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TECHNICAL SPECIFICATION

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(3GPP TS 38.455 version 18.1.0 Release 18)**

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Contents

Foreword

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

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x the first digit:

1 presented to TSG for information;

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

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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".

[20]   3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[21]   3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces".

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].

Mobile IAB-MT: 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-RSCP	UL Reference Signal Carrier Phase
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, NRPPa protocol uses the services provided by 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.

- Area-specific SRS Information Transfer. This function allows the LMF to notify the NG-RAN node about area-specific SRS configuration information.

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
Area-specific SRS Information Transfer	SRS Information Reservation Notification

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
SRS Information Reservation Notification	SRS INFORMATION RESERVATION NOTIFICATION

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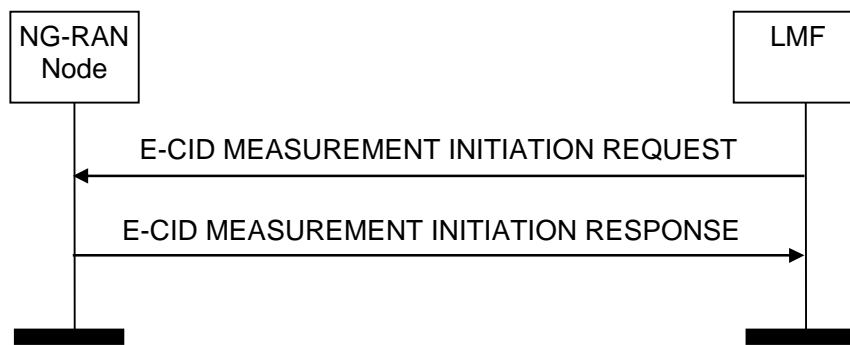
Figure 8.2.1.2-1: E-CID Measurement Initiation procedure, successful operation

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 or the *Geographical Coordinates* 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
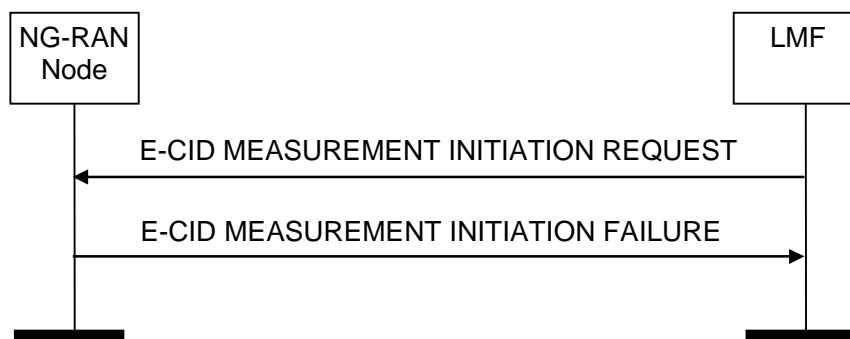
Figure 8.2.1.3-1: E-CID Measurement Initiation procedure, unsuccessful operation

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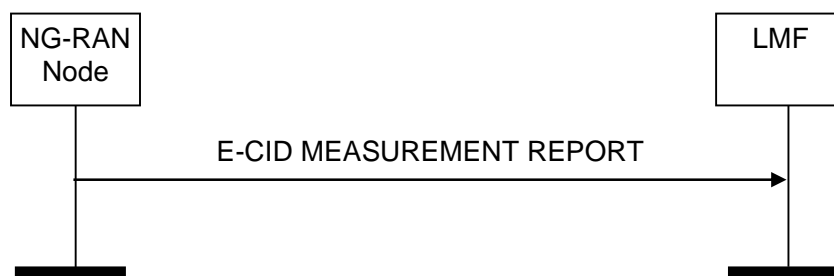
Figure 8.2.3.2-1: E-CID Measurement Report procedure, successful operation

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.

If available, the NG-RAN node shall include the *Mobile Access Point Location Information* IE in the E-CID MEASUREMENT REPORT message. Upon reception of the *Mobile Access Point Location Information* IE, the LMF may use the value as the location information of the mobile NG-RAN access point that is associated to the mobile TRP.

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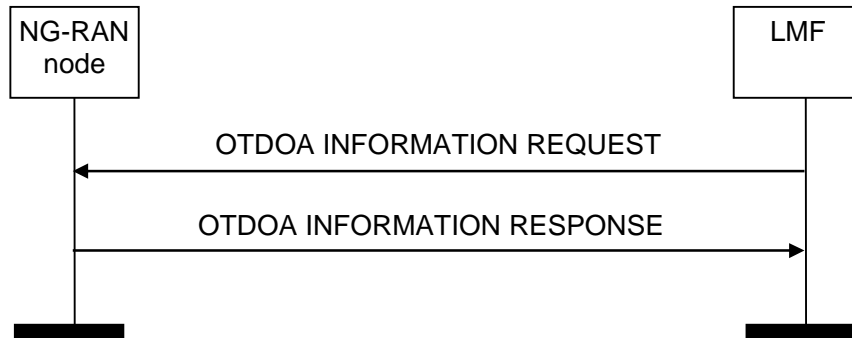
Figure 8.2.5.2-1: OTDOA Information Exchange procedure, successful operation

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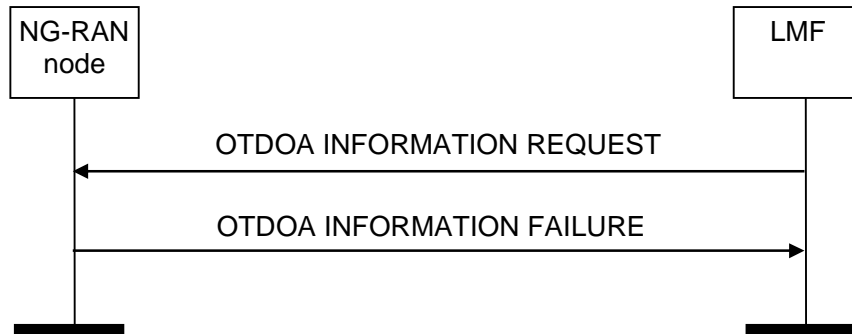
Figure 8.2.5.3-1: OTDOA Information Exchange procedure, unsuccessful operation

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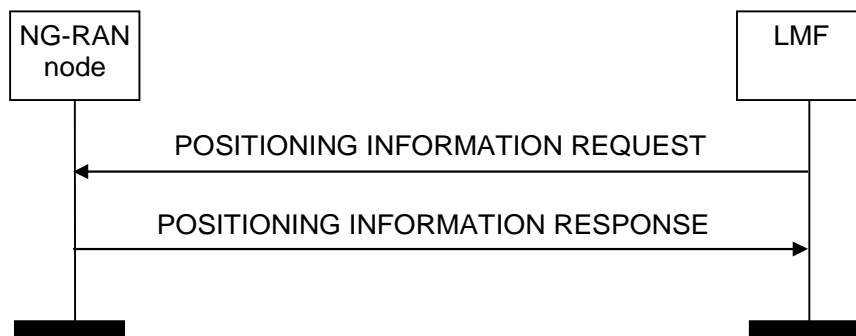
Figure 8.2.6.2-1: Positioning Information Exchange procedure, successful operation

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.

If the *New NR CGI* IE is included in the POSITIONING INFORMATION RESPONSE message, the LMF shall, if supported, consider it as the new cell identity where the UE has currently resumed and take it into account for subsequent positioning procedures.

If the *Time Window Information for SRS* IE is included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node shall, if supported, configure the UE to start transmitting its UL SRS transmission at the indicated time instance.

If the *Positioning Validity Area Cell List* IE and the *Validity Area Specific SRS Information* IE within the *Requested SRS Transmission Characteristics* IE are included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node may take this information into account for configuring SRS transmissions for the UE in the indicated validty area, and it shall include the *SRS Configuration* IE, the *SFN Initialisation Time* IE and the *Positioning Validity Area Cell List* IE in the POSITIONING INFORMATION RESPONSE message.

