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

TRPInformationResponse ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- 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},

...

}

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

--

-- POSITIONING ACTIVATION REQUEST

--

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

PositioningActivationRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningActivationRequestIEs} },

...

}

PositioningActivationRequestIEs NRPPA-PROTOCOL-IES ::= {

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

{ ID id-ActivationTime CRITICALITY ignore TYPE RelativeTime1900 PRESENCE optional },

...

}

SRSType ::= CHOICE {

semipersistentSRS SemipersistentSRS,

aperiodicSRS AperiodicSRS,

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

}

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

...

}

SemipersistentSRS ::= SEQUENCE {

sRSResourceSetID SRSResourceSetID,

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

...

}

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

{ ID id-SRSSpatialRelation CRITICALITY ignore EXTENSION SpatialRelationInfo PRESENCE optional}|

{ ID id-SRSSpatialRelationPerSRSResource CRITICALITY ignore EXTENSION SpatialRelationPerSRSResource PRESENCE optional},

...

}

AperiodicSRS ::= SEQUENCE {

aperiodic ENUMERATED{true,...},

sRSResourceTrigger SRSResourceTrigger OPTIONAL,

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-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|

{ ID id-SystemFrameNumber CRITICALITY ignore TYPE SystemFrameNumber PRESENCE optional }|

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

...

}

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

--

-- POSITIONING ACTIVATION FAILURE

--

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

PositioningActivationFailure ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningActivationFailureIEs} },

...

}

PositioningActivationFailureIEs NRPPA-PROTOCOL-IES ::= {

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

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

...

}

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

--

-- POSITIONING DEACTIVATION

--

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

PositioningDeactivation ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { PositioningDeactivationIEs} },

...

}

PositioningDeactivationIEs NRPPA-PROTOCOL-IES ::= {

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

...

}

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

--

-- PRS CONFIGURATION REQUEST

--

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

PRSConfigurationRequest ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- PRS CONFIGURATION RESPONSE

--

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

PRSConfigurationResponse ::= SEQUENCE {

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

...

}

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

{ ID id-PRSTransmissionTRPList CRITICALITY ignore TYPE PRSTransmissionTRPList PRESENCE optional}|

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

...

}

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

--

-- PRS CONFIGURATION FAILURE

--

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

PRSConfigurationFailure ::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- MEASUREMENT PRECONFIGURATION REQUIRED

--

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

MeasurementPreconfigurationRequired ::= SEQUENCE {

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

...

}

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

{ ID id-TRP-PRS-Information-List CRITICALITY ignore TYPE TRP-PRS-Information-List PRESENCE mandatory},

...

}

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

--

-- MEASUREMENT PRECONFIGURATION CONFIRM

--

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

MeasurementPreconfigurationConfirm::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- MEASUREMENT PRECONFIGURATION REFUSE

--

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

MeasurementPreconfigurationRefuse::= SEQUENCE {

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

...

}

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

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

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

...

}

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

--

-- MEASUREMENT ACTIVATION

--

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

MeasurementActivation::= SEQUENCE {

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

...

}

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

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

{ ID id-PRS-Measurements-Info-List CRITICALITY ignore TYPE PRS-Measurements-Info-List PRESENCE optional},

...

}

END

-- ASN1STOP

### 9.3.5 Information Element definitions

-- ASN1START

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

--

-- Information Element Definitions

--

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

NRPPA-IEs {

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

ngran-access (22) modules (3) nrppa (4) version1 (1) nrppa-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

id-MeasurementQuantities-Item,

id-CGI-NR,

id-SFNInitialisationTime-NR,

id-GeographicalCoordinates,

id-ResultSS-RSRP,

id-ResultSS-RSRQ,

id-ResultCSI-RSRP,

id-ResultCSI-RSRQ,

id-AngleOfArrivalNR,

id-ResultNR,

id-ResultEUTRA,

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,

maxnoPosMeas,

maxnoTRPs,

maxnoTRPInfoTypes,

maxNoOfMeasTRPs,

maxNoPath,

maxnoofAngleInfo,

maxnolcs-gcs-translation,

maxnoBcastCell,

maxnoSRSTriggerStates,

maxnoSpatialRelations,

maxNRMeas,

maxEUTRAMeas,

maxIndexesReport,

maxCellReportNR,

maxnoSRS-Carriers,

maxnoSCSs,

maxnoSRS-Resources,

maxnoSRS-PosResources,

maxnoSRS-ResourceSets,

maxnoSRS-ResourcePerSet,

maxnoSRS-PosResourceSets,

maxnoSRS-PosResourcePerSet,

maxPRS-ResourceSets,

maxPRS-ResourcesPerSet,

maxNoSSBs,

maxnoofPRSresourceSet,

maxnoofPRSresource,

maxnoofULAoAs,

maxNoPathExtended,

maxnoARPs,

maxnoTRPTEGs,

maxnoUETEGs,

maxFreqLayers,

maxnoPRSTRPs,

maxNumResourcesPerAngle,

maxnoAzimuthAngles,

maxnoElevationAngles,

id-Cell-ID,

id-TRPInformationTypeItem,

id-SrsFrequency,

id-TRPType,

id-SRSSpatialRelationPerSRSResource,

id-PRS-Resource-ID,

id-OnDemandPRS,

id-AoA-SearchWindow,

id-ZoA,

id-MultipleULAoA,

id-UL-SRS-RSRPP,

id-SRSResourcetype,

id-ExtendedAdditionalPathList,

id-ARPLocationInfo,

id-ARP-ID,

id-LoS-NLoSInformation,

id-NumberOfTRPRxTEG,

id-NumberOfTRPRxTxTEG,

id-TRPTxTEGAssociation,

id-TRPTEGInformation,

id-TRP-Rx-TEGInformation,

id-TRPBeamAntennaInformation,

id-NR-TADV,

id-pathPower,

id-SRSPortIndex,

id-UETxTimingErrorMargin,

id-nrofSymbolsExtended,

id-repetitionFactorExtended,

id-StartRBHopping,

id-StartRBIndex,

id-transmissionCombn8

FROM NRPPA-Constants

Criticality,

NRPPATransactionID,

ProcedureCode,

ProtocolIE-ID,

TriggeringMessage

FROM NRPPA-CommonDataTypes

ProtocolExtensionContainer{},

ProtocolIE-Single-Container{},

NRPPA-PROTOCOL-EXTENSION,

NRPPA-PROTOCOL-IES

FROM NRPPA-Containers;

-- A

AbortTransmission ::= CHOICE {

deactivateSRSResourceSetID SRSResourceSetID,

releaseALL NULL,

choice-extension ProtocolIE-Single-Container { { AbortTransmission-ExtIEs } }

}

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

...

}

ActiveULBWP ::= SEQUENCE {

locationAndBandwidth INTEGER (0..37949,...),

subcarrierSpacing ENUMERATED {kHz15, kHz30, kHz60, kHz120,..., kHz480, kHz960},

cyclicPrefix ENUMERATED {normal, extended},

txDirectCurrentLocation INTEGER (0..3301,...),

shift7dot5kHz ENUMERATED {true, ...} OPTIONAL,

sRSConfig SRSConfig,

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

...

}

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

...

}

AdditionalPathList ::= SEQUENCE (SIZE (1.. maxNoPath)) OF AdditionalPathListItem

AdditionalPathListItem ::= SEQUENCE {

relativeTimeOfPath RelativePathDelay,

pathQuality TrpMeasurementQuality OPTIONAL,

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

...

}

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

{ ID id-MultipleULAoA CRITICALITY ignore EXTENSION MultipleULAoA PRESENCE optional}|

{ ID id-pathPower CRITICALITY ignore EXTENSION UL-SRS-RSRPP PRESENCE optional},

...

}

ExtendedAdditionalPathList ::= SEQUENCE (SIZE (1.. maxNoPathExtended)) OF ExtendedAdditionalPathList-Item

ExtendedAdditionalPathList-Item ::= SEQUENCE {

relativeTimeOfPath RelativePathDelay,

pathQuality TrpMeasurementQuality OPTIONAL,

multipleULAoA MultipleULAoA OPTIONAL,

pathPower UL-SRS-RSRPP OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ExtendedAdditionalPathList-Item-ExtIEs} } OPTIONAL,

...

}

ExtendedAdditionalPathList-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

AoA-AssistanceInfo ::= SEQUENCE {

angleMeasurement AngleMeasurementType,

lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { AoA-AssistanceInfo-ExtIEs } } OPTIONAL,

...

}

AoA-AssistanceInfo-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

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

AperiodicSRSResourceTrigger ::= INTEGER (1..3)

AngleMeasurementType ::= CHOICE {

expected-ULAoA Expected-UL-AoA,

expected-ZoA Expected-ZoA-only,

choice-extension ProtocolIE-Single-Container { { AngleMeasurementType-ExtIEs } }

}

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

...

}

Expected-UL-AoA ::= SEQUENCE {

expected-Azimuth-AoA Expected-Azimuth-AoA,

expected-Zenith-AoA Expected-Zenith-AoA OPTIONAL,

iE-extensions ProtocolExtensionContainer { { Expected-UL-AoA-ExtIEs } } OPTIONAL,

...

}

Expected-UL-AoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

Expected-ZoA-only ::= SEQUENCE {

expected-ZoA-only Expected-Zenith-AoA,

iE-extensions ProtocolExtensionContainer { { Expected-ZoA-only-ExtIEs } } OPTIONAL,

...

}

Expected-ZoA-only-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

Expected-Azimuth-AoA ::= SEQUENCE {

expected-Azimuth-AoA-value Expected-Value-AoA,

expected-Azimuth-AoA-uncertainty Uncertainty-range-AoA,

iE-extensions ProtocolExtensionContainer { { Expected-Azimuth-AoA-ExtIEs } } OPTIONAL,

...

}

Expected-Azimuth-AoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

Expected-Zenith-AoA ::= SEQUENCE {

expected-Zenith-AoA-value Expected-Value-ZoA,

expected-Zenith-AoA-uncertainty Uncertainty-range-ZoA,

iE-extensions ProtocolExtensionContainer { { Expected-Zenith-AoA-ExtIEs } } OPTIONAL,

...

}

Expected-Zenith-AoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ARP-ID ::= INTEGER (1..16, ...)

ARPLocationInformation ::= SEQUENCE (SIZE (1..maxnoARPs)) OF ARPLocationInformation-Item

ARPLocationInformation-Item ::= SEQUENCE {

aRP-ID ARP-ID,

aRPLocationType ARPLocationType,

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

...

}

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

...

}

ARPLocationType ::= CHOICE {

aRPPositionRelativeGeodetic RelativeGeodeticLocation,

aRPPositionRelativeCartesian RelativeCartesianLocation,

choice-extension ProtocolIE-Single-Container { { ARPLocationType-ExtIEs } }

}

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

...

}

Assistance-Information ::= SEQUENCE {

systemInformation SystemInformation,

iE-Extensions ProtocolExtensionContainer { { Assistance-Information-ExtIEs} } OPTIONAL,

...

}

Assistance-Information-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

AssistanceInformationFailureList ::= SEQUENCE (SIZE (1..maxnoAssistInfoFailureListItems)) OF SEQUENCE {

posSIB-Type PosSIB-Type,

outcome Outcome,

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

...

}

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

...

}

AssistanceInformationMetaData ::= SEQUENCE {

encrypted ENUMERATED {true, ...} OPTIONAL,

gNSSID ENUMERATED {gps, sbas, qzss, galileo, glonass, bds, navic, ...} OPTIONAL,

sBASID ENUMERATED {waas, egnos, msas, gagan, ...} OPTIONAL,

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

...

}

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

...

}

-- B

BandwidthSRS ::= CHOICE {

fR1 ENUMERATED {mHz5, mHz10, mHz20, mHz40, mHz50, mHz80, mHz100, ...},

fR2 ENUMERATED {mHz50, mHz100, mHz200, mHz400, ...},

choice-extension ProtocolIE-Single-Container { { BandwidthSRS-ExtIEs } }

}

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

...

}

BCCH ::= INTEGER (0..1023, ...)

Broadcast ::= ENUMERATED {

start,

stop,

...

}

BroadcastPeriodicity ::= ENUMERATED {

ms80,

ms160,

ms320,

ms640,

ms1280,

ms2560,

ms5120,

...

}

PositioningBroadcastCells ::= SEQUENCE (SIZE (1..maxnoBcastCell)) OF NG-RAN-CGI

BSSID ::= OCTET STRING (SIZE(6))

-- C

CarrierFreq ::= SEQUENCE {

pointA INTEGER (0..3279165),

offsetToCarrier INTEGER (0..2199, ...),

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

...

}

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

...

}

Cause ::= CHOICE {

radioNetwork CauseRadioNetwork,

protocol CauseProtocol,

misc CauseMisc,

choice-Extension ProtocolIE-Single-Container {{ Cause-ExtensionIE }}

}

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

...

}

CauseMisc ::= ENUMERATED {

unspecified,

...

}

CauseProtocol ::= ENUMERATED {

transfer-syntax-error,

abstract-syntax-error-reject,

abstract-syntax-error-ignore-and-notify,

message-not-compatible-with-receiver-state,

semantic-error,

unspecified,

abstract-syntax-error-falsely-constructed-message,

...

}

CauseRadioNetwork ::= ENUMERATED {

unspecified,

requested-item-not-supported,

requested-item-temporarily-not-available,

...,

serving-NG-RAN-node-changed,

requested-item-not-supported-on-time

}

Cell-Portion-ID ::= INTEGER (0..4095,...)

CGI-EUTRA ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

eUTRAcellIdentifier EUTRACellIdentifier,

iE-Extensions ProtocolExtensionContainer { {CGI-EUTRA-ExtIEs} } OPTIONAL,

...

}

CGI-EUTRA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

CGI-NR ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

nRcellIdentifier NRCellIdentifier,

iE-Extensions ProtocolExtensionContainer { {CGI-NR-ExtIEs} } OPTIONAL,

...

}

CGI-NR-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

CPLength-EUTRA ::= ENUMERATED {

normal,

extended,

...

}

CriticalityDiagnostics ::= SEQUENCE {

procedureCode ProcedureCode OPTIONAL,

triggeringMessage TriggeringMessage OPTIONAL,

procedureCriticality Criticality OPTIONAL,

nrppatransactionID NRPPATransactionID OPTIONAL,

iEsCriticalityDiagnostics CriticalityDiagnostics-IE-List OPTIONAL,

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

...

}

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

...

}

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxNrOfErrors)) OF

SEQUENCE {

iECriticality Criticality,

iE-ID ProtocolIE-ID,

typeOfError TypeOfError,

iE-Extensions ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} } OPTIONAL,

...

}

CriticalityDiagnostics-IE-List-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

-- D

DL-Bandwidth-EUTRA ::= ENUMERATED {

bw6,

bw15,

bw25,

bw50,

bw75,

bw100,

...

}

DL-PRS ::= SEQUENCE {

prsid INTEGER (0..255),

dl-PRSResourceSetID PRS-Resource-Set-ID,

dl-PRSResourceID PRS-Resource-ID OPTIONAL,

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

...

}

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

...