If the *Requested SRS Preconfiguration Characteristics List* IE is included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node shall, if supported, take this information into account when preconfiguring area specific SRS configuration for the UE, and include the *SRS Preconfiguration List* IE in the POSITIONING INFORMATION RESPONSE message.

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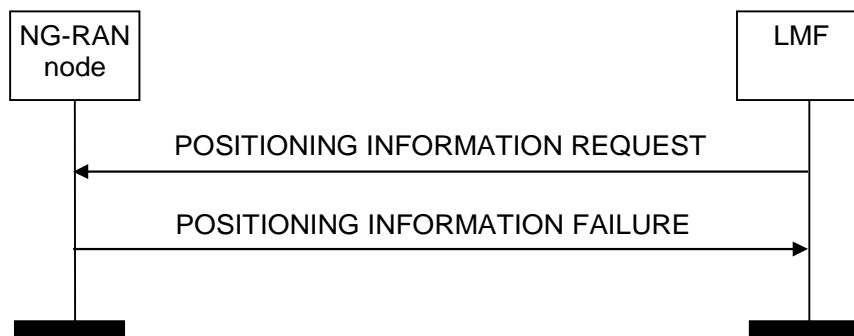
Figure 8.2.6.3-1: Positioning Information Exchange procedure, unsuccessful operation

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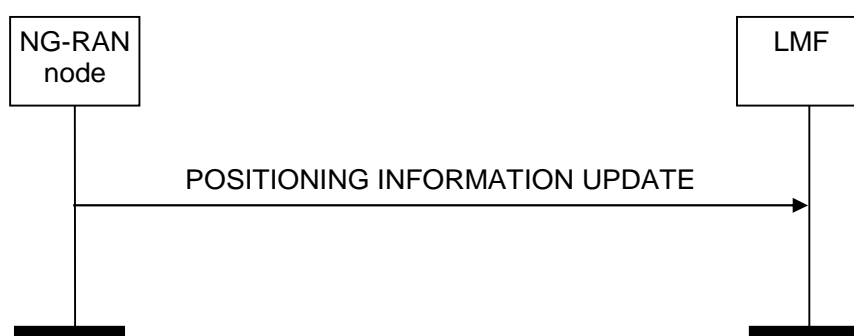
Figure 8.2.7.2-1: Positioning Information Update procedure, successful operation

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.

If the *New Cell Identity* IE is included in the POSITIONING INFORMATION UPDATE message, the LMF shall consider that as the new cell information of the UE.

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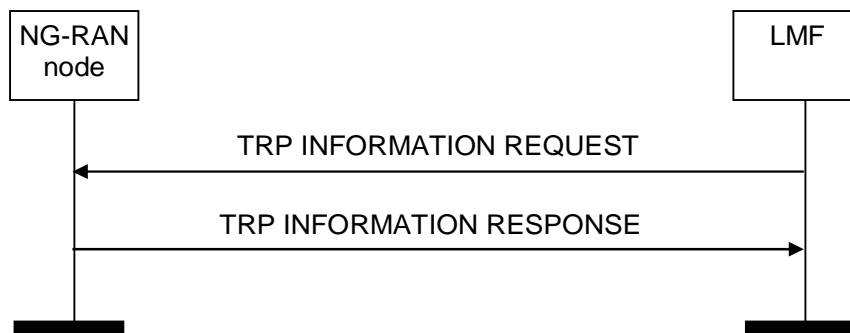
Figure 8.2.8.2-1: TRP Information Exchange procedure, successful operation

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.

If the *Mobile IAB-MT UE ID* IE is included in the *TRP Information* IE in the TRP INFORMATION RESPONSE message, the LMF shall, if supported, use this information to determine an updated location of the Mobile TRP as specified in TS 23.273 [20].

If the *TRP Information Type Item* IE is set to 'mobile trp location info', the NG-RAN node shall, if supported, derive the location of the Mobile TRP as specified in TS 23.273 [20] and include the *Mobile TRP Location Information* in the TRP INFORMATION RESPONSE message.

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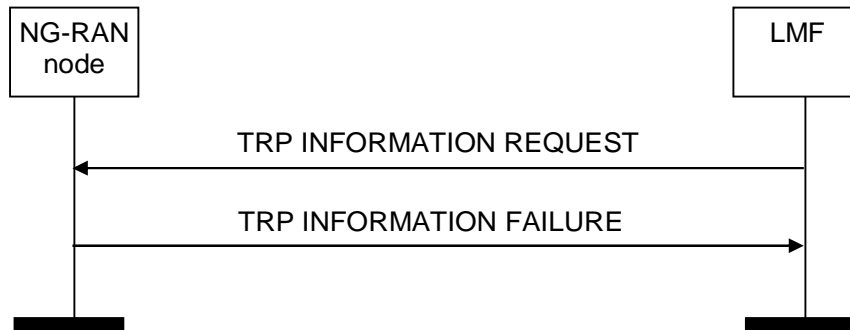
Figure 8.2.8.3-1: TRP Information Exchange procedure, unsuccessful operation

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
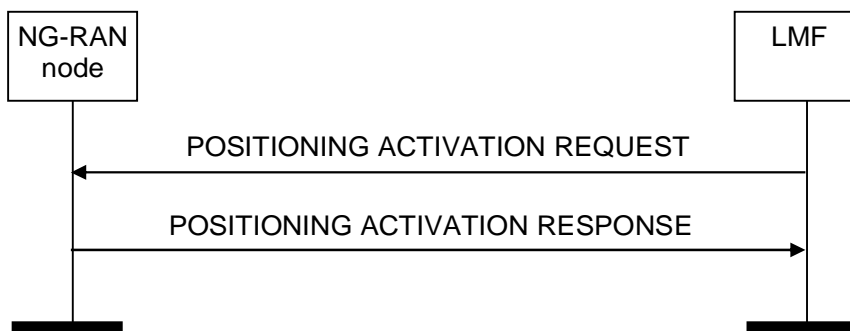
Figure 8.2.9.2-1: Positioning Activation procedure, successful operation

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
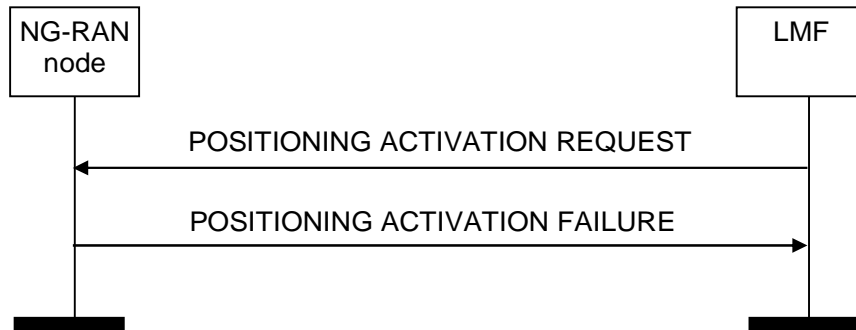
Figure 8.2.9.3-1: Positioning Activation procedure, unsuccessful operation

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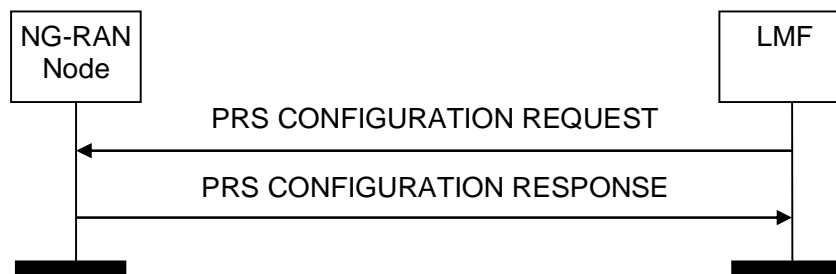
Figure 8.2.11.2-1: PRS Configuration Exchange procedure, successful operation

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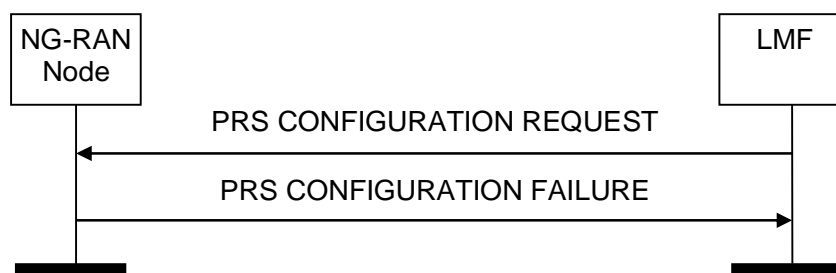
Figure 8.2.11.3-1: PRS Configuration Exchange procedure, unsuccessful operation

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
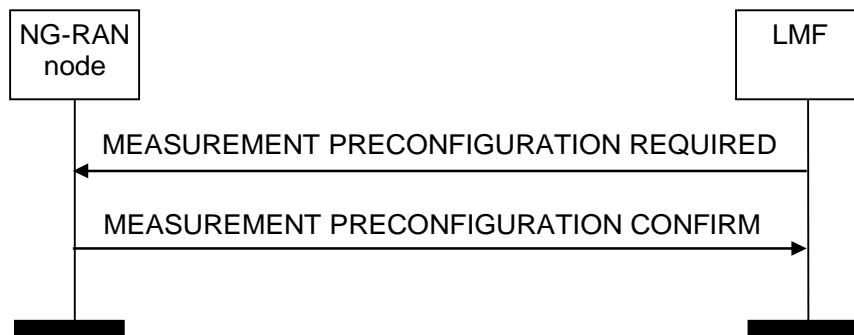
Figure 8.2.12.2-1: Measurement Preconfiguration procedure, successful operation

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
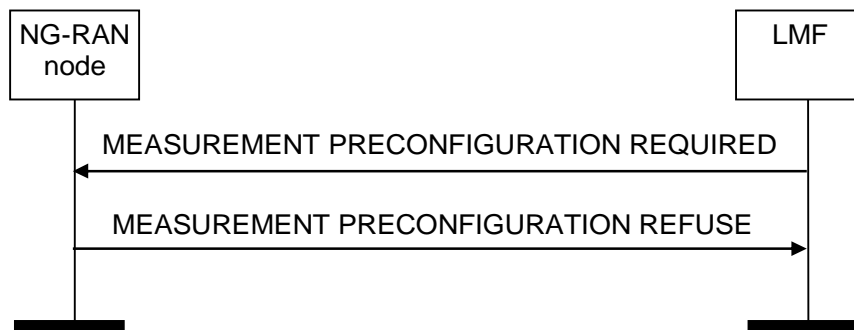
Figure 8.2.12.3-1: Measurement Preconfiguration procedure, unsuccessful operation

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.

8.2.14 SRS Information Reservation Notification

8.2.14.1 General

The purpose of the SRS Information Reservation Notification procedure is to allow the LMF to notify the NG-RAN node to reserve or release SRS resources in the positioning validity area.

8.2.14.2 Successful Operation

Figure 8.2.14.2-1: SRS Information Reservation Notification procedure, successful operation

The LMF initiates the procedure by sending a SRS INFORMATION RESERVATION NOTIFICATION message to the NG-RAN node.

If the *SRS Reservation Type* IE is set to "reserve", the NG-RAN node shall reserve the indicated SRS information in the cells indicated by by the *Positioning Validity Area Cell List* IE. If the *SRS Reservation Type* IE is set to "release", the NG-RAN node shall release the indicated SRS information in the cells indicated by the *Positioning Validity Area Cell List* IE.

8.2.14.3 Unsuccessful Operation

Not Applicable.

8.2.14.4 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
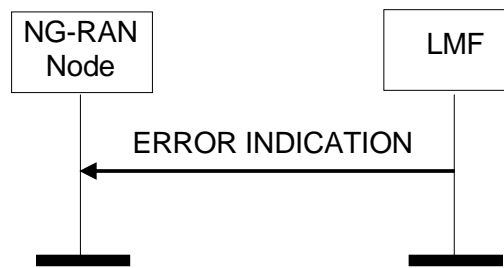
Figure 8.3.1.2-1: Error Indication procedure, LMF originated, successful operation
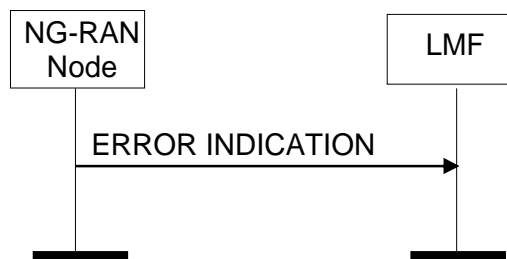
Figure 8.3.1.2-2: Error Indication procedure, NG-RAN node originated, successful operation

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
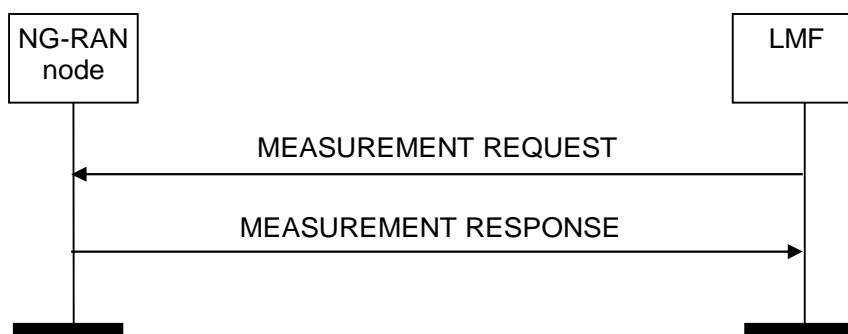
Figure 8.5.1.2.1: Measurement procedure. Successful operation.

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.

If the *Time Window Information Measurement List* IE is included in the MEASUREMENT REQUEST message, the NG-RAN node shall, if supported, measure the UL SRS resources from the UE within the indicated time window(s).

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
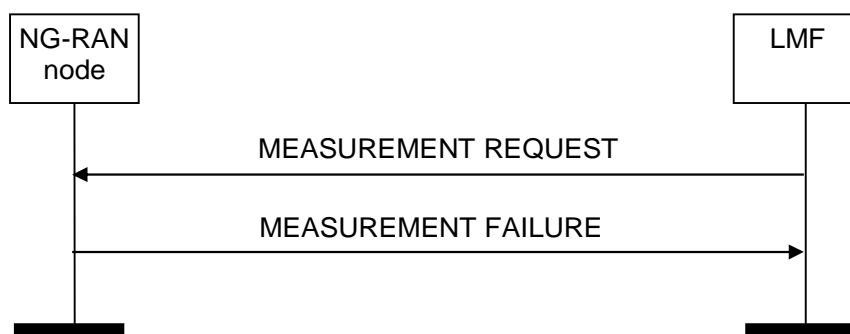
Figure 8.5.1.3.1: Measurement procedure. Unsuccessful operation.

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
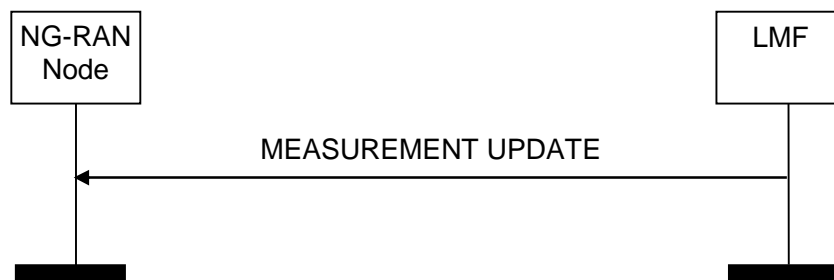
Figure 8.5.3.2.1: Measurement Update: Successful Operation.