}

DL-PRSMutingPattern ::= CHOICE {

two BIT STRING (SIZE(2)),

four BIT STRING (SIZE(4)),

six BIT STRING (SIZE(6)),

eight BIT STRING (SIZE(8)),

sixteen BIT STRING (SIZE(16)),

thirty-two BIT STRING (SIZE(32)),

choice-extension ProtocolIE-Single-Container { { DL-PRSMutingPattern-ExtIEs } }

}

DL-PRSMutingPattern-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

DLPRSResourceCoordinates ::= SEQUENCE {

listofDL-PRSResourceSetARP SEQUENCE (SIZE(1.. maxPRS-ResourceSets)) OF DLPRSResourceSetARP,

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

...

}

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

...

}

DLPRSResourceSetARP ::= SEQUENCE {

dl-PRSResourceSetID PRS-Resource-Set-ID,

dL-PRSResourceSetARPLocation DL-PRSResourceSetARPLocation,

listofDL-PRSResourceARP SEQUENCE (SIZE(1.. maxPRS-ResourcesPerSet)) OF DLPRSResourceARP,

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

...

}

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

...

}

DL-PRSResourceSetARPLocation ::= CHOICE {

relativeGeodeticLocation RelativeGeodeticLocation,

relativeCartesianLocation RelativeCartesianLocation,

choice-Extension ProtocolIE-Single-Container { { DL-PRSResourceSetARPLocation-ExtIEs } }

}

DL-PRSResourceSetARPLocation-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

DLPRSResourceARP ::= SEQUENCE {

dl-PRSResourceID PRS-Resource-ID,

dL-PRSResourceARPLocation DL-PRSResourceARPLocation,

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

...

}

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

...

}

DL-PRSResourceARPLocation ::= CHOICE {

relativeGeodeticLocation RelativeGeodeticLocation,

relativeCartesianLocation RelativeCartesianLocation,

choice-Extension ProtocolIE-Single-Container { { DL-PRSResourceARPLocation-ExtIEs } }

}

DL-PRSResourceARPLocation-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

-- E

E-CID-MeasurementResult ::= SEQUENCE {

servingCell-ID NG-RAN-CGI,

servingCellTAC TAC,

nG-RANAccessPointPosition NG-RANAccessPointPosition OPTIONAL,

measuredResults MeasuredResults OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { E-CID-MeasurementResult-ExtIEs} } OPTIONAL,

...

}

E-CID-MeasurementResult-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-GeographicalCoordinates CRITICALITY ignore EXTENSION GeographicalCoordinates PRESENCE optional},

...

}

EUTRACellIdentifier ::= BIT STRING (SIZE (28))

EARFCN ::= INTEGER (0..262143, ...)

Expected-Value-AoA ::= INTEGER (0..3599)

Expected-Value-ZoA ::= INTEGER (0..1799)

-- F

-- G

GeographicalCoordinates ::= SEQUENCE {

tRPPositionDefinitionType TRPPositionDefinitionType,

dLPRSResourceCoordinates DLPRSResourceCoordinates OPTIONAL,

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

...

}

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

{ ID id-ARPLocationInfo CRITICALITY ignore EXTENSION ARPLocationInformation PRESENCE optional},

...

}

GNB-RxTxTimeDiff ::= SEQUENCE {

rxTxTimeDiff GNBRxTxTimeDiffMeas,

additionalPathList AdditionalPathList OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { GNB-RxTxTimeDiff-ExtIEs} } OPTIONAL,

...

}

GNB-RxTxTimeDiff-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-ExtendedAdditionalPathList CRITICALITY ignore EXTENSION ExtendedAdditionalPathList PRESENCE optional}|

{ ID id-TRPTEGInformation CRITICALITY ignore EXTENSION TRPTEGInformation PRESENCE optional },

...

}

GNBRxTxTimeDiffMeas ::= CHOICE {

k0 INTEGER (0.. 1970049),

k1 INTEGER (0.. 985025),

k2 INTEGER (0.. 492513),

k3 INTEGER (0.. 246257),

k4 INTEGER (0.. 123129),

k5 INTEGER (0.. 61565),

choice-extension ProtocolIE-Single-Container { { GNBRxTxTimeDiffMeas-ExtIEs } }

}

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

...

}

-- H

HESSID ::= OCTET STRING (SIZE(6))

-- I

-- J

-- K

-- L

LCS-to-GCS-Translation::= SEQUENCE {

alpha INTEGER (0..3599),

beta INTEGER (0..3599),

gamma INTEGER (0..3599),

iE-Extensions ProtocolExtensionContainer { { LCS-to-GCS-Translation-ExtIEs} } OPTIONAL,

...

}

LCS-to-GCS-Translation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

LCS-to-GCS-TranslationItem::= SEQUENCE {

alpha INTEGER (0..359),

alphaFine INTEGER (0..9) OPTIONAL,

beta INTEGER (0..359),

betaFine INTEGER (0..9) OPTIONAL,

gamma INTEGER (0..359),

gammaFine INTEGER (0..9) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { LCS-to-GCS-TranslationItem-ExtIEs} } OPTIONAL,

...

}

LCS-to-GCS-TranslationItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

LocationUncertainty ::= SEQUENCE {

horizontalUncertainty INTEGER (0..255),

horizontalConfidence INTEGER (0..100),

verticalUncertainty INTEGER (0..255),

verticalConfidence INTEGER (0..100),

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

...

}

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

...

}

LoS-NLoSIndicatorHard ::= ENUMERATED {nlos, los}

LoS-NLoSIndicatorSoft ::= INTEGER (0..10)

LoS-NLoSInformation ::= CHOICE {

loS-NLoSIndicatorSoft LoS-NLoSIndicatorSoft,

loS-NLoSIndicatorHard LoS-NLoSIndicatorHard,

choice-Extension ProtocolIE-Single-Container {{ LoS-NLoSInformation-ExtIEs}}

}

LoS-NLoSInformation-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

-- M

Measurement-ID ::= INTEGER (1.. 65536, ...)

MeasurementAmount ::= ENUMERATED {ma0, ma1, ma2, ma4, ma8, ma16, ma32, ma64}

MeasurementBeamInfoRequest ::= ENUMERATED {true, ...}

MeasurementBeamInfo ::= SEQUENCE {

pRS-Resource-ID PRS-Resource-ID OPTIONAL,

pRS-Resource-Set-ID PRS-Resource-Set-ID OPTIONAL,

sSB-Index SSB-Index OPTIONAL,

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

...

}

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

...

}

MeasurementPeriodicity ::= ENUMERATED {

ms120,

ms240,

ms480,

ms640,

ms1024,

ms2048,

ms5120,

ms10240,

min1,

min6,

min12,

min30,

min60,

...,

ms20480,

ms40960,

extended

}

MeasurementPeriodicityExtended ::= ENUMERATED {

ms160,

ms320,

ms1280,

ms2560,

ms61440,

ms81920,

ms368640,

ms737280,

ms1843200,

...

}

MeasurementPeriodicityNR-AoA ::= ENUMERATED {

ms160,

ms320,

ms640,

ms1280,

ms2560,

ms5120,

ms10240,

ms20480,

ms40960,

ms61440,

ms81920,

ms368640,

ms737280,

ms1843200,

...

}

MeasurementQuantities ::= SEQUENCE (SIZE (1.. maxNoMeas)) OF ProtocolIE-Single-Container { {MeasurementQuantities-ItemIEs} }

MeasurementQuantities-ItemIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-MeasurementQuantities-Item CRITICALITY reject TYPE MeasurementQuantities-Item PRESENCE mandatory}

}

MeasurementQuantities-Item ::= SEQUENCE {

measurementQuantitiesValue MeasurementQuantitiesValue,

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

...

}

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

...

}

MeasurementQuantitiesValue ::= ENUMERATED {

cell-ID,

angleOfArrival,

timingAdvanceType1,

timingAdvanceType2,

rSRP,

rSRQ,

... ,

sS-RSRP,

sS-RSRQ,

cSI-RSRP,

cSI-RSRQ,

angleOfArrivalNR,

timingAdvanceNR

}

MeasurementTimeOccasion ::= ENUMERATED {o1, o4, ...}

MeasurementCharacteristicsRequestIndicator ::= BIT STRING (SIZE (16))

MeasuredResults ::= SEQUENCE (SIZE (1.. maxNoMeas)) OF MeasuredResultsValue

MeasuredResultsValue ::= CHOICE {

valueAngleOfArrival-EUTRA INTEGER (0..719),

valueTimingAdvanceType1-EUTRA INTEGER (0..7690),

valueTimingAdvanceType2-EUTRA INTEGER (0..7690),

resultRSRP-EUTRA ResultRSRP-EUTRA,

resultRSRQ-EUTRA ResultRSRQ-EUTRA,

choice-Extension ProtocolIE-Single-Container {{ MeasuredResultsValue-ExtensionIE }}

}

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

{ ID id-ResultSS-RSRP CRITICALITY ignore TYPE ResultSS-RSRP PRESENCE mandatory }|

{ ID id-ResultSS-RSRQ CRITICALITY ignore TYPE ResultSS-RSRQ PRESENCE mandatory }|

{ ID id-ResultCSI-RSRP CRITICALITY ignore TYPE ResultCSI-RSRP PRESENCE mandatory }|

{ ID id-ResultCSI-RSRQ CRITICALITY ignore TYPE ResultCSI-RSRQ PRESENCE mandatory }|

{ ID id-AngleOfArrivalNR CRITICALITY ignore TYPE UL-AoA PRESENCE mandatory }|

{ ID id-NR-TADV CRITICALITY ignore TYPE NR-TADV PRESENCE mandatory },

...

}

MultipleULAoA ::= SEQUENCE {

multipleULAoA MultipleULAoA-List,

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

...

}

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

...

}

MultipleULAoA-List ::= SEQUENCE (SIZE(1.. maxnoofULAoAs)) OF MultipleULAoA-Item

MultipleULAoA-Item ::= CHOICE {

uL-AoA UL-AoA,

ul-ZoA ZoA,

choice-extension ProtocolIE-Single-Container { { MultipleULAoA-Item-ExtIEs } }

}

MultipleULAoA-Item-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

-- N

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

NG-RANAccessPointPosition ::= SEQUENCE {

latitudeSign ENUMERATED {north, south},

latitude INTEGER (0..8388607),

longitude INTEGER (-8388608..8388607),

directionOfAltitude ENUMERATED {height, depth},

altitude INTEGER (0..32767),

uncertaintySemi-major INTEGER (0..127),

uncertaintySemi-minor INTEGER (0..127),

orientationOfMajorAxis INTEGER (0..179),

uncertaintyAltitude INTEGER (0..127),

confidence INTEGER (0..100),

iE-Extensions ProtocolExtensionContainer { { NG-RANAccessPointPosition-ExtIEs} } OPTIONAL,

...

}

NG-RANAccessPointPosition-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

NGRANHighAccuracyAccessPointPosition ::= SEQUENCE {

latitude INTEGER (-2147483648.. 2147483647),

longitude INTEGER (-2147483648.. 2147483647),

altitude INTEGER (-64000..1280000),

uncertaintySemi-major INTEGER (0..255),

uncertaintySemi-minor INTEGER (0..255),

orientationOfMajorAxis INTEGER (0..179),

horizontalConfidence INTEGER (0..100),

uncertaintyAltitude INTEGER (0..255),

verticalConfidence INTEGER (0..100),

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

...

}

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

...

}

NG-RAN-CGI ::= SEQUENCE {

pLMN-Identity PLMN-Identity,

nG-RANcell NG-RANCell,

iE-Extensions ProtocolExtensionContainer { {NG-RAN-CGI-ExtIEs} } OPTIONAL,

...

}

NG-RAN-CGI-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

NG-RANCell ::= CHOICE {

eUTRA-CellID EUTRACellIdentifier,

nR-CellID NRCellIdentifier,

choice-Extension ProtocolIE-Single-Container {{ NG-RANCell-ExtensionIE }}

}

NG-RANCell-ExtensionIE NRPPA-PROTOCOL-IES ::= {

...

}

NR-ARFCN ::= INTEGER (0..3279165)

NRCellIdentifier ::= BIT STRING (SIZE (36))

NrofSymbolsExtended ::= ENUMERATED {n8, n10, n12, n14, ...}

NR-PCI ::= INTEGER (0..1007)

NR-PRS-Beam-Information ::= SEQUENCE {

nR-PRS-Beam-InformationList SEQUENCE (SIZE(1.. maxPRS-ResourceSets)) OF NR-PRS-Beam-InformationItem,

lCS-to-GCS-TranslationList SEQUENCE (SIZE(1..maxnolcs-gcs-translation)) OF LCS-to-GCS-TranslationItem OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { NR-PRS-Beam-Information-IEs} } OPTIONAL,

...

}

NR-PRS-Beam-Information-IEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

NR-PRS-Beam-InformationItem ::= SEQUENCE {

pRSresourceSetID PRS-Resource-Set-ID,

pRSAngle SEQUENCE (SIZE(1..maxPRS-ResourcesPerSet)) OF PRSAngleItem,

iE-Extensions ProtocolExtensionContainer { { NR-PRS-Beam-InformationItem-ExtIEs} } OPTIONAL,

...

}

NR-PRS-Beam-InformationItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

NR-TADV ::= INTEGER (0.. 7690)

NumberOfAntennaPorts-EUTRA ::= ENUMERATED {

n1-or-n2,

n4,

...

}

NumberOfDlFrames-EUTRA ::= ENUMERATED {

sf1,

sf2,

sf4,

sf6,

...

}

NumberOfDlFrames-Extended-EUTRA ::= INTEGER (1..160,...)

NumberOfFrequencyHoppingBands ::= ENUMERATED {

twobands,

fourbands,

...

}

NumberOfTRPRxTEG ::= ENUMERATED {two, three, four, six, eight, ...}

NumberOfTRPRxTxTEG ::= ENUMERATED {two, three, four, six, eight, ...}

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

-- O

OnDemandPRS-Info ::= SEQUENCE {

onDemandPRSRequestAllowed BIT STRING (SIZE (16)),

allowedResourceSetPeriodicityValues BIT STRING (SIZE (24)) OPTIONAL,

allowedPRSBandwidthValues BIT STRING (SIZE (64)) OPTIONAL,

allowedResourceRepetitionFactorValues BIT STRING (SIZE (8)) OPTIONAL,

allowedResourceNumberOfSymbolsValues BIT STRING (SIZE (8)) OPTIONAL,

allowedCombSizeValues BIT STRING (SIZE (8)) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { OnDemandPRS-Info-ExtIEs} } OPTIONAL,

...

}

OnDemandPRS-Info-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

OTDOACells ::= SEQUENCE (SIZE (1.. maxCellinRANnode)) OF SEQUENCE {

oTDOACellInfo OTDOACell-Information,

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

...

}

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

...

}

OTDOACell-Information ::= SEQUENCE (SIZE (1..maxnoOTDOAtypes)) OF OTDOACell-Information-Item

OTDOACell-Information-Item ::= CHOICE {

pCI-EUTRA PCI-EUTRA,

cGI-EUTRA CGI-EUTRA,

tAC TAC,

eARFCN EARFCN,

pRS-Bandwidth-EUTRA PRS-Bandwidth-EUTRA,

pRS-ConfigurationIndex-EUTRA PRS-ConfigurationIndex-EUTRA,

cPLength-EUTRA CPLength-EUTRA,

numberOfDlFrames-EUTRA NumberOfDlFrames-EUTRA,

numberOfAntennaPorts-EUTRA NumberOfAntennaPorts-EUTRA,

sFNInitialisationTime-EUTRA SFNInitialisationTime-EUTRA,

nG-RANAccessPointPosition NG-RANAccessPointPosition,

pRSMutingConfiguration-EUTRA PRSMutingConfiguration-EUTRA,

prsid-EUTRA PRS-ID-EUTRA,

tpid-EUTRA TP-ID-EUTRA,

tpType-EUTRA TP-Type-EUTRA,

numberOfDlFrames-Extended-EUTRA NumberOfDlFrames-Extended-EUTRA,

crsCPlength-EUTRA CPLength-EUTRA,

dL-Bandwidth-EUTRA DL-Bandwidth-EUTRA,

pRSOccasionGroup-EUTRA PRSOccasionGroup-EUTRA,

pRSFrequencyHoppingConfiguration-EUTRA PRSFrequencyHoppingConfiguration-EUTRA,

choice-Extension ProtocolIE-Single-Container {{ OTDOACell-Information-Item-ExtensionIE }}

}

OTDOACell-Information-Item-ExtensionIE NRPPA-PROTOCOL-IES ::= {

{ ID id-TDD-Config-EUTRA-Item CRITICALITY ignore TYPE TDD-Config-EUTRA-Item PRESENCE mandatory }|

{ ID id-CGI-NR CRITICALITY ignore TYPE CGI-NR PRESENCE mandatory }|

{ ID id-SFNInitialisationTime-NR CRITICALITY ignore TYPE SFNInitialisationTime-EUTRA PRESENCE mandatory },

...

}

OTDOA-Information-Item ::= ENUMERATED {

pci,

cGI,

tac,

earfcn,

prsBandwidth,

prsConfigIndex,

cpLength,

noDlFrames,

noAntennaPorts,

sFNInitTime,

nG-RANAccessPointPosition,

prsmutingconfiguration,

prsid,

tpid,

tpType,

crsCPlength,

dlBandwidth,

multipleprsConfigurationsperCell,

prsOccasionGroup,

prsFrequencyHoppingConfiguration,

...,

tddConfig

}

OtherRATMeasurementQuantities ::= SEQUENCE (SIZE (0.. maxNoMeas)) OF ProtocolIE-Single-Container { {OtherRATMeasurementQuantities-ItemIEs} }

OtherRATMeasurementQuantities-ItemIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-OtherRATMeasurementQuantities-Item CRITICALITY reject TYPE OtherRATMeasurementQuantities-Item PRESENCE mandatory}}

OtherRATMeasurementQuantities-Item ::= SEQUENCE {

otherRATMeasurementQuantitiesValue OtherRATMeasurementQuantitiesValue,

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

...

}

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

...

}

OtherRATMeasurementQuantitiesValue ::= ENUMERATED {

geran,

utran,

... ,

nR,

eUTRA

}

OtherRATMeasurementResult ::= SEQUENCE (SIZE (1.. maxNoMeas)) OF OtherRATMeasuredResultsValue

OtherRATMeasuredResultsValue ::= CHOICE {

resultGERAN ResultGERAN,

resultUTRAN ResultUTRAN,

choice-Extension ProtocolIE-Single-Container {{ OtherRATMeasuredResultsValue-ExtensionIE }}

}

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

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

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

...

}

Outcome ::= ENUMERATED {

failed,

...

}

-- P

PathlossReferenceInformation ::= SEQUENCE {

pathlossReferenceSignal PathlossReferenceSignal,

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

...

}

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

...

}

PathlossReferenceSignal ::= CHOICE {

sSB-Reference SSB,

dL-PRS-Reference DL-PRS,

choice-Extension ProtocolIE-Single-Container {{ PathlossReferenceSignal-ExtensionIE }}

}

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

...

}

PCI-EUTRA ::= INTEGER (0..503, ...)

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

PhysCellIDUTRA-FDD ::= INTEGER (0..511, ...)

PhysCellIDUTRA-TDD ::= INTEGER (0..127, ...)

PLMN-Identity ::= OCTET STRING (SIZE(3))

PeriodicityList ::= SEQUENCE (SIZE (1.. maxnoSRS-ResourcePerSet)) OF PeriodicityItem

PeriodicityItem ::= ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot625, ms1, ms1dot25, ms2, ms2dot5, ms4dot, ms5, ms8, ms10, ms16, ms20, ms32, ms40, ms64, ms80m, ms160, ms320, ms640m, ms1280, ms2560, ms5120, ms10240, ...}

PosSIBs ::= SEQUENCE (SIZE (1.. maxNrOfPosSIBs)) OF SEQUENCE {

posSIB-Type PosSIB-Type,

posSIB-Segments PosSIB-Segments,

assistanceInformationMetaData AssistanceInformationMetaData OPTIONAL,

broadcastPriority INTEGER (1..16,...) OPTIONAL,

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

...

}

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

...

}

PosSIB-Segments ::= SEQUENCE (SIZE (1.. maxNrOfSegments)) OF SEQUENCE {

assistanceDataSIBelement OCTET STRING,

iE-Extensions ProtocolExtensionContainer { { PosSIB-Segments-ExtIEs} } OPTIONAL,

...

}

PosSIB-Segments-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PosSIB-Type ::= ENUMERATED {

posSibType1-1,

posSibType1-2,

posSibType1-3,

posSibType1-4,

posSibType1-5,

posSibType1-6,

posSibType1-7,

posSibType1-8,

posSibType2-1,

posSibType2-2,

posSibType2-3,

posSibType2-4,

posSibType2-5,

posSibType2-6,

posSibType2-7,

posSibType2-8,

posSibType2-9,

posSibType2-10,

posSibType2-11,

posSibType2-12,

posSibType2-13,

posSibType2-14,

posSibType2-15,

posSibType2-16,

posSibType2-17,

posSibType2-18,

posSibType2-19,

posSibType2-20,

posSibType2-21,

posSibType2-22,

posSibType2-23,

posSibType2-24,

posSibType2-25,

posSibType3-1,

posSibType4-1,

posSibType5-1,

posSibType6-1,

posSibType6-2,

posSibType6-3,

...,

posSibType1-9,

posSibType1-10,

posSibType6-4,

posSibType6-5,

posSibType6-6

}

PosSRSResource-List ::= SEQUENCE (SIZE (1..maxnoSRS-PosResources)) OF PosSRSResource-Item

PosSRSResource-Item ::= SEQUENCE {

srs-PosResourceId SRSPosResourceID,

transmissionCombPos TransmissionCombPos,

startPosition INTEGER (0..13),

nrofSymbols ENUMERATED {n1, n2, n4, n8, n12},

freqDomainShift INTEGER (0..268),

c-SRS INTEGER (0..63),

groupOrSequenceHopping ENUMERATED { neither, groupHopping, sequenceHopping },

resourceTypePos ResourceTypePos,

sequenceId INTEGER (0.. 65535),

spatialRelationPos SpatialRelationPos OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PosSRSResource-Item-ExtIEs} } OPTIONAL,

...

}

PosSRSResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PosSRSResourceID-List ::= SEQUENCE (SIZE (1..maxnoSRS-PosResources)) OF SRSPosResourceID

PosSRSResourceSet-List ::= SEQUENCE (SIZE (1..maxnoSRS-PosResourceSets)) OF PosSRSResourceSet-Item

PosSRSResourceIDPerSet-List ::= SEQUENCE (SIZE (1..maxnoSRS-PosResourcePerSet)) OF SRSPosResourceID

PosSRSResourceSet-Item ::= SEQUENCE {

possrsResourceSetID INTEGER(0..15),

possRSResourceIDPerSet-List PosSRSResourceIDPerSet-List,

posresourceSetType PosResourceSetType,

iE-Extensions ProtocolExtensionContainer { { PosSRSResourceSet-Item-ExtIEs} } OPTIONAL,

...

}

PosSRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PosResourceSetType ::= CHOICE {

periodic PosResourceSetTypePeriodic,

semi-persistent PosResourceSetTypeSemi-persistent,

aperiodic PosResourceSetTypeAperiodic,

choice-extension ProtocolIE-Single-Container {{ PosResourceSetType-ExtIEs }}

}

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

...

}

PosResourceSetTypePeriodic ::= SEQUENCE {

posperiodicSet ENUMERATED{true, ...},

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

...

}

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

...

}

PosResourceSetTypeSemi-persistent ::= SEQUENCE {

possemi-persistentSet ENUMERATED{true, ...},

iE-Extensions ProtocolExtensionContainer { { PosResourceSetTypeSemi-persistent-ExtIEs} } OPTIONAL,

...

}

PosResourceSetTypeSemi-persistent-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PosResourceSetTypeAperiodic ::= SEQUENCE {

sRSResourceTrigger INTEGER(1..3),

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

...

}

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

...

}

PreconfigurationResult ::= BIT STRING (SIZE(8))

PRS-Bandwidth-EUTRA ::= ENUMERATED {

bw6,

bw15,

bw25,

bw50,

bw75,

bw100,

...

}

PRSAngleItem ::= SEQUENCE {

nRPRSAzimuth INTEGER (0..359),

nRPRSAzimuthFine INTEGER (0..9) OPTIONAL,

nRPRSElevation INTEGER (0..180) OPTIONAL,

nRPRSElevationFine INTEGER (0..9) OPTIONAL,

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

...

}

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

{ ID id-PRS-Resource-ID CRITICALITY ignore EXTENSION PRS-Resource-ID PRESENCE optional },

...

}

PRSInformationPos ::= SEQUENCE {

pRS-IDPos INTEGER(0..255),

pRS-Resource-Set-IDPos INTEGER(0..7),

pRS-Resource-IDPos INTEGER(0..63) OPTIONAL,

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

...

}

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

...

}

PRSConfigRequestType ::= ENUMERATED {configure, off, ...}

PRSConfiguration ::= SEQUENCE {

pRSResourceSet-List PRSResourceSet-List,

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

...

}

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

...

}

PRS-ConfigurationIndex-EUTRA ::= INTEGER (0..4095, ...)

PRS-ID-EUTRA ::= INTEGER (0..4095, ...)

PRSMutingConfiguration-EUTRA ::= CHOICE {

two BIT STRING (SIZE (2)),

four BIT STRING (SIZE (4)),

eight BIT STRING (SIZE (8)),

sixteen BIT STRING (SIZE (16)),

thirty-two BIT STRING (SIZE (32)),

sixty-four BIT STRING (SIZE (64)),

one-hundred-and-twenty-eight BIT STRING (SIZE (128)),

two-hundred-and-fifty-six BIT STRING (SIZE (256)),

five-hundred-and-twelve BIT STRING (SIZE (512)),

one-thousand-and-twenty-four BIT STRING (SIZE (1024)),

choice-Extension ProtocolIE-Single-Container {{ PRSMutingConfiguration-EUTRA-ExtensionIE }}

}

PRSMutingConfiguration-EUTRA-ExtensionIE NRPPA-PROTOCOL-IES ::= {

...

}

PRSOccasionGroup-EUTRA ::= ENUMERATED {

og2,

og4,

og8,

og16,

og32,

og64,

og128,

...

}

PRSFrequencyHoppingConfiguration-EUTRA ::= SEQUENCE {

noOfFreqHoppingBands NumberOfFrequencyHoppingBands,

bandPositions SEQUENCE(SIZE (1..maxnoFreqHoppingBandsMinusOne)) OF NarrowBandIndex,

iE-Extensions ProtocolExtensionContainer { { PRSFrequencyHoppingConfiguration-EUTRA-Item-IEs} } OPTIONAL,

...

}

PRSFrequencyHoppingConfiguration-EUTRA-Item-IEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRS-Measurements-Info-List ::= SEQUENCE (SIZE(1..maxFreqLayers)) OF PRS-Measurements-Info-List-Item

PRS-Measurements-Info-List-Item ::= SEQUENCE {

pointA INTEGER (0..3279165),

measPRSPeriodicity ENUMERATED {ms20, ms40, ms80, ms160, ...},

measPRSOffset INTEGER (0..159, ...),

measurementPRSLength ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20},

iE-Extensions ProtocolExtensionContainer { { PRS-Measurements-Info-List-Item-ExtIEs} } OPTIONAL,

...

}

PRS-Measurements-Info-List-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSMuting::= SEQUENCE {

pRSMutingOption1 PRSMutingOption1 OPTIONAL,

pRSMutingOption2 PRSMutingOption2 OPTIONAL,

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

...

}

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

...

}

PRSMutingOption1 ::= SEQUENCE {

mutingPattern DL-PRSMutingPattern,

mutingBitRepetitionFactor ENUMERATED{n1,n2,n4,n8,...},

iE-Extensions ProtocolExtensionContainer { { PRSMutingOption1-ExtIEs} } OPTIONAL,

...

}

PRSMutingOption1-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSMutingOption2 ::= SEQUENCE {

mutingPattern DL-PRSMutingPattern,

iE-Extensions ProtocolExtensionContainer { { PRSMutingOption2-ExtIEs} } OPTIONAL,

...

}

PRSMutingOption2-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSResource-List::= SEQUENCE (SIZE (1..maxnoofPRSresource)) OF PRSResource-Item

PRSResource-Item ::= SEQUENCE {

pRSResourceID PRS-Resource-ID,

sequenceID INTEGER(0..4095),

rEOffset INTEGER(0..11,...),

resourceSlotOffset INTEGER(0..511),

resourceSymbolOffset INTEGER(0..12),

qCLInfo PRSResource-QCLInfo OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PRSResource-Item-ExtIEs} } OPTIONAL,

...

}

PRSResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSResource-QCLInfo ::= CHOICE {

qCLSourceSSB PRSResource-QCLSourceSSB,

qCLSourcePRS PRSResource-QCLSourcePRS,

choice-Extension ProtocolIE-Single-Container {{ PRSResource-QCLInfo-ExtIEs }}

}

PRSResource-QCLInfo-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

PRSResource-QCLSourceSSB ::= SEQUENCE {

pCI-NR INTEGER(0..1007),

sSB-Index SSB-Index OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PRSResource-QCLSourceSSB-ExtIEs} } OPTIONAL,

...

}

PRSResource-QCLSourceSSB-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSResource-QCLSourcePRS ::= SEQUENCE {

qCLSourcePRSResourceSetID PRS-Resource-Set-ID,

qCLSourcePRSResourceID PRS-Resource-ID OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { PRSResource-QCLSourcePRS-ExtIEs} } OPTIONAL,

...

}

PRSResource-QCLSourcePRS-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSResourceSet-List ::= SEQUENCE (SIZE (1..maxnoofPRSresourceSet)) OF PRSResourceSet-Item

PRSResourceSet-Item ::= SEQUENCE {

pRSResourceSetID PRS-Resource-Set-ID,

subcarrierSpacing ENUMERATED{kHz15, kHz30, kHz60, kHz120, ...},

pRSbandwidth INTEGER(1..63),

startPRB INTEGER(0..2176),

pointA INTEGER (0..3279165),

combSize ENUMERATED{n2, n4, n6, n12, ...},

cPType ENUMERATED{normal, extended, ...},

resourceSetPeriodicity ENUMERATED{n4,n5,n8,n10,n16,n20,n32,n40,n64,n80,n160,n320,n640,n1280,n2560,n5120,n10240,n20480,n40960, n81920,...},

resourceSetSlotOffset INTEGER(0..81919,...),

resourceRepetitionFactor ENUMERATED{rf1,rf2,rf4,rf6,rf8,rf16,rf32,...},

resourceTimeGap ENUMERATED{tg1,tg2,tg4,tg8,tg16,tg32,...},

resourceNumberofSymbols ENUMERATED{n2,n4,n6,n12,...},

pRSMuting PRSMuting OPTIONAL,

pRSResourceTransmitPower INTEGER(-60..50),

pRSResource-List PRSResource-List,

iE-Extensions ProtocolExtensionContainer { { PRSResourceSet-Item-ExtIEs} } OPTIONAL,

...