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*			YES	reject
>Measurement Quantities Item		*1..<maxnoMeas>*			EACH	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>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, UE Rx-Tx Time Difference)		-	-
Other-RAT Measurement Quantities		*0..1*			YES	ignore
>Other-RAT Measurement Quantities Item		*0 .. <maxnoMeas>*			EACH	reject
>>Other-RAT Measurement Quantities Value	M		ENUMERATED (GERAN, UTRAN,…, NR, EUTRA)		-	
WLAN Measurement Quantities		*0..1*			YES	ignore
>WLAN Measurement Quantities Item		*0 .. <maxnoMeas>*			EACH	reject
>>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	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

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*			YES	reject
>OTDOA Information Type Item		*1 .. <maxnoOTDOAtypes>*			EACH	reject
>>OTDOA Information Item	M		ENUMERATED (pci, cellid, tac, earfcn, prsBandwidth, prsConfigIndex, cpLength, noDlFrames, noAntennaPorts, sFNInitTime, nG-RANAccessPointPosition, prsmutingconfig		-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			uration, 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).	YES	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
Time Window Information SRS List	O		9.2.90		YES	reject
Requested SRS Preconfiguration Characteristics List	O		9.2.97		YES	ignore

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
New NR CGI	O		NR CGI 9.2.9		YES	ignore
Positioning Validity Area Cell List	O		9.2.93		YES	ignore
SRS Preconfiguration List	O		9.2.98		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
New Cell Identity	O		NR CGI 9.2.9		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>			-	
>>TRP ID	M		9.2.24		-	
>>PRS Bandwidth Aggregation Request Indication	O		ENUMERATED (true, …)		YES	ignore
TRP Information Type List		1			YES	reject
>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		-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			direction info, geo-coordinates, …, trp type, on-demand prs, trp tx teg, beam antenna info, mobile trp location info, common ta)			

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>*			-	
>>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*>			-	
>>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>*			-	
>>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>*			-	
>>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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>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

9.1.1.28 SRS INFORMATION RESERVATION NOTIFICATION

This message is sent by the LMF to notify the NG-RAN node to reserve or release SRS resources in a validity area.

Direction: LMF → NG-RAN node.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3		YES	reject
NRPPa Transaction ID	M		9.2.4		-	
SRS Reservation Type	M		ENUMERATED (reserve, release, …)		YES	ignore
SRS Information	O		Requested SRS Transmission Characteristics 9.2.27		YES	ignore

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..<maxno ofMeasTR Ps>*			-	
>>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	YES	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
				the *TRP ID* IE.		
>>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>*			-	
>>TRP Measurement Type	M		ENUMERATED (gNB-RxTxTimeDiff, UL-SRS-RSRP, UL-AoA, UL-RTOA,…, Multiple UL-AoA, UL SRS-RSRPP, UL-RSCP)		-	
>>Timing Reporting Granularity Factor	O		INTEGER (0..5)	Value (0..5) corresponds to (k0..k5) TS 38.133 [16]. This IE is ignored when the Timing Reporting Granularity Factor Extended IE is included.	-	
>>Timing Reporting Granularity Factor Extended	O		INTEGER (-6..-1, …)	Value -6 corresponds to kminus6, value -5 corresponds to kminus5 and so on, see 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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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
Time Window Information Measurement List	O		9.2.91		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.

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..<maxno ofMeasTR Ps>*			-	
>>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	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
TRP Measurement Response List		*1*			YES	reject
>TRP Measurement Response Item		*1..<maxno ofMeasTR Ps>*			-	
>>TRP ID	M		9.2.24		-	
>>TRP Measurement Result	M		9.2.37		-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>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*>			-	
>>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	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

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	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
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)	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>*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 ..<maxno Meas>*			-	
>>*Value Angle of Arrival EUTRA*			INTEGER (0..719)	According to mapping in TS 36.133 [9]		
>>*Value Timing Advance Type 1 EUTRA*			INTEGER (0..7690)	As defined in TS 36.214 [17]		
>>*Value Timing Advance Type 2 EUTRA*			INTEGER (0..7690)	As defined in TS 36.214 [17]		
>>*Result RSRP EUTRA*						
>>>Result RSRP EUTRA Item		*1 .. <maxCell Report>*			-	
>>>>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	M		INTEGER		-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
RSRP EUTRA			(0..97, …)			
>>*Result RSRQ EUTRA*						
>>>Result RSRQ EUTRA Item		*1 .. \<maxCell Report>*			-	
>>>>*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*					YES	ignore
>>>Result SS-RSRP Item		*1 .. \<maxCell ReportNR >*			-	
>>>>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 .. \<maxInde xesReport >*			-	
>>>>>>SSB Index	M		INTEGER (0..63)		-	
>>>>>>Value SS-RSRP	M		INTEGER (0..127)	SS-RSRP measurement per SSB resource	-	
>>*Result SS-RSRQ*					YES	ignore
>>>ResultSS-RSRQ-Item		*1 .. \<maxCell ReportNR >*			-	
>>>>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-		*1 ..*			-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
RSRQ PerSSB Resource Item		*<maxIndexesReport>*				
>>>>>>SSB Index	M		INTEGER (0..63)		-	
>>>>>>Value SS-RSRQ	M		INTEGER (0..127)	SS-RSRQ measurement per SSB resource	-	
>>*Result CSI-RSRP*					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*					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*			UL Angle of Arrival 9.2.38		YES	ignore

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>*Value Timing Advance NR*			INTEGER (0.. 7690)	Report mapping as defined in TS 38.133 [16]	YES	ignore
>>*Value UE Rx-Tx Time Difference*			INTEGER (0.. 61565)	As defined in TS 38.215 [19]	YES	ignore
Geographical Coordinates	O		9.2.46		YES	ignore
Mobile Access Point Location Information	O		Mobile TRP Location Information 9.2.88	The location information of the mobile access point of the cell that is associated to the mobile TRP.	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			
>*E-UTRAN Cell*				
>>E-UTRAN Cell Identifier	M		BIT STRING (28)	
>*NR Cell*				
>>NR Cell Identifier	M		BIT STRING (36)	

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
				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 $(0..2^{23}-1)$	The IE value (N) is derived by this formula: $N \leq 2^{23} X /90 < N+1$ X being the latitude in degrees $(0°.. 90°)$.
Degrees Of Longitude	M		INTEGER $(-2^{23}..2^{23}-1)$	The IE value (N) is derived by this formula: $N \leq 2^{24} X /360 < N+1$ X being the longitude in degrees $(-180°..+180°)$.
Direction of Altitude	M		ENUMERATED (Height, Depth)	
Altitude	M		INTEGER $(0..2^{15}-1)$	The relation between the value (N) and the altitude (a) in meters it describes is $N \leq a < N+1$, except for $N=2^{15}-1$ 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 $r = 10 \times (1.1^k-1)$.
Uncertainty semi-minor	M		INTEGER (0..127)	The uncertainty "r" is derived from the "uncertainty code" k by $r = 10 \times (1.1^k-1)$.
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: $h=45 \times (1.025^k-1)$.
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*						
>>>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*						
>>>Result UTRAN Item		*1..<maxUTRANMeas>*			-	
>>>>UARFCN	M		INTEGER (0..16383, ...)		-	
>>>>CHOICE *Physical CellId UTRA*	M				-	
>>>>>*Physical CellId UTRA FDD*			INTEGER (0..511, ...)			
>>>>>*Physical CellId UTRA TDD*			INTEGER (0..127, ...)			
>>>>UTRA RSCP	O		INTEGER (-5..91, ...)		-	
>>>>UTRA EcNo	O		INTEGER (0..49, ...)	This IE applies to FDD only.	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>*Result NR*					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*					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	O		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..<maxWLAN channels>*		
>>>>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 <maxnoO TDOAtype s>*			-	
>>PCI EUTRA	M		INTEGER (0..503, …)	Physical Cell ID of the reported E-	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned criticality
				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.	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned criticality
>>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	YES	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned criticality
				fraction part is expressed with a granularity of 1 /2**32 second.		