}

PRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRS-Resource-ID ::= INTEGER (0..63)

PRS-Resource-Set-ID ::= INTEGER(0..7)

PRS-ID ::= INTEGER(0..255)

PRSTransmissionOffIndication ::= CHOICE {

pRSTransmissionOffPerTRP NULL,

pRSTransmissionOffPerResourceSet PRSTransmissionOffPerResourceSet,

pRSTransmissionOffPerResource PRSTransmissionOffPerResource,

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

}

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

...

}

PRSTransmissionOffPerResource ::= SEQUENCE (SIZE (1..maxnoofPRSresourceSet)) OF PRSTransmissionOffPerResource-Item

PRSTransmissionOffPerResource-Item ::= SEQUENCE {

pRSResourceSetID PRS-Resource-Set-ID,

pRSTransmissionOffIndicationPerResourceList SEQUENCE (SIZE(1.. maxnoofPRSresource)) OF PRSTransmissionOffIndicationPerResource-Item,

iE-Extensions ProtocolExtensionContainer { { PRSTransmissionOffPerResource-Item-ExtIEs} } OPTIONAL,

...

}

PRSTransmissionOffPerResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSTransmissionOffIndicationPerResource-Item ::= SEQUENCE {

pRSResourceID PRS-Resource-ID,

iE-Extensions ProtocolExtensionContainer { { PRSTransmissionOffIndicationPerResource-Item-ExtIEs} } OPTIONAL,

...

}

PRSTransmissionOffIndicationPerResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSTransmissionOffInformation ::= SEQUENCE {

pRSTransmissionOffIndication PRSTransmissionOffIndication,

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

...

}

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

...

}

PRSTransmissionOffPerResourceSet ::= SEQUENCE (SIZE (1..maxnoofPRSresourceSet)) OF PRSTransmissionOffPerResourceSet-Item

PRSTransmissionOffPerResourceSet-Item ::= SEQUENCE {

pRSResourceSetID PRS-Resource-Set-ID,

iE-Extensions ProtocolExtensionContainer { { PRSTransmissionOffPerResourceSet-Item-ExtIEs} } OPTIONAL,

...

}

PRSTransmissionOffPerResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

PRSTRPList ::= SEQUENCE (SIZE(1.. maxnoTRPs)) OF PRSTRPItem

PRSTRPItem ::= SEQUENCE {

tRP-ID TRP-ID,

requestedDLPRSTransmissionCharacteristics RequestedDLPRSTransmissionCharacteristics OPTIONAL,

-- The IE shall be present if the PRS Configuration Request Type IE is set to “configure” --

pRSTransmissionOffInformation PRSTransmissionOffInformation OPTIONAL,

-- The IE shall be present if the PRS Configuration Request Type IE is set to “off” --

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

...

}

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

...

}

PRSTransmissionTRPList ::= SEQUENCE (SIZE(1.. maxnoTRPs)) OF PRSTransmissionTRPItem

PRSTransmissionTRPItem ::= SEQUENCE {

tRP-ID TRP-ID,

pRSConfiguration PRSConfiguration,

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

...

}

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

...

}

-- Q

-- R

ReferenceSignal ::= CHOICE {

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

sSB SSB,

sRS SRSResourceID,

positioningSRS SRSPosResourceID,

dL-PRS DL-PRS,

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

}

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

...

}

ReferencePoint ::= CHOICE {

relativeCoordinateID CoordinateID,

referencePointCoordinate NG-RANAccessPointPosition,

referencePointCoordinateHA NGRANHighAccuracyAccessPointPosition,

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

}

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

...

}

CoordinateID ::= INTEGER (0..511, ...)

RelativeGeodeticLocation ::= SEQUENCE {

milli-Arc-SecondUnits ENUMERATED {zerodot03, zerodot3, three, ...}, heightUnits ENUMERATED {mm, cm, m, ...},

deltaLatitude INTEGER (-1024.. 1023),

deltaLongitude INTEGER (-1024.. 1023),

deltaHeight INTEGER (-1024.. 1023),

locationUncertainty LocationUncertainty,

iE-extensions ProtocolExtensionContainer {{RelativeGeodeticLocation-ExtIEs }} OPTIONAL,

...

}

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

...

}

RelativeCartesianLocation ::= SEQUENCE {

xYZunit ENUMERATED {mm, cm, dm, ...},

xvalue INTEGER (-65536..65535),

yvalue INTEGER (-65536..65535),

zvalue INTEGER (-32768..32767),

locationUncertainty LocationUncertainty,

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

...

}

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

...

}

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 ::= {

...

}

RepetitionFactorExtended ::= ENUMERATED {n3, n5, n6, n7, n8, n10, n12, n14, ...}

ReportCharacteristics ::= ENUMERATED {

onDemand,

periodic,

...

}

RequestedDLPRSTransmissionCharacteristics ::= SEQUENCE {

requestedDLPRSResourceSet-List RequestedDLPRSResourceSet-List,

numberofFrequencyLayers INTEGER(1..4) OPTIONAL,

startTimeAndDuration StartTimeAndDuration OPTIONAL,

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

...

}

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

...

}

RequestedDLPRSResourceSet-List ::= SEQUENCE (SIZE (1..maxnoofPRSresourceSet)) OF RequestedDLPRSResourceSet-Item

RequestedDLPRSResourceSet-Item ::= SEQUENCE {

pRSbandwidth INTEGER(1..63) OPTIONAL,

combSize ENUMERATED{n2, n4, n6, n12, ...} OPTIONAL,

resourceSetPeriodicity ENUMERATED{n4,n5,n8,n10,n16,n20,n32,n40,n64,n80,n160,n320,n640,n1280,n2560,n5120,n10240,n20480,n40960, n81920,...} OPTIONAL,

resourceRepetitionFactor ENUMERATED{rf1,rf2,rf4,rf6,rf8,rf16,rf32,...} OPTIONAL,

resourceNumberofSymbols ENUMERATED{n2,n4,n6,n12,...} OPTIONAL,

requestedDLPRSResource-List RequestedDLPRSResource-List OPTIONAL,

resourceSetStartTimeAndDuration StartTimeAndDuration OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { RequestedDLPRSResourceSet-Item-ExtIEs} } OPTIONAL,

...

}

RequestedDLPRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

RequestedDLPRSResource-List::= SEQUENCE (SIZE (1..maxnoofPRSresource)) OF RequestedDLPRSResource-Item

RequestedDLPRSResource-Item ::= SEQUENCE {

qCLInfo PRSResource-QCLInfo OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { RequestedDLPRSResource-Item-ExtIEs} } OPTIONAL,

...

}

RequestedDLPRSResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

RequestedSRSTransmissionCharacteristics ::= SEQUENCE {

numberOfTransmissions INTEGER (0..500,...) OPTIONAL,

-- The IE shall be present if the Resource Type IE is set to “periodic” --

resourceType ENUMERATED {periodic, semi-persistent, aperiodic, ...},

bandwidth BandwidthSRS,

listOfSRSResourceSet SEQUENCE (SIZE (1.. maxnoSRS-ResourceSets)) OF SRSResourceSet-Item OPTIONAL,

sSBInformation SSBInfo OPTIONAL,

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

...

}

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

{ ID id-SrsFrequency CRITICALITY ignore EXTENSION SrsFrequency PRESENCE optional },

...

}

SRSResourceSet-Item ::= SEQUENCE {

numberOfSRSResourcePerSet INTEGER (1..16, ...) OPTIONAL,

periodicityList PeriodicityList OPTIONAL,

spatialRelationInformation SpatialRelationInfo OPTIONAL,

pathlossReferenceInformation PathlossReferenceInformation OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { SRSResourceSet-Item-ExtIEs} } OPTIONAL,

...

}

SRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-SRSSpatialRelationPerSRSResource CRITICALITY ignore EXTENSION SpatialRelationPerSRSResource PRESENCE optional},

...

}

RequestType ::= ENUMERATED {activate, deactivate, ...}

ResourceSetType ::= CHOICE {

periodic ResourceSetTypePeriodic,

semi-persistent ResourceSetTypeSemi-persistent,

aperiodic ResourceSetTypeAperiodic,

choice-extension ProtocolIE-Single-Container {{ ResourceSetType-ExtIEs }}

}

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

...

}

ResourceSetTypePeriodic ::= SEQUENCE {

periodicSet ENUMERATED{true, ...},

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

...

}

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

...

}

ResourceSetTypeSemi-persistent ::= SEQUENCE {

semi-persistentSet ENUMERATED{true, ...},

iE-Extensions ProtocolExtensionContainer { { ResourceSetTypeSemi-persistent-ExtIEs} } OPTIONAL,

...

}

ResourceSetTypeSemi-persistent-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResourceSetTypeAperiodic ::= SEQUENCE {

sRSResourceTrigger INTEGER(1..3),

slotoffset INTEGER(0..32),

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

...

}

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

...

}

ResourceType ::= CHOICE {

periodic ResourceTypePeriodic,

semi-persistent ResourceTypeSemi-persistent,

aperiodic ResourceTypeAperiodic,

choice-extension ProtocolIE-Single-Container {{ ResourceType-ExtIEs }}

}

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

...

}

ResourceTypePeriodic ::= SEQUENCE {

periodicity ENUMERATED{slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, ...},

offset INTEGER(0..2559, ...),

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

...

}

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

...

}

ResourceTypeSemi-persistent ::= SEQUENCE {

periodicity ENUMERATED{slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, ...},

offset INTEGER(0..2559, ...),

iE-Extensions ProtocolExtensionContainer { { ResourceTypeSemi-persistent-ExtIEs} } OPTIONAL,

...

}

ResourceTypeSemi-persistent-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResourceTypeAperiodic ::= SEQUENCE {

aperiodicResourceType ENUMERATED{true, ...},

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

...

}

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

...

}

ResourceTypePos ::= CHOICE {

periodic ResourceTypePeriodicPos,

semi-persistent ResourceTypeSemi-persistentPos,

aperiodic ResourceTypeAperiodicPos,

choice-extension ProtocolIE-Single-Container {{ ResourceTypePos-ExtIEs }}

}

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

...

}

ResourceTypePeriodicPos ::= SEQUENCE {

periodicity ENUMERATED{slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, slot5120, slot10240, slot40960, slot81920, ..., slot128, slot256, slot512, slot20480},

offset INTEGER(0..81919, ...),

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

...

}

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

...

}

ResourceTypeSemi-persistentPos ::= SEQUENCE {

periodicity ENUMERATED{slot1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, slot5120, slot10240, slot40960, slot81920, ..., slot128, slot256, slot512, slot20480},

offset INTEGER(0..81919, ...),

iE-Extensions ProtocolExtensionContainer { { ResourceTypeSemi-persistentPos-ExtIEs} } OPTIONAL,

...

}

ResourceTypeSemi-persistentPos-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResourceTypeAperiodicPos ::= SEQUENCE {

slotOffset INTEGER (0..32),

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

...

}

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

...

}

ResponseTime ::= SEQUENCE {

time INTEGER (1..128,...),

timeUnit ENUMERATED {second, ten-seconds, ten-milliseconds,...},

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

...

}

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

...

}

ResultCSI-RSRP ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultCSI-RSRP-Item

ResultCSI-RSRP-Item ::= SEQUENCE {

nR-PCI NR-PCI,

nR-ARFCN NR-ARFCN,

cGI-NR CGI-NR OPTIONAL,

valueCSI-RSRP-Cell ValueRSRP-NR OPTIONAL,

cSI-RSRP-PerCSI-RS ResultCSI-RSRP-PerCSI-RS OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultCSI-RSRP-Item-ExtIEs} } OPTIONAL,

...

}

ResultCSI-RSRP-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultCSI-RSRP-PerCSI-RS ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultCSI-RSRP-PerCSI-RS-Item

ResultCSI-RSRP-PerCSI-RS-Item ::= SEQUENCE {

cSI-RS-Index INTEGER (0..95),

valueCSI-RSRP ValueRSRP-NR,

iE-Extensions ProtocolExtensionContainer { { ResultCSI-RSRP-PerCSI-RS-Item-ExtIEs} } OPTIONAL,

...

}

ResultCSI-RSRP-PerCSI-RS-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultCSI-RSRQ ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultCSI-RSRQ-Item

ResultCSI-RSRQ-Item ::= SEQUENCE {

nR-PCI NR-PCI,

nR-ARFCN NR-ARFCN,

cGI-NR CGI-NR OPTIONAL,

valueCSI-RSRQ-Cell ValueRSRQ-NR OPTIONAL,

cSI-RSRQ-PerCSI-RS ResultCSI-RSRQ-PerCSI-RS OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultCSI-RSRQ-Item-ExtIEs} } OPTIONAL,

...

}

ResultCSI-RSRQ-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultCSI-RSRQ-PerCSI-RS ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultCSI-RSRQ-PerCSI-RS-Item

ResultCSI-RSRQ-PerCSI-RS-Item ::= SEQUENCE {

cSI-RS-Index INTEGER (0..95),

valueCSI-RSRQ ValueRSRQ-NR,

iE-Extensions ProtocolExtensionContainer { { ResultCSI-RSRQ-PerCSI-RS-Item-ExtIEs} } OPTIONAL,

...

}

ResultCSI-RSRQ-PerCSI-RS-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultEUTRA ::= SEQUENCE (SIZE (1.. maxEUTRAMeas)) OF ResultEUTRA-Item

ResultEUTRA-Item ::= SEQUENCE {

pCI-EUTRA PCI-EUTRA,

eARFCN EARFCN,

valueRSRP-EUTRA ValueRSRP-EUTRA OPTIONAL,

valueRSRQ-EUTRA ValueRSRQ-EUTRA OPTIONAL,

cGI-EUTRA CGI-EUTRA OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultEUTRA-Item-ExtIEs} } OPTIONAL,

...

}

ResultEUTRA-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultRSRP-EUTRA ::= SEQUENCE (SIZE (1.. maxCellReport)) OF ResultRSRP-EUTRA-Item

ResultRSRP-EUTRA-Item ::= SEQUENCE {

pCI-EUTRA PCI-EUTRA,

eARFCN EARFCN,

cGI-EUTRA CGI-EUTRA OPTIONAL,

valueRSRP-EUTRA ValueRSRP-EUTRA,

iE-Extensions ProtocolExtensionContainer { { ResultRSRP-EUTRA-Item-ExtIEs} } OPTIONAL,

...

}

ResultRSRP-EUTRA-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultRSRQ-EUTRA ::= SEQUENCE (SIZE (1.. maxCellReport)) OF ResultRSRQ-EUTRA-Item

ResultRSRQ-EUTRA-Item ::= SEQUENCE {

pCI-EUTRA PCI-EUTRA,

eARFCN EARFCN,

cGI-UTRA CGI-EUTRA OPTIONAL,

valueRSRQ-EUTRA ValueRSRQ-EUTRA,

iE-Extensions ProtocolExtensionContainer { { ResultRSRQ-EUTRA-Item-ExtIEs} } OPTIONAL,

...

}

ResultRSRQ-EUTRA-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultSS-RSRP ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultSS-RSRP-Item

ResultSS-RSRP-Item ::= SEQUENCE {

nR-PCI NR-PCI,

nR-ARFCN NR-ARFCN,

cGI-NR CGI-NR OPTIONAL,

valueSS-RSRP-Cell ValueRSRP-NR OPTIONAL,

sS-RSRP-PerSSB ResultSS-RSRP-PerSSB OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultSS-RSRP-Item-ExtIEs} } OPTIONAL,

...

}

ResultSS-RSRP-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultSS-RSRP-PerSSB ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultSS-RSRP-PerSSB-Item

ResultSS-RSRP-PerSSB-Item ::= SEQUENCE {

sSB-Index SSB-Index,

valueSS-RSRP ValueRSRP-NR,

iE-Extensions ProtocolExtensionContainer { { ResultSS-RSRP-PerSSB-Item-ExtIEs} } OPTIONAL,

...

}

ResultSS-RSRP-PerSSB-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultSS-RSRQ ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultSS-RSRQ-Item

ResultSS-RSRQ-Item ::= SEQUENCE {

nR-PCI NR-PCI,

nR-ARFCN NR-ARFCN,

cGI-NR CGI-NR OPTIONAL,

valueSS-RSRQ-Cell ValueRSRQ-NR OPTIONAL,

sS-RSRQ-PerSSB ResultSS-RSRQ-PerSSB OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultSS-RSRQ-Item-ExtIEs} } OPTIONAL,

...

}

ResultSS-RSRQ-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultSS-RSRQ-PerSSB ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultSS-RSRQ-PerSSB-Item

ResultSS-RSRQ-PerSSB-Item ::= SEQUENCE {

sSB-Index SSB-Index,

valueSS-RSRQ ValueRSRQ-NR,

iE-Extensions ProtocolExtensionContainer { { ResultSS-RSRQ-PerSSB-Item-ExtIEs} } OPTIONAL,

...

}

ResultSS-RSRQ-PerSSB-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultGERAN ::= SEQUENCE (SIZE (1.. maxGERANMeas)) OF ResultGERAN-Item

ResultGERAN-Item ::= SEQUENCE {

bCCH BCCH,

physCellIDGERAN PhysCellIDGERAN,

rSSI RSSI,

iE-Extensions ProtocolExtensionContainer { { ResultGERAN-Item-ExtIEs} } OPTIONAL,

...

}

ResultGERAN-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultNR ::= SEQUENCE (SIZE (1.. maxNRMeas)) OF ResultNR-Item

ResultNR-Item ::= SEQUENCE {

nR-PCI NR-PCI,

nR-ARFCN NR-ARFCN,

valueSS-RSRP-Cell ValueRSRP-NR OPTIONAL,

valueSS-RSRQ-Cell ValueRSRQ-NR OPTIONAL,

sS-RSRP-PerSSB ResultSS-RSRP-PerSSB OPTIONAL,

sS-RSRQ-PerSSB ResultSS-RSRQ-PerSSB OPTIONAL,

cGI-NR CGI-NR OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultNR-Item-ExtIEs} } OPTIONAL,

...

}

ResultNR-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

ResultUTRAN ::= SEQUENCE (SIZE (1.. maxUTRANMeas)) OF ResultUTRAN-Item

ResultUTRAN-Item ::= SEQUENCE {

uARFCN UARFCN,

physCellIDUTRAN CHOICE {

physCellIDUTRA-FDD PhysCellIDUTRA-FDD,

physCellIDUTRA-TDD PhysCellIDUTRA-TDD

},

uTRA-RSCP UTRA-RSCP OPTIONAL,

uTRA-EcN0 UTRA-EcN0 OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { ResultUTRAN-Item-ExtIEs} } OPTIONAL,

...

}

ResultUTRAN-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

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

RxTxTimingErrorMargin ::= ENUMERATED {tc0dot5, tc1, tc2, tc4, tc8, tc12, tc16, tc20, tc24, tc32, tc40, tc48, tc64, tc80, tc96, tc128, ...}

-- S

SCS-SpecificCarrier ::= SEQUENCE {

offsetToCarrier INTEGER (0..2199,...),

subcarrierSpacing ENUMERATED {kHz15, kHz30, kHz60, kHz120,..., kHz480, kHz960},

carrierBandwidth INTEGER (1..275,...),

iE-Extensions ProtocolExtensionContainer { { SCS-SpecificCarrier-ExtIEs } } OPTIONAL,

...

}

SCS-SpecificCarrier-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

Search-window-information ::= SEQUENCE {

expectedPropagationDelay INTEGER (-3841..3841,...),

delayUncertainty INTEGER (1..246,...),

iE-Extensions ProtocolExtensionContainer { { Search-window-information-ExtIEs } } OPTIONAL,

...

}

Search-window-information-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

RelativeTime1900 ::= BIT STRING (SIZE (64))

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

SlotNumber ::= INTEGER (0..79)

SpatialDirectionInformation ::= SEQUENCE {

nR-PRS-Beam-Information NR-PRS-Beam-Information,

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

...

}

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

...

}

SpatialRelationInfo ::= SEQUENCE {

spatialRelationforResourceID SpatialRelationforResourceID,

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

...

}

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

...

}

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

SpatialRelationforResourceIDItem ::= SEQUENCE {

referenceSignal ReferenceSignal,

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

...

}

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

...

}

SpatialRelationPerSRSResource ::= SEQUENCE {

spatialRelationPerSRSResource-List SpatialRelationPerSRSResource-List,

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

...

}

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

...

}

SpatialRelationPerSRSResource-List::= SEQUENCE(SIZE (1.. maxnoSRS-ResourcePerSet)) OF SpatialRelationPerSRSResourceItem

SpatialRelationPerSRSResourceItem ::= SEQUENCE {

referenceSignal ReferenceSignal,

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

...

}

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

...

}

SpatialRelationPos ::= CHOICE {

sSBPos SSB,

pRSInformationPos PRSInformationPos,

choice-extension ProtocolIE-Single-Container {{ SpatialInformationPos-ExtIEs }}

}

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

...

}

SRSConfig ::= SEQUENCE {

sRSResource-List SRSResource-List OPTIONAL,

posSRSResource-List PosSRSResource-List OPTIONAL,

sRSResourceSet-List SRSResourceSet-List OPTIONAL,

posSRSResourceSet-List PosSRSResourceSet-List OPTIONAL,

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

...

}

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

...

}

SRSCarrier-List ::= SEQUENCE (SIZE(1.. maxnoSRS-Carriers)) OF SRSCarrier-List-Item

SRSCarrier-List-Item ::= SEQUENCE {

pointA INTEGER (0..3279165),

uplinkChannelBW-PerSCS-List UplinkChannelBW-PerSCS-List,

activeULBWP ActiveULBWP,

pCI-NR INTEGER (0..1007) OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { SRSCarrier-List-Item-ExtIEs } } OPTIONAL,

...

}

SRSCarrier-List-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

SRSConfiguration ::= SEQUENCE {

sRSCarrier-List SRSCarrier-List,

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

...

}

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

...

}

SrsFrequency ::= INTEGER (0..3279165)

SRSPortIndex ::= ENUMERATED{id1000, id1001, id1002, id1003, ...}

SRSPosResourceID ::= INTEGER (0..63)

SRSResource::= SEQUENCE {

sRSResourceID SRSResourceID,

nrofSRS-Ports ENUMERATED {port1, ports2, ports4},

transmissionComb TransmissionComb,

startPosition INTEGER (0..13),

nrofSymbols ENUMERATED {n1, n2, n4},

repetitionFactor ENUMERATED {n1, n2, n4},

freqDomainPosition INTEGER (0..67),

freqDomainShift INTEGER (0..268),

c-SRS INTEGER (0..63),

b-SRS INTEGER (0..3),

b-hop INTEGER (0..3),

groupOrSequenceHopping ENUMERATED { neither, groupHopping, sequenceHopping },

resourceType ResourceType,

sequenceId INTEGER (0..1023),

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

...

}

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

{ ID id-nrofSymbolsExtended CRITICALITY ignore EXTENSION NrofSymbolsExtended PRESENCE optional}|

{ ID id-repetitionFactorExtended CRITICALITY ignore EXTENSION RepetitionFactorExtended PRESENCE optional}|

{ ID id-StartRBHopping CRITICALITY ignore EXTENSION StartRBHopping PRESENCE optional}|

{ ID id-StartRBIndex CRITICALITY ignore EXTENSION StartRBIndex PRESENCE optional},

...

}

SRSResourceID ::= INTEGER (0..63)

SRSResource-List ::= SEQUENCE (SIZE (1..maxnoSRS-Resources)) OF SRSResource

SRSResourceSet-List ::= SEQUENCE (SIZE (1..maxnoSRS-ResourceSets)) OF SRSResourceSet

SRSResourceID-List::= SEQUENCE (SIZE (1..maxnoSRS-ResourcePerSet)) OF SRSResourceID

SRSResourceSet::= SEQUENCE {

sRSResourceSetID INTEGER(0..15),

sRSResourceID-List SRSResourceID-List,

resourceSetType ResourceSetType,

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

...

}

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

...

}

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

SRSResourceTrigger ::= SEQUENCE {

aperiodicSRSResourceTriggerList AperiodicSRSResourceTriggerList,

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

...

}

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

...

}

SRSResourcetype ::= SEQUENCE {

sRSResourceTypeChoice SRSResourceTypeChoice,

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

...

}

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

{ ID id-SRSPortIndex CRITICALITY ignore EXTENSION SRSPortIndex PRESENCE optional},

...

}

SRSResourceTypeChoice ::= CHOICE {

sRSResourceInfo SRSInfo,

posSRSResourceInfo PosSRSInfo,

...

}

SRSInfo ::= SEQUENCE {

sRSResource SRSResourceID,

...

}

SRSTransmissionStatus ::= ENUMERATED {stopped, ...}

PosSRSInfo ::= SEQUENCE {

posSRSResourceID SRSPosResourceID,

...

}

SSBInfo ::= SEQUENCE {

listOfSSBInfo SEQUENCE (SIZE (1..maxNoSSBs)) OF SSBInfoItem,

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

...

}

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

...

}

SSBInfoItem ::= SEQUENCE {

sSB-Configuration TF-Configuration,

pCI-NR INTEGER (0..1007),

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

...

}

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

...

}

SSB ::= SEQUENCE {

pCI-NR INTEGER (0..1007),

ssb-index SSB-Index OPTIONAL,

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

...

}

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

...

}

SSBBurstPosition ::= CHOICE {

shortBitmap BIT STRING (SIZE(4)),

mediumBitmap BIT STRING (SIZE(8)),

longBitmap BIT STRING (SIZE(64)),

choice-extension ProtocolIE-Single-Container { { SSBBurstPosition-ExtIEs} }

}

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

...

}

SSB-Index ::= INTEGER(0..63)

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

StartRBIndex ::= CHOICE{

freqScalingFactor2 INTEGER(0..1),

freqScalingFactor4 INTEGER(0..3),

choice-extension ProtocolIE-Single-Container { { StartRBIndex-ExtIEs} }

}

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

...

}

StartRBHopping ::= ENUMERATED {enable}

StartTimeAndDuration ::= SEQUENCE {

startTime RelativeTime1900 OPTIONAL,

duration INTEGER (0..90060, ...) OPTIONAL,

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

...

}

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

...

}

SystemFrameNumber ::= INTEGER (0..1023)

SystemInformation ::= SEQUENCE (SIZE (1.. maxNrOfPosSImessage)) OF SEQUENCE {

broadcastPeriodicity BroadcastPeriodicity,

posSIBs PosSIBs,

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

...

}

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

...

}

-- T

TAC ::= OCTET STRING (SIZE(3))

TDD-Config-EUTRA-Item ::= SEQUENCE {

subframeAssignment ENUMERATED { sa0, sa1, sa2, sa3, sa4, sa5, sa6, ... },

iE-Extensions ProtocolExtensionContainer { { TDD-Config-EUTRA-Item-Item-ExtIEs } } OPTIONAL,

...

}

TDD-Config-EUTRA-Item-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPTEGInformation ::= CHOICE {

rxTx-TEG RxTxTEG,

rx-TEG RxTEG,

choice-extension ProtocolIE-Single-Container { { TRPTEGInformation-ExtIEs} }

}

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

...

}

RxTxTEG ::= SEQUENCE {

tRP-RxTx-TEGInformation TRP-RxTx-TEGInformation,

tRP-Tx-TEGInformation TRP-Tx-TEGInformation OPTIONAL,

iE-extensions ProtocolExtensionContainer { { RxTxTEG-ExtIEs } } OPTIONAL,

...

}

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

...

}

RxTEG ::= SEQUENCE {

tRP-Rx-TEGInformation TRP-Rx-TEGInformation,

tRP-Tx-TEGInformation TRP-Tx-TEGInformation,

iE-extensions      ProtocolExtensionContainer { { RxTEG-ExtIEs } } OPTIONAL,

...

}

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

...

}

TimingErrorMargin ::= ENUMERATED {tc0, tc2, tc4, tc6, tc8, tc12, tc16, tc20, tc24, tc32, tc40, tc48, tc56, tc64, tc72, tc80, ...}

TF-Configuration ::= SEQUENCE {

sSB-frequency INTEGER (0..3279165),

sSB-subcarrier-spacing ENUMERATED {kHz15, kHz30, kHz120, kHz240, ..., kHz60, kHz480, kHz960},

-- The value kHz60 is not supported in this version of the specification.

sSB-Transmit-power INTEGER (-60..50),

sSB-periodicity ENUMERATED {ms5, ms10, ms20, ms40, ms80, ms160, ...},

sSB-half-frame-offset INTEGER(0..1),

sSB-SFN-offset INTEGER(0..15),

sSB-BurstPosition SSBBurstPosition OPTIONAL,

sFN-initialisation-time RelativeTime1900 OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { TF-Configuration-ExtIEs} } OPTIONAL,

...

}

TF-Configuration-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TimeStamp ::= SEQUENCE {

systemFrameNumber SystemFrameNumber,

slotIndex TimeStampSlotIndex,

measurementTime RelativeTime1900 OPTIONAL,

iE-Extension ProtocolExtensionContainer { { TimeStamp-ExtIEs} } OPTIONAL,

...

}

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

...

}

TimeStampSlotIndex ::= CHOICE {

sCS-15 INTEGER(0..9),

sCS-30 INTEGER(0..19),

sCS-60 INTEGER(0..39),

sCS-120 INTEGER(0..79),

choice-extension ProtocolIE-Single-Container { { TimeStampSlotIndex-ExtIEs} }

}

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

...

}

TP-ID-EUTRA ::= INTEGER (0..4095, ...)