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*			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*			BIT STRING (4)	Same as above
>*Eight*			BIT STRING (8)	Same as above
>*Sixteen*			BIT STRING (16)	Same as above
>*thirty-two*			BIT STRING (32)	Same as above
>*sixty-four*			BIT STRING (64)	Same as above
>*one-hundred-and-twenty-eight*			BIT STRING (128)	Same as above
>*two-hundred-and-fifty-six*			BIT STRING (256)	Same as above
>*five-hundred-and-twelve*			BIT STRING (512)	Same as above
>*one-thousand-and-twenty-four*			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,	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
			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*			INTEGER (0..1007)	NR Physical Cell ID		
>>*NR CGI*			9.2.9			
>>*NR ARFCN*			INTEGER (0..3279165)			
>>*PRS Configuration*			9.2.44			
>>*SSB Information*			9.2.54			
>>*SFN Initialisation Time*			Relative Time 1900			

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
			9.2.36			
>>*Spatial Direction Information*			9.2.45			
>>*Geographical Coordinates*			9.2.46			
>>*TRP type*			ENUMERATED (prs-only-tp, srs-only-rp, tp, rp, trp, …, mobile trp)	TS 38.305 [18]	YES	reject
>>*On-demand PRS TRP Information*			9.2.65		YES	reject
>>*TRP Tx TEG Association*			9.2.79		YES	reject
>>*TRP Beam Antenna Information*			9.2.82		YES	reject
>>Mobile TRP Location Information	M		9.2.88		YES	ignore
>>Common TA Parameters	M		9.2.89		YES	reject
Mobile IAB-MT UE ID	C-ifMobileTRP		OCTET STRING	The UE ID of the IAB-MT associated with the mobile TRP. Includes the GPSI as defined in TS 29.571 [21]	YES	reject

Condition	Explanation
ifMobileTRP	This IE shall be present if the *TRP type* IE is set to the value 'mobile trp'

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 $T_0 + t_{SRS}$, where - T_0 is the SFN Initialisation Time - $t_{SRS} = (10n_f + n_{sf}) \times 10^{-3}$, where n_f and n_{sf} 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				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, ... , 160mHz, 200mHz)			
>*FR2*			ENUMERATED (50mHz, 100mHz, 200mHz, 400mHz,…, 600mHz, 800mHz, 1600mHz, 2000mHz)			
SRS Resource Set List		*0.. 1*			-	
>SRS Resource Set Item		*1..< maxnoSRS-Resource Sets>*			-	
>>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..<maxno SRS-Resource PerSet>*			-	
>>>>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,	Milli-seconds	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
			5120, 10240, …)			
>>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..32 79165)	NR ARFCN The carrier frequency of SRS transmission bandwidth.	YES	ignore
Bandwidth Aggregation Request Indication	O		ENUMERATED (true, …)		YES	ignore
Positioning Validity Area Cell List	O		9.2.93		YES	ignore
Validity Area Specific SRS Information	O		9.2.96		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(kHz 15, kHz30, kHz60, kHz120,…, kHz480, kHz960)	
>>>>Carrier Bandwidth	M		INTEGER(1..275,…)	
>>Active UL BWP		*1*		Only the configuration in the

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				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(kHz 15, 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		*1*		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,		-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
			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*			INTEGER (0..1)			
>*FreqScalingFactor4*			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	Criticality	Assigned Criticality
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				-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>*periodic*						
>>SRS Periodicity	M		9.2.99		**-**	
>>Offset	M		INTEGER(0..81 919,…)		**-**	
>*semi-persistent*						
>>SRS Periodicity	M		9.2.99		**-**	
>>Offset	M		INTEGER(0..81 919,…)		**-**	
>*aperiodic*						
>>slot offset	M		INTEGER(0..32)		**-**	
Sequence ID	M		INTEGER(0..65 535)		**-**	
CHOICE *Spatial Relation Positioning*	O				**-**	
>*SSB*						
>>NR PCI	M		INTEGER (0..1007)		**-**	
>>SSB index	O		INTEGER(0..63)		**-**	
>*PRS*						
>>PRS ID	M		INTEGER(0..25 5)		**-**	
>>PRS Resource Set ID	M		INTEGER(0..7)		**-**	
>>PRS Resource ID	O		INTEGER(0..63)		**-**	
Tx Hopping Configuration	O		9.2.100		YES	ignore

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	Criticality	Assigned Criticality
Positioning SRS Resource Set ID	M		INTEGER(0..15)		-	
Positioning SRS Resource ID List		1..<*maxno SRS- PosResour cePerSet*>			-	
>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)		-	
Aggregated Positioning SRS Resource Set List	O		9.2.94		YES	ignore

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..<*maxnoSpat ialRelations*>		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*				

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>>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*			9.2.38			
>>*UL SRS-RSRP*			INTEGER (0..126)			
>>*UL RTOA Measurement*			9.2.39			
>>*gNB Rx-Tx Time Difference*			9.2.40			
>>*Z-AoA*			9.2.67		YES	reject
>>*Multiple UL-AoA*			9.2.71		YES	reject
>>*UL SRS-RSRPP*			9.2.72		YES	reject
>>*UL RSCP*			9.2.92		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
>Mobile TRP Location Information	O		9.2.88		YES	ignore
>Measured Frequency Hops	O		ENUMERATED (singleHop, multiHop, …)		YES	ignore
>Aggregated Positioning SRS Resource ID List		*0..1*		Indicates the used SRS for positioning resources across aggregated carriers.	YES	ignore
>>Aggregated Positioning SRS Resource ID Item		*1..< maxnoaggregatedPosSRS-Resources >*			-	
>>>Positioning SRS Resource ID	M		INTEGER (0..63)			

Range bound	Explanation
maxnoPosMeas	Maximum no. of measured quantities that can be configured and reported with one positioning measurement message. Value is 16384.
maxnoaggregatedPosSRS-Resources	Maximum no of aggregated Positioning SRS resources per UL BWP. Value is 3.

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*			INTEGER (0.. 1970049)	TS 38.133 [16]		
>*k1*			INTEGER (0.. 985025)	TS 38.133 [16]		
>*k2*			INTEGER (0.. 492513)	TS 38.133 [16]		
>*k3*			INTEGER (0.. 246257)	TS 38.133 [16]		
>*k4*			INTEGER (0.. 123129)	TS 38.133 [16]		
>*k5*			INTEGER (0.. 61565)	TS 38.133 [16]		
>*kminus1*			INTEGER (0..3940097)	TS 38.133 [16]	YES	ignore
>*kminus2*			INTEGER (0..7880193)	TS 38.133 [16]	YES	ignore
>*kminus3*			INTEGER (0.. 15760385)	TS 38.133 [16]	YES	ignore
>*kminus4*			INTEGER (0.. 31520769)	TS 38.133 [16]	YES	ignore
>*kminus5*			INTEGER (0.. 63041537)	TS 38.133 [16]	YES	ignore
>*kminus6*			INTEGER (0.. 126083073)	TS 38.133 [16]	YES	ignore
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*			INTEGER (0.. 1970049)	TS 38.133 [16]		
>*k1*			INTEGER (0.. 985025)	TS 38.133 [16]		
>*k2*			INTEGER (0.. 492513)	TS 38.133 [16]		
>*k3*			INTEGER (0.. 246257)	TS 38.133 [16]		
>*k4*			INTEGER (0.. 123129)	TS 38.133 [16]		
>*k5*			INTEGER (0..	TS 38.133 [16]		