TP-Type-EUTRA ::= ENUMERATED { prs-only-tp, ... }

TransmissionComb ::= CHOICE {

n2 SEQUENCE {

combOffset-n2 INTEGER (0..1),

cyclicShift-n2 INTEGER (0..7)

},

n4 SEQUENCE {

combOffset-n4 INTEGER (0..3),

cyclicShift-n4 INTEGER (0..11)

},

choice-extension ProtocolIE-Single-Container { { TransmissionComb-ExtIEs} }

}

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

{ ID id-transmissionCombn8 CRITICALITY reject TYPE TransmissionCombn8 PRESENCE mandatory},

...

}

TransmissionCombn8 ::= SEQUENCE {

combOffset-n8 INTEGER (0..7),

cyclicShift-n8 INTEGER (0..5),

iE-Extensions ProtocolExtensionContainer { { TransmissionCombn8-ExtIEs } } OPTIONAL

}

TransmissionCombn8-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TransmissionCombPos ::= CHOICE {

n2 SEQUENCE {

combOffset-n2 INTEGER (0..1),

cyclicShift-n2 INTEGER (0..7)

},

n4 SEQUENCE {

combOffset-n4 INTEGER (0..3),

cyclicShift-n4 INTEGER (0..11)

},

n8 SEQUENCE {

combOffset-n8 INTEGER (0..7),

cyclicShift-n8 INTEGER (0..5)

},

choice-extension ProtocolIE-Single-Container { { TransmissionCombPos-ExtIEs} }

}

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

...

}

TRPBeamAntennaInformation ::= SEQUENCE {

choice-TRP-Beam-Antenna-Info-Item Choice-TRP-Beam-Antenna-Info-Item,

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

...

}

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

...

}

Choice-TRP-Beam-Antenna-Info-Item ::= CHOICE {

reference TRP-ID,

explicit TRP-BeamAntennaExplicitInformation,

noChange NULL,

choice-extension ProtocolIE-Single-Container { { Choice-TRP-Beam-Info-Item-ExtIEs } }

}

Choice-TRP-Beam-Info-Item-ExtIEs NRPPA-PROTOCOL-IES ::= {

...

}

TRP-BeamAntennaExplicitInformation ::= SEQUENCE {

trp-BeamAntennaAngles TRP-BeamAntennaAngles,

lcs-to-gcs-translation LCS-to-GCS-Translation OPTIONAL,

iE-Extensions ProtocolExtensionContainer {{ TRP-BeamAntennaExplicitInformation-ExtIEs}} OPTIONAL,

...

}

TRP-BeamAntennaExplicitInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRP-BeamAntennaAngles ::= SEQUENCE (SIZE (1.. maxnoAzimuthAngles)) OF TRP-BeamAntennaAnglesList-Item

TRP-BeamAntennaAnglesList-Item ::= SEQUENCE {

trp-azimuth-angle INTEGER (0..359),

trp-azimuth-angle-fine INTEGER (0..9) OPTIONAL,

trp-elevation-angle-list SEQUENCE (SIZE (1.. maxnoElevationAngles)) OF TRP-ElevationAngleList-Item,

iE-Extensions ProtocolExtensionContainer {{ TRP-BeamAntennaAnglesList-Item-ExtIEs}} OPTIONAL,

...

}

TRP-BeamAntennaAnglesList-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRP-ElevationAngleList-Item ::= SEQUENCE {

trp-elevation-angle INTEGER (0..180),

trp-elevation-angle-fine INTEGER (0..9) OPTIONAL,

trp-beam-power-list SEQUENCE (SIZE (2..maxNumResourcesPerAngle)) OF TRP-Beam-Power-Item,

iE-Extensions ProtocolExtensionContainer {{ TRP-ElevationAngleList-Item-ExtIEs}} OPTIONAL,

...

}

TRP-ElevationAngleList-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRP-Beam-Power-Item ::= SEQUENCE {

pRSResourceSetID PRS-Resource-Set-ID OPTIONAL,

pRSResourceID PRS-Resource-ID,

relativePower INTEGER (0..30), --negative value

relativePowerFine INTEGER (0..9) OPTIONAL, --negative value

iE-Extensions ProtocolExtensionContainer {{ TRP-Beam-Power-Item-ExtIEs}} OPTIONAL,

...

}

TRP-Beam-Power-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPMeasurementQuantities ::= SEQUENCE (SIZE (1..maxnoPosMeas)) OF TRPMeasurementQuantitiesList-Item

TRPMeasurementQuantitiesList-Item ::= SEQUENCE {

tRPMeasurementQuantities-Item TRPMeasurementQuantities-Item,

timingReportingGranularityFactor INTEGER (0..5) OPTIONAL,

iE-Extensions ProtocolExtensionContainer {{ TRPMeasurementQuantitiesList-Item-ExtIEs}} OPTIONAL,

...

}

TRPMeasurementQuantitiesList-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPMeasurementQuantities-Item ::= ENUMERATED {

gNB-RxTxTimeDiff,

uL-SRS-RSRP,

uL-AoA,

uL-RTOA,

...,

multiple-UL-AoA,

uL-SRS-RSRPP

}

TrpMeasurementResult ::= SEQUENCE (SIZE (1.. maxnoPosMeas)) OF TrpMeasurementResultItem

TrpMeasurementResultItem ::= SEQUENCE {

measuredResultsValue TrpMeasuredResultsValue,

timeStamp TimeStamp,

measurementQuality TrpMeasurementQuality OPTIONAL,

measurementBeamInfo MeasurementBeamInfo OPTIONAL,

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

...

}

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

{ ID id-SRSResourcetype CRITICALITY ignore EXTENSION SRSResourcetype PRESENCE optional}|

{ ID id-ARP-ID CRITICALITY ignore EXTENSION ARP-ID PRESENCE optional}|

{ ID id-LoS-NLoSInformation CRITICALITY ignore EXTENSION LoS-NLoSInformation PRESENCE optional },

...

}

TrpMeasuredResultsValue ::= CHOICE {

uL-AngleOfArrival UL-AoA,

uL-SRS-RSRP UL-SRS-RSRP,

uL-RTOA UL-RTOAMeasurement,

gNB-RxTxTimeDiff GNB-RxTxTimeDiff,

choice-extension ProtocolIE-Single-Container { { TrpMeasuredResultsValue-ExtIEs } }

}

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

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

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

{ ID id-UL-SRS-RSRPP CRITICALITY reject TYPE UL-SRS-RSRPP PRESENCE mandatory},

...

}

TrpMeasurementQuality ::= CHOICE {

timingMeasQuality TrpMeasurementTimingQuality,

angleMeasQuality TrpMeasurementAngleQuality,

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

}

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

...

}

TrpMeasurementTimingQuality ::= SEQUENCE {

measurementQuality INTEGER (0..31),

resolution ENUMERATED {m0dot1, m1, m10, m30, ...},

iE-extensions ProtocolExtensionContainer { { TrpMeasurementTimingQuality-ExtIEs } } OPTIONAL,

...

}

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

...

}

TrpMeasurementAngleQuality ::= SEQUENCE {

azimuthQuality INTEGER (0..255),

zenithQuality INTEGER (0..255) OPTIONAL,

resolution ENUMERATED {deg0dot1, ...},

iE-extensions ProtocolExtensionContainer { { TrpMeasurementAngleQuality-ExtIEs } } OPTIONAL,

...

}

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

...

}

TRP-MeasurementRequestList ::= SEQUENCE (SIZE (1..maxNoOfMeasTRPs)) OF TRP-MeasurementRequestItem

TRP-MeasurementRequestItem ::= SEQUENCE {

tRP-ID TRP-ID,

search-window-information Search-window-information OPTIONAL,

iE-extensions ProtocolExtensionContainer { { TRP-MeasurementRequestItem-ExtIEs } } OPTIONAL,

...

}

TRP-MeasurementRequestItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-Cell-ID CRITICALITY ignore EXTENSION CGI-NR PRESENCE optional }|

{ ID id-AoA-SearchWindow CRITICALITY ignore EXTENSION AoA-AssistanceInfo PRESENCE optional }|

{ ID id-NumberOfTRPRxTEG CRITICALITY ignore EXTENSION NumberOfTRPRxTEG PRESENCE optional }|

{ ID id-NumberOfTRPRxTxTEG CRITICALITY ignore EXTENSION NumberOfTRPRxTxTEG PRESENCE optional },

...

}

TRP-MeasurementResponseList ::= SEQUENCE (SIZE (1..maxNoOfMeasTRPs)) OF TRP-MeasurementResponseItem

TRP-MeasurementResponseItem ::= SEQUENCE {

tRP-ID TRP-ID,

measurementResult TrpMeasurementResult,

iE-extensions ProtocolExtensionContainer { { TRP-MeasurementResponseItem-ExtIEs } } OPTIONAL,

...

}

TRP-MeasurementResponseItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-Cell-ID CRITICALITY ignore EXTENSION CGI-NR PRESENCE optional },

...

}

TRP-MeasurementUpdateList ::= SEQUENCE (SIZE (1..maxNoOfMeasTRPs)) OF TRP-MeasurementUpdateItem

TRP-MeasurementUpdateItem ::= SEQUENCE {

tRP-ID TRP-ID,

aoA-window-information AoA-AssistanceInfo OPTIONAL,

iE-extensions ProtocolExtensionContainer { { TRP-MeasurementUpdateItem-ExtIEs } } OPTIONAL,

...

}

TRP-MeasurementUpdateItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-NumberOfTRPRxTEG CRITICALITY ignore EXTENSION NumberOfTRPRxTEG PRESENCE optional }|

{ ID id-NumberOfTRPRxTxTEG CRITICALITY ignore EXTENSION NumberOfTRPRxTxTEG PRESENCE optional },

...

}

TRPInformationListTRPResp ::= SEQUENCE (SIZE (1.. maxnoTRPs)) OF SEQUENCE {

tRPInformation TRPInformation,

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

...

}

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

...

}

TRPInformation ::= SEQUENCE {

tRP-ID TRP-ID,

tRPInformationTypeResponseList TRPInformationTypeResponseList,

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

...

}

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

...

}

TRPInformationTypeResponseList ::= SEQUENCE (SIZE (1..maxnoTRPInfoTypes)) OF TRPInformationTypeResponseItem

TRPInformationTypeResponseItem ::= CHOICE {

pCI-NR INTEGER (0..1007),

cGI-NR CGI-NR,

aRFCN INTEGER (0..3279165),

pRSConfiguration PRSConfiguration,

sSBinformation SSBInfo,

sFNInitialisationTime RelativeTime1900,

spatialDirectionInformation SpatialDirectionInformation,

geographicalCoordinates GeographicalCoordinates,

choice-extension ProtocolIE-Single-Container { { TRPInformationTypeResponseItem-ExtIEs } }

}

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

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

{ ID id-OnDemandPRS CRITICALITY reject TYPE OnDemandPRS-Info PRESENCE mandatory}|

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

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

...

}

TRPInformationTypeListTRPReq ::= SEQUENCE (SIZE(1.. maxnoTRPInfoTypes)) OF ProtocolIE-Single-Container { {TRPInformationTypeItemTRPReq} }

TRPInformationTypeItemTRPReq NRPPA-PROTOCOL-IES ::= {

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

...

}

TRPInformationTypeItem ::= ENUMERATED {

nrPCI,

nG-RAN-CGI,

arfcn,

pRSConfig,

sSBInfo,

sFNInitTime,

spatialDirectInfo,

geoCoord,

...,

trp-type,

ondemandPRSInfo,

trpTxTeg,

beam-antenna-info

}

TRPList ::= SEQUENCE (SIZE(1.. maxnoTRPs)) OF TRPItem

TRPItem ::= SEQUENCE {

tRP-ID TRP-ID,

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

...

}

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

...

}

TRP-ID ::= INTEGER (1.. maxnoTRPs, ...)

TRPPositionDefinitionType ::= CHOICE {

direct TRPPositionDirect,

referenced TRPPositionReferenced,

choice-extension ProtocolIE-Single-Container { { TRPPositionDefinitionType-ExtIEs } }

}

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

...

}

TRPPositionDirect ::= SEQUENCE {

accuracy TRPPositionDirectAccuracy,

iE-extensions ProtocolExtensionContainer { { TRPPositionDirect-ExtIEs } } OPTIONAL,

...

}

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

...

}

TRPPositionDirectAccuracy ::= CHOICE {

tRPPosition NG-RANAccessPointPosition ,

tRPHAposition NGRANHighAccuracyAccessPointPosition ,

choice-extension ProtocolIE-Single-Container { { TRPPositionDirectAccuracy-ExtIEs } }

}

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

...

}

TRPPositionReferenced ::= SEQUENCE {

referencePoint ReferencePoint,

referencePointType TRPReferencePointType,

iE-extensions ProtocolExtensionContainer { { TRPPositionReferenced-ExtIEs } } OPTIONAL,

...

}

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

...

}

TRP-PRS-Information-List ::= SEQUENCE (SIZE(1.. maxnoPRSTRPs)) OF TRP-PRS-Information-List-Item

TRP-PRS-Information-List-Item ::= SEQUENCE {

tRP-ID TRP-ID,

nR-PCI NR-PCI,

cGI-NR CGI-NR OPTIONAL,

pRSConfiguration PRSConfiguration,

iE-Extensions ProtocolExtensionContainer { { TRP-PRS-Information-List-Item-ExtIEs} } OPTIONAL,

...

}

TRP-PRS-Information-List-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPReferencePointType ::= CHOICE {

tRPPositionRelativeGeodetic RelativeGeodeticLocation,

tRPPositionRelativeCartesian RelativeCartesianLocation,

choice-extension ProtocolIE-Single-Container { { TRPReferencePointType-ExtIEs } }

}

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

...

}

TRP-Rx-TEGInformation ::= SEQUENCE {

tRP-Rx-TEGID INTEGER (0..31),

tRP-Rx-TimingErrorMargin TimingErrorMargin,

iE-Extensions ProtocolExtensionContainer { { TRP-Rx-TEGInformation-ExtIEs } } OPTIONAL,

...

}

TRP-Rx-TEGInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRP-RxTx-TEGInformation ::= SEQUENCE {

tRP-RxTx-TEGID INTEGER (0..255),

tRP-RxTx-TimingErrorMargin RxTxTimingErrorMargin,

iE-Extensions ProtocolExtensionContainer { { TRP-RxTx-TEGInformation-ExtIEs } } OPTIONAL,

...

}

TRP-RxTx-TEGInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRP-Tx-TEGInformation ::= SEQUENCE {

tRP-Tx-TEGID INTEGER (0..7),

tRP-Tx-TimingErrorMargin TimingErrorMargin,

iE-Extensions ProtocolExtensionContainer { { TRP-Tx-TEGInformation-ExtIEs } } OPTIONAL,

...

}

TRP-Tx-TEGInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPTxTEGAssociation ::= SEQUENCE (SIZE(1.. maxnoTRPTEGs)) OF TRPTEGItem

TRPTEGItem ::= SEQUENCE {

tRP-Tx-TEGInformation TRP-Tx-TEGInformation,

dl-PRSResourceSetID PRS-Resource-Set-ID,

dl-PRSResourceID-List SEQUENCE (SIZE(1.. maxPRS-ResourcesPerSet)) OF DLPRSResourceID-Item OPTIONAL,

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

...

}

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

...

}

DLPRSResourceID-Item ::= SEQUENCE {

dl-PRSResourceID PRS-Resource-ID,

iE-Extensions ProtocolExtensionContainer { { DLPRSResource-Item-ExtIEs} } OPTIONAL,

...

}

DLPRSResource-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

TRPType ::= ENUMERATED {

prsOnlyTP,

srsOnlyRP,

tp,

rp,

trp,

...

}

TypeOfError ::= ENUMERATED {

not-understood,

missing,

...

}

-- U

UARFCN ::= INTEGER (0..16383, ...)

UE-Measurement-ID ::= INTEGER (1..15, ..., 16..256)

UEReportingInformation::= SEQUENCE {

reportingAmount ENUMERATED {ma0, ma1, ma2, ma4, ma8, ma16, ma32, ma64},

reportingInterval ENUMERATED {none, one, two, four, eight, ten, sixteen, twenty, thirty-two, sixty-four, ...},

iE-extensions ProtocolExtensionContainer { { UEReportingInformation-ExtIEs } } OPTIONAL,

...

}

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

...

}

UE-TEG-ReportingPeriodicity ::= ENUMERATED {

ms160,

ms320,

ms1280,

ms2560,

ms61440,

ms81920,

ms368640,

ms737280,

...

}

UETxTEGAssociationList ::= SEQUENCE (SIZE(1.. maxnoUETEGs)) OF UETxTEGAssociationItem

UETxTEGAssociationItem ::= SEQUENCE {

uE-Tx-TEG-ID INTEGER (0..7),

posSRSResourceID-List PosSRSResourceID-List,

timeStamp TimeStamp,

carrierFreq CarrierFreq OPTIONAL,

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

...

}

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

{ ID id-UETxTimingErrorMargin CRITICALITY ignore EXTENSION TimingErrorMargin PRESENCE optional },

...

}

SRSResourceID-Item ::= SEQUENCE {

sRSResourceID SRSResourceID,

iE-Extensions ProtocolExtensionContainer { { SRSResourceID-Item-ExtIEs} } OPTIONAL,

...

}

SRSResourceID-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

UE-TEG-Info-Request ::= ENUMERATED {onDemand, periodic, stop, ...}

UTRA-EcN0 ::= INTEGER (0..49, ...)

UTRA-RSCP ::= INTEGER (-5..91, ...)

UL-AoA ::= SEQUENCE {

azimuthAoA INTEGER (0..3599),

zenithAoA INTEGER (0..1799) OPTIONAL,

lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

iE-extensions ProtocolExtensionContainer { { UL-AoA-ExtIEs } } OPTIONAL,

...

}

UL-AoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

UL-RTOAMeasurement ::= SEQUENCE {

uLRTOAmeas ULRTOAMeas,

additionalPathList AdditionalPathList OPTIONAL,

iE-extensions ProtocolExtensionContainer { { UL-RTOAMeasurement-ExtIEs } } OPTIONAL, ...

}

UL-RTOAMeasurement-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

{ ID id-ExtendedAdditionalPathList CRITICALITY ignore EXTENSION ExtendedAdditionalPathList PRESENCE optional}|

{ ID id-TRP-Rx-TEGInformation CRITICALITY ignore EXTENSION TRP-Rx-TEGInformation PRESENCE optional},

...

}

ULRTOAMeas::= CHOICE {

k0 INTEGER (0.. 1970049),

k1 INTEGER (0.. 985025),

k2 INTEGER (0.. 492513),

k3 INTEGER (0.. 246257),

k4 INTEGER (0.. 123129),

k5 INTEGER (0.. 61565),

choice-extension ProtocolIE-Single-Container { { ULRTOAMeas-ExtIEs } }

}

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

...

}

UL-SRS-RSRP ::= INTEGER (0..126)

UL-SRS-RSRPP ::= SEQUENCE {

firstPathRSRPP INTEGER (0..126),

iE-extensions ProtocolExtensionContainer { { UL-SRS-RSRPP-ExtIEs } } OPTIONAL,

...

}

UL-SRS-RSRPP-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

UplinkChannelBW-PerSCS-List ::= SEQUENCE (SIZE (1..maxnoSCSs)) OF SCS-SpecificCarrier

Uncertainty-range-AoA ::= INTEGER (0..3599)

Uncertainty-range-ZoA ::= INTEGER (0..1799)

-- V

ValueRSRP-EUTRA ::= INTEGER (0..97, ...)

ValueRSRQ-EUTRA ::= INTEGER (0..34, ...)

ValueRSRP-NR ::= INTEGER (0..127)

ValueRSRQ-NR ::= INTEGER (0..127)

-- W

WLANMeasurementQuantities ::= SEQUENCE (SIZE (0.. maxNoMeas)) OF ProtocolIE-Single-Container { {WLANMeasurementQuantities-ItemIEs} }

WLANMeasurementQuantities-ItemIEs NRPPA-PROTOCOL-IES ::= {

{ ID id-WLANMeasurementQuantities-Item CRITICALITY reject TYPE WLANMeasurementQuantities-Item PRESENCE mandatory}}

WLANMeasurementQuantities-Item ::= SEQUENCE {

wLANMeasurementQuantitiesValue WLANMeasurementQuantitiesValue,

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

...

}

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

...

}

WLANMeasurementQuantitiesValue ::= ENUMERATED {

wlan,

...

}

WLANMeasurementResult ::= SEQUENCE (SIZE (1..maxNoMeas)) OF WLANMeasurementResult-Item

WLANMeasurementResult-Item ::= SEQUENCE {

wLAN-RSSI WLAN-RSSI,

sSID SSID OPTIONAL,

bSSID BSSID OPTIONAL,

hESSID HESSID OPTIONAL,

operatingClass WLANOperatingClass OPTIONAL,

countryCode WLANCountryCode OPTIONAL,

wLANChannelList WLANChannelList OPTIONAL,

wLANBand WLANBand OPTIONAL,

iE-Extensions ProtocolExtensionContainer { { WLANMeasurementResult-Item-ExtIEs } } OPTIONAL,

...

}

WLANMeasurementResult-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

...

}

WLAN-RSSI ::= INTEGER (0..141, ...)

WLANBand ::= ENUMERATED {band2dot4, band5, ...}

WLANChannelList ::= SEQUENCE (SIZE (1..maxWLANchannels)) OF WLANChannel

WLANChannel ::= INTEGER (0..255)

WLANCountryCode ::= ENUMERATED {

unitedStates,

europe,

japan,

global,

...

}

WLANOperatingClass ::= INTEGER (0..255)

-- X

-- Y

-- Z

ZoA ::= SEQUENCE {

zenithAoA INTEGER (0..1799),

lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

iE-extensions ProtocolExtensionContainer { { ZoA-ExtIEs } } OPTIONAL,

...

}

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

...

}

END

-- ASN1STOP

### 9.3.6 Common definitions

-- ASN1START

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

--

-- Common definitions

--

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

NRPPA-CommonDataTypes {

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

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

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- Extension constants

--

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

maxPrivateIEs INTEGER ::= 65535

maxProtocolExtensions INTEGER ::= 65535

maxProtocolIEs INTEGER ::= 65535

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

--

-- Common Data Types

--

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

Criticality ::= ENUMERATED { reject, ignore, notify }

NRPPATransactionID ::= INTEGER (0..32767)

Presence ::= ENUMERATED { optional, conditional, mandatory }

PrivateIE-ID ::= CHOICE {

local INTEGER (0.. maxPrivateIEs),

global OBJECT IDENTIFIER

}

ProcedureCode ::= INTEGER (0..255)

ProtocolIE-ID ::= INTEGER (0..maxProtocolIEs)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome}

END

-- ASN1STOP

### 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 ::= 7

id-assistanceInformationFeedback ProcedureCode ::= 8

id-positioningInformationExchange ProcedureCode ::= 9

id-positioningInformationUpdate ProcedureCode ::= 10

id-Measurement ProcedureCode ::= 11

id-MeasurementReport ProcedureCode ::= 12

id-MeasurementUpdate ProcedureCode ::= 13

id-MeasurementAbort ProcedureCode ::= 14

id-MeasurementFailureIndication ProcedureCode ::= 15

id-tRPInformationExchange ProcedureCode ::= 16

id-positioningActivation ProcedureCode ::= 17

id-positioningDeactivation ProcedureCode ::= 18

id-pRSConfigurationExchange ProcedureCode ::= 19

id-measurementPreconfiguration ProcedureCode ::= 20

id-measurementActivation ProcedureCode ::= 21

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

--

-- Lists

--

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

maxNrOfErrors INTEGER ::= 256

maxCellinRANnode INTEGER ::= 3840

maxIndexesReport INTEGER ::= 64

maxNoMeas INTEGER ::= 64

maxCellReport INTEGER ::= 9

maxCellReportNR INTEGER ::= 9

maxnoOTDOAtypes INTEGER ::= 63

maxServCell INTEGER ::= 5

maxEUTRAMeas INTEGER ::= 8

maxGERANMeas INTEGER ::= 8

maxNRMeas INTEGER ::= 8

maxUTRANMeas INTEGER ::= 8

maxWLANchannels INTEGER ::= 16

maxnoFreqHoppingBandsMinusOne INTEGER ::= 7

maxNoPath INTEGER ::= 2

maxNrOfPosSImessage INTEGER ::= 32

maxnoAssistInfoFailureListItems INTEGER ::= 32

maxNrOfSegments INTEGER ::= 64

maxNrOfPosSIBs INTEGER ::= 32

maxNoOfMeasTRPs INTEGER ::= 64

maxnoTRPs INTEGER ::= 65535

maxnoTRPInfoTypes INTEGER ::= 64

maxnoofAngleInfo INTEGER ::= 65535

maxnolcs-gcs-translation INTEGER ::= 3

maxnoBcastCell INTEGER ::= 16384

maxnoSRSTriggerStates INTEGER ::= 3

maxnoSpatialRelations INTEGER ::= 64

maxnoPosMeas INTEGER ::= 16384

maxnoSRS-Carriers INTEGER ::= 32

maxnoSCSs INTEGER ::= 5

maxnoSRS-Resources INTEGER ::= 64

maxnoSRS-PosResources INTEGER ::= 64

maxnoSRS-ResourceSets INTEGER ::= 16

maxnoSRS-ResourcePerSet INTEGER ::= 16

maxnoSRS-PosResourceSets INTEGER ::= 16

maxnoSRS-PosResourcePerSet INTEGER ::= 16

maxPRS-ResourceSets INTEGER ::= 2

maxPRS-ResourcesPerSet INTEGER ::= 64

maxNoSSBs INTEGER ::= 255

maxnoofPRSresourceSet INTEGER ::= 8

maxnoofPRSresource INTEGER ::= 64

maxnoofULAoAs INTEGER ::= 8

maxNoPathExtended INTEGER ::= 8

maxnoARPs INTEGER ::= 16

maxnoUETEGs INTEGER ::= 256

maxnoTRPTEGs INTEGER ::= 8

maxFreqLayers INTEGER ::= 4

maxNumResourcesPerAngle INTEGER ::= 24

maxnoAzimuthAngles INTEGER ::= 3600

maxnoElevationAngles INTEGER ::= 1801

maxnoPRSTRPs INTEGER ::= 256

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

--

-- 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 ::= 23

id-Broadcast ProtocolIE-ID ::= 24

id-AssistanceInformationFailureList ProtocolIE-ID ::= 25

id-SRSConfiguration ProtocolIE-ID ::= 26

id-MeasurementResult ProtocolIE-ID ::= 27

id-TRP-ID ProtocolIE-ID ::= 28

id-TRPInformationTypeListTRPReq ProtocolIE-ID ::= 29

id-TRPInformationListTRPResp ProtocolIE-ID ::= 30

id-MeasurementBeamInfoRequest ProtocolIE-ID ::= 31

id-ResultSS-RSRP ProtocolIE-ID ::= 32

id-ResultSS-RSRQ ProtocolIE-ID ::= 33

id-ResultCSI-RSRP ProtocolIE-ID ::= 34

id-ResultCSI-RSRQ ProtocolIE-ID ::= 35

id-AngleOfArrivalNR ProtocolIE-ID ::= 36

id-GeographicalCoordinates ProtocolIE-ID ::= 37

id-PositioningBroadcastCells ProtocolIE-ID ::= 38

id-LMF-Measurement-ID ProtocolIE-ID ::= 39

id-RAN-Measurement-ID ProtocolIE-ID ::= 40

id-TRP-MeasurementRequestList ProtocolIE-ID ::= 41

id-TRP-MeasurementResponseList ProtocolIE-ID ::= 42

id-TRP-MeasurementReportList ProtocolIE-ID ::= 43

id-SRSType ProtocolIE-ID ::= 44

id-ActivationTime ProtocolIE-ID ::= 45

id-SRSResourceSetID ProtocolIE-ID ::= 46

id-TRPList ProtocolIE-ID ::= 47

id-SRSSpatialRelation ProtocolIE-ID ::= 48

id-SystemFrameNumber ProtocolIE-ID ::= 49

id-SlotNumber ProtocolIE-ID ::= 50

id-SRSResourceTrigger ProtocolIE-ID ::= 51

id-TRPMeasurementQuantities ProtocolIE-ID ::= 52

id-AbortTransmission ProtocolIE-ID ::= 53

id-SFNInitialisationTime ProtocolIE-ID ::= 54

id-ResultNR ProtocolIE-ID ::= 55

id-ResultEUTRA ProtocolIE-ID ::= 56

id-TRPInformationTypeItem ProtocolIE-ID ::= 57

id-CGI-NR ProtocolIE-ID ::= 58

id-SFNInitialisationTime-NR ProtocolIE-ID ::= 59

id-Cell-ID ProtocolIE-ID ::= 60

id-SrsFrequency ProtocolIE-ID ::= 61

id-TRPType ProtocolIE-ID ::= 62

id-SRSSpatialRelationPerSRSResource ProtocolIE-ID ::= 63

id-MeasurementPeriodicityExtended ProtocolIE-ID ::= 64

id-PRS-Resource-ID ProtocolIE-ID ::= 65

id-PRSTRPList ProtocolIE-ID ::= 66

id-PRSTransmissionTRPList ProtocolIE-ID ::= 67

id-OnDemandPRS ProtocolIE-ID ::= 68

id-AoA-SearchWindow ProtocolIE-ID ::= 69

id-TRP-MeasurementUpdateList ProtocolIE-ID ::= 70

id-ZoA ProtocolIE-ID ::= 71

id-ResponseTime ProtocolIE-ID ::= 72

id-UEReportingInformation ProtocolIE-ID ::= 73

id-MultipleULAoA ProtocolIE-ID ::= 74

id-UL-SRS-RSRPP ProtocolIE-ID ::= 75

id-SRSResourcetype ProtocolIE-ID ::= 76

id-ExtendedAdditionalPathList ProtocolIE-ID ::= 77

id-ARPLocationInfo ProtocolIE-ID ::= 78

id-ARP-ID ProtocolIE-ID ::= 79

id-LoS-NLoSInformation ProtocolIE-ID ::= 80

id-UETxTEGAssociationList ProtocolIE-ID ::= 81

id-NumberOfTRPRxTEG ProtocolIE-ID ::= 82

id-NumberOfTRPRxTxTEG ProtocolIE-ID ::= 83

id-TRPTxTEGAssociation ProtocolIE-ID ::= 84

id-TRPTEGInformation ProtocolIE-ID ::= 85

id-TRP-Rx-TEGInformation ProtocolIE-ID ::= 86

id-TRP-PRS-Information-List ProtocolIE-ID ::= 87

id-PRS-Measurements-Info-List ProtocolIE-ID ::= 88

id-PRSConfigRequestType ProtocolIE-ID ::= 89

id-UE-TEG-Info-Request ProtocolIE-ID ::= 90

id-MeasurementTimeOccasion ProtocolIE-ID ::= 91

id-MeasurementCharacteristicsRequestIndicator ProtocolIE-ID ::= 92

id-TRPBeamAntennaInformation ProtocolIE-ID ::= 93

id-NR-TADV ProtocolIE-ID ::= 94

id-MeasurementAmount ProtocolIE-ID ::= 95

id-pathPower ProtocolIE-ID ::= 96

id-PreconfigurationResult ProtocolIE-ID ::= 97

id-RequestType ProtocolIE-ID ::= 98

id-UE-TEG-ReportingPeriodicity ProtocolIE-ID ::= 99

id-SRSPortIndex ProtocolIE-ID ::= 100

id-procedure-code-101-not-to-be-used ProtocolIE-ID ::= 101

id-procedure-code-102-not-to-be-used ProtocolIE-ID ::= 102

id-procedure-code-103-not-to-be-used ProtocolIE-ID ::= 103

id-UETxTimingErrorMargin ProtocolIE-ID ::= 104

id-MeasurementPeriodicityNR-AoA ProtocolIE-ID ::= 105

id-SRSTransmissionStatus ProtocolIE-ID ::= 106

id-nrofSymbolsExtended ProtocolIE-ID ::= 107

id-repetitionFactorExtended ProtocolIE-ID ::= 108

id-StartRBHopping ProtocolIE-ID ::= 109

id-StartRBIndex ProtocolIE-ID ::= 110

id-transmissionCombn8 ProtocolIE-ID ::= 111

END

-- ASN1STOP

### 9.3.8 Container definitions

-- ASN1START

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

--

-- Container definitions

--

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

NRPPA-Containers {

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

ngran-access (22) modules (3) nrppa (4) version1 (1) nrppa-Containers (5)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- IE parameter types from other modules.