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
			61565)			
>*kminus1*			INTEGER (0..3940097)	TS 38.133 [16]	YES	ignore
>*kminus2*			INTEGER (0..7880193)	TS 38.133 [16]	YES	ignore
>*kminus3*			INTEGER (0.. 15760385)	TS 38.133 [16]	YES	ignore
>*kminus4*			INTEGER (0.. 31520769)	TS 38.133 [16]	YES	ignore
>*kminus5*			INTEGER (0.. 63041537)	TS 38.133 [16]	YES	ignore
>*kminus6*			INTEGER (0.. 126083073)	TS 38.133 [16]	YES	ignore
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..<maxno path>*			-	
>CHOICE *Relative Path Delay*	M				-	
>>*k0*			INTEGER(0..16 351)	TS 38.133 [16]		
>>*k1*			INTEGER(0..81 76)	TS 38.133 [16]		
>>*k2*			INTEGER(0..40 88)	TS 38.133 [16]		
>>*k3*			INTEGER(0..20 44)	TS 38.133 [16]		
>>*k4*			INTEGER(0..10 22)	TS 38.133 [16]		
>>*k5*			INTEGER(0..51 1)	TS 38.133 [16]		
>>*kminus1*			INTEGER(0..32 701)	TS 38.133 [16]	YES	ignore
>>*kminus2*			INTEGER(0..65 401)	TS 38.133 [16]	YES	ignore
>>*kminus3*			INTEGER(0..13 0801)	TS 38.133 [16]	YES	ignore
>>*kminus4*			INTEGER(0..26 1601)	TS 38.133 [16]	YES	ignore
>>*kminus5*			INTEGER(0..52 3201)	TS 38.133 [16]	YES	ignore
>>*kminus6*			INTEGER(0..10 46401)	TS 38.133 [16]	YES	ignore
>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	Criticality	Assigned Criticality
System Frame Number	M		INTEGER(0..1023)		-	
CHOICE *Slot Index*	M				-	
>*SCS-15*			INTEGER(0..9)		-	
>*SCS-30*			INTEGER(0..19)		-	
>*SCS-60*			INTEGER(0..39)		-	
>*SCS-120*			INTEGER(0..79)		-	
>*SCS-480*	M		INTEGER(0..319)		YES	reject
>*SCS-960*	M		INTEGER(0..639)		YES	reject
Measurement time	O		Relative Time 1900 9.2.36		-	
Symbol Index	O		INTEGER(0..13)	Applicable to UL RSCP measurement only	YES	ignore

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	Criticality	Assigned Criticality
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, …)		-	
>*Phase Quality*				Corresponds to information provided in NR-PhaseQuality IE as defined in TS 37.355 [14].	YES	ignore

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>Phase Quality Index	M		INTEGER(0..179)		-	
>>Phase Quality Resolution	M		ENUMERATED (0.1deg, 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	Criticality	Assigned Criticality
PRS Resource Set List		*1*			-	
>PRS Resource Set Item		*1..<maxno ofPRSreso urceSet>*			-	
>>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,…, 128, 256, 512)	Slots	-	
>>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,…, n1)		-	
>>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	M		DL-PRS Muting	Muting pattern	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Pattern			Pattern 9.2.56	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)	This IE is ignored if the *Extended Resource Symbol Offset* IE is present.	-	
>>>>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	-	
>>>>Extended Resource Symbol Offset	O		INTEGER(0..13, ...)		YES	ignore
>>Aggregated PRS Resource Set List	O		9.2.95	Indicates the PRS Resource Set ID values linked for PRS bandwidth aggregation.	YES	ignore

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 (-	Delta value in ellipsoidal height in

			1024..1023)	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 $(-2^{16}.. 2^{16}-1)$	Positive value represents easting from reference point, in units of *XYZ Unit* IE.
Y value	M		INTEGER $(-2^{16}.. 2^{16}-1)$	Positive value represents northing from reference point in units of *XYZ Unit* IE.
Z value	M		INTEGER $(-2^{15}.. 2^{15}-1)$	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.. 2^9-1,…)	Referential ID mapped via OAM
>*Reference Point Coordinates*				
>>Reference Point	M		NG-RAN Access	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Position			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*			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))	

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-Resource Sets >*			-	
>>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-Resources PerSet >*			-	
>>>>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..<maxno lcs-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 .. <maxnoBcast Cell>*		
>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 -ResourcePerS et>*		
>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	Criticality	Assigned Criticality
Requested DL-PRS Resource Set List		*1*			-	
>Requested DL-PRS Resource Set Item		*1..<maxno ofPRSreso urceSet>*			-	
>>PRS bandwidth	O		INTEGER(1..63)	24,28,…,272 PRBs	-	
>>Comb Size	O		ENUMERATED(2, 4, 6, 12, …)		-	
>>Resource Set Periodicity	O		ENUMERATED(4, 5,8,10,16,20,32,4 0,64,80,160,320,6 40,1280,2560,512 0,10240,20480,40 960,81920,…,128, 256, 512)	Slots	-	
>>Resource Repetition Factor	O		ENUMERATED(rf 1,rf2,rf4,rf6,rf8,rf1 6,rf32,…)		-	
>>Resource Number of Symbols	O		ENUMERATED(n 2,n4,n6,n12,…,n1)		-	
>>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		-	
PRS Bandwidth Aggregation Request Indication	O		ENUMERATED(tr ue, …)		YES	ignore

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..<maxnoofP RSresource>*		
>>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	O		INTEGER(0..63)	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
PRS Resource ID				

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. Bit 24 is 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.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
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 6-8 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 $(\varphi_{AOA} - \Delta\varphi_{AOA}/2, \varphi_{AOA} + \Delta\varphi_{AOA}/2)$
>>>Expected Azimuth AoA Value	M		INTEGER(0..3599)	φ_{AOA} component of Expected Azimuth AoA
>>>Expected Azimuth AoA Uncertainty Range	M		INTEGER(0..3599)	$\Delta\varphi_{AOA}$ component of Expected Azimuth AoA
>>Expected Zenith AoA		0..1		Defined as $(\theta_{ZOA} - \Delta\theta_{ZOA}/2, \theta_{ZOA} + \Delta\theta_{ZOA}/2)$
>>>Expected Zenith AoA Value	M		INTEGER(0..1799)	θ_{ZOA} component of Expected Zenith AoA
>>>Expected Zenith AoA Uncertainty Range	M		INTEGER(0..1799)	$\Delta\theta_{ZOA}$ component of Expected Zenith AoA
>*Expected UL Angle of Arrival Zenith Only*				Defined as $(\theta_{ZOA} - \Delta\theta_{ZOA}/2, \theta_{ZOA} + \Delta\theta_{ZOA}/2)$
>>Expected Zenith AoA Value	M		INTEGER(0..1799)	θ_{ZOA} component of Expected Zenith AoA
>>Expected Zenith AoA Uncertainty Range	M		INTEGER(0..1799)	$\Delta\theta_{ZOA}$ 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				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 that can be reported. Value is 8

9.2.72 UL SRS-RSRPP

This information element contains the UL SRS Reference Signal Received Path Power measurement.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UL SRS-RSRPP	M		INTEGER (0..126)	As defined in TS 38.215 [19]

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	Criticality	Assigned Criticality
Extended Additional Path Item		*1..<maxNoPathExtended>*			-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>CHOICE *Relative Path Delay*	M				-	
>>k0			INTEGER(0..16351)	TS 38.133 [16]		
>>k1			INTEGER(0..8176)	TS 38.133 [16]		
>>k2			INTEGER(0..4088)	TS 38.133 [16]		
>>k3			INTEGER(0..2044)	TS 38.133 [16]		
>>k4			INTEGER(0..1022)	TS 38.133 [16]		
>>k5			INTEGER(0..511)	TS 38.133 [16]		
>>kminus1			INTEGER (0..32701)	TS 38.133 [16]	YES	ignore
>>kminus2			INTEGER (0..65401)	TS 38.133 [16]	YES	ignore
>>kminus3			INTEGER(0..130801)	TS 38.133 [16]	YES	ignore
>>kminus4			INTEGER(0..261601)	TS 38.133 [16]	YES	ignore
>>kminus5			INTEGER(0..523201)	TS 38.133 [16]	YES	ignore
>>kminus6			INTEGER(0..1046401)	TS 38.133 [16]	YES	ignore
>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 extended 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*				

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>>>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..<maxno UETEGs>*			-	
>UE Tx TEG ID	M		INTEGER (0..7)		-	
>Positioning SRS Resource ID List		*1*			-	
>>Positioning SRS Resource ID Item		*1..<maxno SRS-PosResou rces>*			-	
>>>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	YES	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
				ID.		

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..<maxnoTRP TEGs>*		
>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-ResourcesPer Set>*		
>>>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: UL SRS-RSRPP in Additional Path Fourth Bit: Multiple UL AoA in Additional Path Fifth bit: LoS/NLoS Information Sixth bit: TRP Rx TEG association for UL-TDOA Seventh bit: TRP RxTxTEG information for DL+UL positioning. Eighth bit: SRS Resource Type Ninth bit: Multiple Measurement Instances Tenth bit: Mobile TRP location information Eleventh bit: Aggregated SRS resources IDs used for joint UL positioning measurement. 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*				

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>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..< maxnoAzimuth Angles>*		
>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..<maxnoElev ationAngles>*		
>>>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..< maxNumReso urcesPerAngle >*		
>>>>>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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
				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.

9.2.88   Mobile TRP Location Information

This IE contains location information for one mobile TRP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Location Information	M		OCTET STRING	Location of the mobile TRP, Includes the *locationEstimate* IE as defined in TS 37.355 [14]
Velocity Information	O		OCTET STRING	Velocity of the mobile TRP, Includes the *velocityEstimate* IE as defined in TS 37.355 [14]
Location Time stamp	O		Time Stamp 9.2.42	Indicates the time when the mobile TRP location information is generated.

9.2.89   Common TA Parameters

This information element contains the Common TA parameters for an NG-RAN node.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
EpochTime	M		OCTET STRING	Includes the *EpochTime* IE as defined in TS 38.331[13]
TA Info	M		OCTET STRING	Includes the *TA-Info* IE as defined in TS 38.331[13]

9.2.90   Time Window Information SRS List

This IE contains the time window(s) when UL SRS transmission is requested.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Time Window Information SRS List		1		
>Time Window Information SRS Item		*1..<maxnoofTimeWindowSRS>*		
>>Time Window Start		*1*		
>>>System Frame Number	M		INTEGER(0..1023)	
>>>Slot Number	M		INTEGER(0..79)	
>>>Symbol Index	M		INTEGER(0..13)	
>>CHOICE *Time Window Duration*	M			
>>>*Symbols*				
>>>>Duration in Symbols	M		ENUMERATED (1, 2, 4, 8, 12, …)	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>>*Slots*				
>>>>Duration in Slots	M		ENUMERATED (1, 2, 4, 6, 8, 12, 16, …)	
>>Time Window Type	M		ENUMERATED (single, periodic, …)	
>>Time Window Periodicity	C-ifTimeWindowTypePeriodic		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, …)	Unit: Milli-seconds

Condition	Explanation
ifTimeWindowTypePeriodic	This IE shall be present if the *Time Window Type* IE is set to the value "periodic".

Range bound	Explanation
maxnoofTimeWindowSRS	Maximum no of Time Window of SRS. Value is 16.

9.2.91 Time Window Information Measurement List

This IE contains the time window(s) when UL SRS measurement is requested.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Time Window Information Measurement List		1		
>Time Window Information Measurement Item		*1..<maxnoofTimeWindowMeas>*		
>>CHOICE *Time Window Duration*	M			Duration of time window with start time given by the *System Frame Number* IE and *Slot Number* IE.
>>>*Slots*				
>>>>Duration in Slots	M		ENUMERATED (1, 2, 4, 6, 8, 12, 16, …)	
>>Time Window Type	M		ENUMERATED (single, periodic, …)	
>>Time Window Periodicity	C-ifTimeWindowTypePeriodic		ENUMERATED (160, 320, 640, 1280, 2560, 5120, 10240, 20480, 40960, 61440, 81920, 368640, 737280, 1843200, …)	Unit: Milli-seconds

Condition	Explanation
ifTimeWindowTypePeriodic	This IE shall be present if the *Time Window Type* IE is set to the value "periodic".

Range bound	Explanation
maxnoofTimeWindowMeas	Maximum no of Time Window for measurement. Value is 16.

9.2.92 UL RSCP

This IE contains the UL Reference Signal Carrier Phase (RSCP) measurement.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
UL RSCP	M		INTEGER (0..3599)	TS 38.133 [16]

9.2.93 Positioning Validity Area Cell List

This IE is used to indicate the cells belong to the validity area.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Positioning Validity Area Cell Item		*1 .. <maxnoVACell>*		
>NR CGI	M		9.2.9	
>NR PCI	O		INTEGER (0..1007)	

Range bound	Explanation
maxnoVACell	Maximum no of cells in a Positioning Validity Area. Value is 32

9.2.94 Aggregated Positioning SRS Resource Set List

This information element is used to indicate the aggregated Positioning SRS Resource Set List.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Aggregated SRS Positioning Resource Set Item		*1.. < maxnoaggregatedPosSRS-ResourceSets>*		
>Point A	M		INTEGER (0..3279165)	NR ARFCN
>NR PCI	O		INTEGER(0..1007)	
>Positioning SRS Resource Set ID	M		INTEGER(0..15)	

Range bound	Explanation
maxnoaggregatedPosSRS-ResourceSets	Maximum no of aggregated SRS Positioning Resource Sets. Value is 48.

9.2.95 Aggregated PRS Resource Set List

This information element is used to indicate the aggregated PRS Resource Set List.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Aggregated Positioning PRS Resource Set Item		*1.. < maxnoAggPosPRSResourceSets >*		
>Point A	M		INTEGER (0..3279165)	NR ARFCN
>PRS Resource Set ID	M		INTEGER(0..7)	

Range bound	Explanation
maxnoAggPosPRSResourceSets	Maximum no of PRS resource sets aggregated. Value is 3.

9.2.96   Validity Area Specific SRS Information

This IE contains the validity area specific SRS Information when area-specific SRS is requested.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
CHOICE *Transmission Comb*	O				YES	ignore
>*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)		-	
Resource Mapping		0..1			YES	ignore
>Start Position	M		INTEGER(0..13)		-	
>Number of Symbols	M		ENUMERATED(n1,n2,n4, n8, n12)		-	
Frequency Domain Shift	O		INTEGER(0..268)		YES	ignore
C-SRS	O		INTEGER(0..63)		YES	ignore
CHOICE *Resource Type Positioning*	O				YES	ignore
>*periodic*						
>>SRS Periodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..819 19,…)		-	
>*semi-persistent*						
>>SRS Periodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..819 19,…)		-	
>*aperiodic*				Not applicable if the *Positioning Validity Area Cell List* IE is included		
>>slot offset	M		INTEGER(0..32)		-	
Sequence ID	O		INTEGER(0..655 35)		YES	ignore

9.2.97   Requested SRS Preconfiguration Characteristics List

This information element is used to indicate the requested SRS Preconfiguration Characteristics List.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Requested SRS Preconfiguration Item		*1..< maxnoPreconfi guredSRS >*		
>Requested SRS Transmission Characteristics	M		9.2.27	

Range bound	Explanation
maxnoPreconfiguredSRS	Maximum no of preconfigured SRS. Value is 16.