--

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

IMPORTS

maxPrivateIEs,

maxProtocolExtensions,

maxProtocolIEs,

Criticality,

Presence,

PrivateIE-ID,

ProtocolIE-ID

FROM NRPPA-CommonDataTypes;

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

--

-- Class Definition for Protocol IEs

--

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

NRPPA-PROTOCOL-IES ::= CLASS {

&id ProtocolIE-ID UNIQUE,

&criticality Criticality,

&Value,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

TYPE &Value

PRESENCE &presence

}

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

--

-- Class Definition for Protocol Extensions

--

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

NRPPA-PROTOCOL-EXTENSION ::= CLASS {

&id ProtocolIE-ID UNIQUE,

&criticality Criticality,

&Extension,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

EXTENSION &Extension

PRESENCE &presence

}

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

--

-- Class Definition for Private IEs

--

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

NRPPA-PRIVATE-IES ::= CLASS {

&id PrivateIE-ID,

&criticality Criticality,

&Value,

&presence Presence

}

WITH SYNTAX {

ID &id

CRITICALITY &criticality

TYPE &Value

PRESENCE &presence

}

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

--

-- Container for Protocol IEs

--

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

ProtocolIE-Container { NRPPA-PROTOCOL-IES : IEsSetParam} ::=

SEQUENCE (SIZE (0..maxProtocolIEs)) OF

ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Single-Container { NRPPA-PROTOCOL-IES : IEsSetParam} ::=

ProtocolIE-Field {{IEsSetParam}}

ProtocolIE-Field { NRPPA-PROTOCOL-IES : IEsSetParam} ::= SEQUENCE {

id NRPPA-PROTOCOL-IES.&id ({IEsSetParam}),

criticality NRPPA-PROTOCOL-IES.&criticality ({IEsSetParam}{@id}),

value NRPPA-PROTOCOL-IES.&Value ({IEsSetParam}{@id})

}

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

--

-- Container Lists for Protocol IE Containers

--

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

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, NRPPA-PROTOCOL-IES : IEsSetParam} ::=

SEQUENCE (SIZE (lowerBound..upperBound)) OF

ProtocolIE-Container {{IEsSetParam}}

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

--

-- Container for Protocol Extensions

--

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

ProtocolExtensionContainer { NRPPA-PROTOCOL-EXTENSION : ExtensionSetParam} ::=

SEQUENCE (SIZE (1..maxProtocolExtensions)) OF

ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField { NRPPA-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {

id NRPPA-PROTOCOL-EXTENSION.&id ({ExtensionSetParam}),

criticality NRPPA-PROTOCOL-EXTENSION.&criticality ({ExtensionSetParam}{@id}),

extensionValue NRPPA-PROTOCOL-EXTENSION.&Extension ({ExtensionSetParam}{@id})

}

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

--

-- Container for Private IEs

--

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

PrivateIE-Container { NRPPA-PRIVATE-IES : IEsSetParam} ::=

SEQUENCE (SIZE (1..maxPrivateIEs)) OF

PrivateIE-Field {{IEsSetParam}}

PrivateIE-Field { NRPPA-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {

id NRPPA-PRIVATE-IES.&id ({IEsSetParam}),

criticality NRPPA-PRIVATE-IES.&criticality ({IEsSetParam}{@id}),

value NRPPA-PRIVATE-IES.&Value ({IEsSetParam}{@id})

}

END

-- ASN1STOP

## 9.4 Message transfer syntax

NRPPa shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ref. ITU-T Rec. X.691 [6].

## 9.5 Timers

Void.

# 10 Handling of unknown, unforeseen and erroneous protocol data

Section 10 of TS 38.413 [2] is applicable for the purposes of the present document, with the following additions:

- In case of Abstract Syntax Error, when reporting the *Criticality Diagnostics* IE for not comprehended IE/IE groups or missing IE/IE groups, the *NRPPa* *Transaction ID* IE shall also be included;

- In case of Logical Error, when reporting the *Criticality Diagnostics* IE, the *NRPPa* *Transaction ID* IE shall also be included.

Annex A (informative):  
Change history

| **Change history** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2017-08-23 | RAN3#97 | R3-173238 |  |  |  | TS skeleton agreed | v0.0.0 |
| 2017-08-25 | RAN3#97 | R3-173374 |  |  |  | TS 38.455 V0.1.0 | v0.1.0 |
| 2017-10-18 | RAN3#97bis | R3-173979 |  |  |  | Implemented agreed pCR from R3#97bis | V0.2.0 |
| 2017-12-04 | RAN3#98 | R3-175064 |  |  |  | Implemented agreed pCR from R3#98 | V0.3.0 |
| 2018-01-31 | RAN3 Adhoc 1801 | R3-180658 |  |  |  | Implemented agreed pCR from R3 Adhoc\_1801 | V0.5.0 |
| 2018-03-15 | RAN3#99 | R3-181595 |  |  |  | Implemented agreed pCR's from R3#99 | V0.6.0 |
| 2018-05-29 | RAN3#100 | R3-183598 |  |  |  | Implemented agreed pCR's from R3#100 | V0.7.0 |
| 2018-06 | RAN#80 | RP-181147 |  |  |  | Submitted to RAN plenary for Approval | V1.0.0 |
| 2018-06 | RAN#80 | - | - | - | - | Specification approved at TSG-RAN and placed under change control | 15.0.0 |
| 2018-09 | RAN#81 | RP-181921 | 0002 | 1 | F | Rapporteur CR for TS 38.455 | 15.1.0 |
| 2018-12 | RAN#82 | RP-182446 | 0003 | 1 | F | Addition of TDD UL/DL configuration to OTDOA assistance data | 15.2.0 |
| 2019-01 | RAN#82 |  |  |  |  | Editorial Corrections:  - 1 editorial correction to ASN.1  - adding "ASN1START" and "ASN1STOP" TAGs to the ASN.1 | 15.2.1 |
| 2020-07 | SA#88-e | - | - | - | - | Update to Rel-16 version (MCC) | 16.0.0 |
| 2020-09 | SA#89-e | RP-201849 | 0008 | 19 | B | Introduction of NR Positioning in NRPPa | 16.1.0 |
| 2020-12 | RAN#90-e | RP-202315 | 0014 | 2 | A | Support OTDOA assistance data for case of NR serving cell | 16.2.0 |
| 2020-12 | RAN#90-e | RP-202311 | 0015 | 2 | F | Corrections to tabular and asn.1 for NR positioning (NRPPa) | 16.2.0 |
| 2020-12 | RAN#90-e | RP-202311 | 0016 | - | F | Correction of NRPPa positioning procedures | 16.2.0 |
| 2020-12 | RAN#90-e | RP-202311 | 0021 | 1 | F | RRC alignement and various correction including ASN.1 | 16.2.0 |
| 2020-12 | RAN#90-e | RP-202311 | 0022 | 2 | F | Coupling TRP ID and Cell ID in Measurement procedures | 16.2.0 |
| 2021-03 | RAN#91-e | RP-210230 | 0024 | 1 | F | Including SRS frequency information in Positioning Information Request | 16.3.0 |
| 2021-03 | RAN#91-e | RP-210230 | 0025 | 1 | F | Corrections on NRPPa | 16.3.0 |
| 2021-03 | RAN#91-e | RP-210236 | 0026 | - | F | Correction of NRPPa section 10 | 16.3.0 |
| 2021-06 | RAN#92-e | RP-211333 | 0028 | - | A | Clarification of E-CID Measurement Result | 16.4.0 |
| 2021-06 | RAN#92-e | RP-211327 | 0029 | - | F | Correction of Spatial Relation Information | 16.4.0 |
| 2021-06 | RAN#92-e | RP-211327 | 0033 | 1 | F | Correction on SFN Initialisation Time | 16.4.0 |
| 2021-06 | RAN#92-e | RP-211327 | 0034 | - | F | Correction on relative cartesian coordinate | 16.4.0 |
| 2021-09 | RAN#93-e | RP-211883 | 0039 | 1 | F | Correction of the RAN and LMF UE measurement IDs extension | 16.5.0 |
| 2021-09 | RAN#93-e | RP-211883 | 0041 | 1 | F | Adding procedural text for System Frame Number and Slot Number | 16.5.0 |
| 2021-12 | RAN#94-e | RP-213173 | 0047 | 3 | F | Correction on PRS-only TP | 16.6.0 |
| 2021-12 | RAN#94-e | RP-212867 | 0049 | 1 | F | Support of providing spatial relation per SRS resource from LMF to gNB | 16.6.0 |
| 2022-03 | RAN#95-e | RP-220281 | 0052 | 1 | F | Correction on Measurement Periodicity | 16.7.0 |
| 2022-03 | RAN#95-e | RP-220281 | 0053 | 1 | F | Correction on PRS Beam Information | 16.7.0 |
| 2022-03 | RAN#95-e | RP-220228 | 0037 | 8 | B | Introduction of NR Positioning enhancements to NRPPa | 17.0.0 |
| 2022-03 | RAN#95-e | RP-220236 | 0042 | 2 | B | Addition of NR Timing Advance reporting for NR UL E-CID [NRTADV] | 17.0.0 |
| 2022-03 | RAN#95-e | RP-220236 | 0054 | - | D | NRPPa Rapporteur Corrections | 17.0.0 |
| 2022-06 | RAN#96 | RP-221131 | 0057 | 1 | F | NRPPa ASN.1 review for NR Positioning Enhancements | 17.1.0 |
| 2022-06 | RAN#96 | RP-221145 | 0058 | 4 | F | CR to 38.455 on Measurement Amount | 17.1.0 |
| 2022-06 | RAN#96 | RP-221145 | 0062 | 2 | D | Rapporteur Corrections to Rel-17 NRPPa | 17.1.0 |
| 2022-06 | RAN#96 | RP-221131 | 0063 | 4 | F | Positionng corrections for NRPPA | 17.1.0 |
| 2022-06 | RAN#96 | RP-221131 | 0066 | 1 | F | Corrections to Measurement Pre-configuration Information Transfer | 17.1.0 |
| 2022-06 | RAN#96 | RP-221131 | 0067 | 1 | F | Support for Multiple Measurement Instances | 17.1.0 |
| 2022-06 | RAN#96 | RP-221152 | 0069 | 2 | A | Correction for PRS Muting | 17.1.0 |
| 2022-06 | RAN#96 | RP-221152 | 0074 |  | A | Correction to SSB subcarrier spacing | 17.1.0 |
| 2022-06 |  |  |  |  |  | editorial corrections to rename the following asn.1 names as choice extension names  - sRSType-extension -> choice-Extension  - cause-Extension -> choice-Extension  - measuredResultsValue-Extension -> choice-Extension  - nG-RANCell-Extension -> hoice-Extension  - oTDOACell-Information-Item-Extension -> choice-Extension  - otherRATMeasuredResultsValue-Extension -> choice-Extension  - pRSMutingConfiguration-EUTRA-Extension -> choice-Extension | 17.1.1 |
| 2022-09 | RAN#97-e | RP-222186 | 0075 | 1 | F | Correction for UE Tx TEG Association | 17.2.0 |
| 2022-09 | RAN#97-e | RP-222186 | 0076 | - | F | Introduction of SRS port index | 17.2.0 |
| 2022-09 | RAN#97-e | RP-222186 | 0077 | 2 | F | Support of timing error margins for TEGs in NRPPa | 17.2.0 |
| 2022-09 | RAN#97-e | RP-222543 | 0079 | 3 | A | CR to 38.455 on E-CID measurement periodicity | 17.2.0 |
| 2022-09 | RAN#97-e | RP-222186 | 0080 | 1 | F | Correction on Measurement Time Occasion | 17.2.0 |
| 2022-12 | RAN#98-e | RP-222886 | 0086 | 2 | F | Correction of TRP TEG | 17.3.0 |
| 2022-12 | RAN#98-e | RP-222886 | 0087 | 1 | F | Correction of Timing Error Margin | 17.3.0 |
| 2022-12 | RAN#98-e | RP-222886 | 0088 | 1 | F | Correction of Positioning Information Transfer function | 17.3.0 |
| 2022-12 | RAN#98-e | RP-222886 | 0089 | 2 | F | Correction to the PRS Measurement configuration procedures | 17.3.0 |
| 2022-12 | RAN#98-e | RP-222887 | 0092 | 1 | A | CR to 38.455 on SRS periodicity | 17.3.0 |
| 2022-12 | RAN#98-e | RP-222886 | 0093 | - | F | Correction on presence of timing error margin for TRP TEGs | 17.3.0 |
| 2023-03 | RAN#99 | RP-230597 | 0099 | 1 | A | Correction for SRS Configuration status in Positioning Information Update | 17.4.0 |
| 2023-03 | RAN#99 | RP-230593 | 0100 | 1 | F | NRPPA corrections of references to RRC | 17.4.0 |
| 2023-06 | RAN#100 | RP-231077 | 0103 | 1 | F | SRS Resource correction on Comb 8, Number of Symbols and Repetition Factor | 17.5.0 |
| 2023-06 | RAN#100 | RP-231077 | 0105 | 1 | F | Subcarrier Spacing correction | 17.5.0 |