9.2.98 SRS Preconfiguration List

This information element is used to indicate the SRS Preconfiguration List.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SRS Preconfiguration Item		*1..< maxnoPreconfig uredSRS>*		
>SRS Configuration	M		9.2.28	
>Positioning Validity Area Cell List	M		9.2.93	

Range bound	Explanation
maxnoPreconfiguredSRS	Maximum no of preconfigured SRS. Value is 16.

9.2.99   SRS Periodicity

This information element indicates the SRS periodicity.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
SRS Periodicity	M		ENUMERATED(slot 1, slot2, slot4, slot5, slot8, slot10, slot16, slot20, slot32, slot40, slot64, slot80, slot160, slot320, slot640, slot1280, slot2560, slot5120, slot10240, slot40960, slot81920,…, slot128, slot256, slot512, slot20480)	

9.2.100   Tx Hopping Configuration

This information element indicates the Tx hopping configuration.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Overlap Value	M		ENUMERATED(rb0, rb1, rb2, rb4)	
Number of Hops	M		INTEGER(1..6)	
Slot Offset for Remaining Hops List		1		
>Slot Offset for Remaining Hops Item		*1..<maxnoofH opsMinusOne>*		
>>CHOICE *slot offset remaining hops*	M			
>>>*aperiodic*				
>>>>Slot Offset	O		INTEGER(1..32)	
>>>>Start Position	O		INTEGER(0..13)	
>>>*semi-persistent*				
>>>>SRS Periodicity	M		9.2.99	
>>>>Offset	M		INTEGER(0..81919, …)	
>>>*periodic*				

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>>>SRS Periodicity	M		9.2.99	
>>>>Offset	M		INTEGER(0..81919, …)	

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

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,
        SRSInformationReservationNotification


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,
        id-sRSInformationReservationNotification



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           |
    sRSInformationReservationNotification,
    ...
}



-- *************************************************************
--
-- 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
}

sRSInformationReservationNotification NRPPA-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      SRSInformationReservationNotification
    PROCEDURE CODE          id-sRSInformationReservationNotification
    CRITICALITY             reject
}


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,
    CGI-NR,
    TimeWindowInformation-SRS-List,
    TimeWindowInformation-Measurement-List,
    PosValidityAreaCellList,
    SRSReservationType,
    RequestedSRSPreconfigurationCharacteristics-List,
    SRSPreconfiguration-List



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,
    id-NewNRCGI,
    id-TimeWindowInformation-SRS-List,
    id-TimeWindowInformation-Measurement-List,
    id-PosValidityAreaCellList,
    id-SRSReservationType,
    id-NewCellIdentity,
```

```
        id-RequestedSRSPreconfigurationCharacteristics-List,
        id-SRSPreconfiguration-List,
        id-SRSInformation




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 COMMAND
--
-- *************************************************************

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"
    { ID id-TimeWindowInformation-SRS-List           CRITICALITY reject  TYPE TimeWindowInformation-SRS-List           PRESENCE optional }|
    { ID id-RequestedSRSPreconfigurationCharacteristics-List    CRITICALITY ignore  TYPE RequestedSRSPreconfigurationCharacteristics-List
    PRESENCE optional   },
    ...
}

-- ************************************************************
--
-- 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}|
    { ID id-NewNRCGI                   CRITICALITY ignore  TYPE CGI-NR                       PRESENCE optional}|
    { ID id-PosValidityAreaCellList    CRITICALITY ignore  TYPE PosValidityAreaCellList      PRESENCE optional}|
    { ID id-SRSPreconfiguration-List   CRITICALITY ignore  TYPE SRSPreconfiguration-List     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}|
    { ID id-NewCellIdentity              CRITICALITY ignore  TYPE CGI-NR                       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}|
    { ID id-TimeWindowInformation-Measurement-List CRITICALITY ignore  TYPE TimeWindowInformation-Measurement-List      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},
    ...
}

-- ************************************************************
--
-- SRS INFORMATION RESERVATION NOTIFICATION
--
-- ************************************************************

SRSInformationReservationNotification   ::= SEQUENCE {
    protocolIEs     ProtocolIE-Container    {{ SRSInformationReservationNotification-IEs}},
    ...
}

SRSInformationReservationNotification-IEs NRPPA-PROTOCOL-IES ::= {
    { ID id-SRSReservationType  CRITICALITY ignore  TYPE SRSReservationType                         PRESENCE mandatory}|
    { ID id-SRSInformation      CRITICALITY ignore  TYPE RequestedSRSTransmissionCharacteristics    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,
        maxnoVACell,
        maxnoaggregatedPosSRS-Resources,
        maxnoaggregatedPosSRS-ResourceSets,
        maxnoAggPosPRSResourceSets,
        maxnoofTimeWindowSRS,
        maxnoofTimeWindowMeas,
        maxnoPreconfiguredSRS,
        maxnoofHopsMinusOne,
        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,
        id-ExtendedResourceSymbolOffset,
        id-Mobile-TRP-LocationInformation,
        id-Mobile-IAB-MT-UE-ID,
        id-MobileAccessPointLocation,
        id-CommonTAParameters,
        id-UE-Rx-Tx-Time-Diff,
        id-SCS-480,
        id-SCS-960,
        id-UL-RSCPMeas,
        id-Bandwidth-Aggregation-Request-Indication,
        id-PosSRSResourceSet-Aggregation-List,
        id-ReportingGranularitykminus1,
        id-ReportingGranularitykminus2,
        id-ReportingGranularitykminus3,
        id-ReportingGranularitykminus4,
        id-ReportingGranularitykminus5,
        id-ReportingGranularitykminus6,
        id-SymbolIndex,
        id-TimingReportingGranularityFactorExtended,
        id-PosValidityAreaCellList,
        id-PRSBWAggregationRequestIndication,
        id-AggregatedPosSRSResourceID-List,
        id-AggregatedPRSResourceSetList,
        id-TRPPhaseQuality,

        id-ValidityAreaSpecificSRSInformation,

        id-TxHoppingConfiguration,
        id-MeasuredFrequencyHops,
        id-ReportingGranularitykminus1AdditionalPath,
        id-ReportingGranularitykminus2AdditionalPath,
        id-ReportingGranularitykminus3AdditionalPath,
        id-ReportingGranularitykminus4AdditionalPath,
        id-ReportingGranularitykminus5AdditionalPath,
        id-ReportingGranularitykminus6AdditionalPath



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},
    ...
}

AggregatedPosSRSResourceID-List ::= SEQUENCE (SIZE (1..maxnoaggregatedPosSRS-Resources)) OF AggregatedPosSRSResourceID-Item

AggregatedPosSRSResourceID-Item ::= SEQUENCE {
```

```
    sRSPosResource-ID    SRSPosResourceID,
    iE-Extensions        ProtocolExtensionContainer { { AggregatedPosSRSResourceID-Item-ExtIEs} } OPTIONAL,
    ...
}

AggregatedPosSRSResourceID-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

AggregatedPRSResourceSetList ::= SEQUENCE (SIZE (1..maxnoAggPosPRSResourceSets)) OF AggregatedPRSResourceSet-Item

AggregatedPRSResourceSet-Item ::= SEQUENCE {
    pointA               INTEGER (0..3279165),
    posPRSResourceSetID PRS-Resource-Set-ID,
    iE-Extensions        ProtocolExtensionContainer { { AggregatedPRSResourceSet-Item-ExtIEs} } OPTIONAL,
    ...
}

AggregatedPRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}


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, ...)
```

ETSI

```
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, ... ,mHz160, mHz200},
    fR2      ENUMERATED {mHz50, mHz100, mHz200, mHz400, ..., mHz600, mhz800, mHz1600, mHz2000 },
    choice-extension         ProtocolIE-Single-Container { { BandwidthSRS-ExtIEs } }
}

BandwidthSRS-ExtIEs NRPPA-PROTOCOL-IES ::= {
    ...
}

Bandwidth-Aggregation-Request-Indication ::= ENUMERATED { true, ...}

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 ::= {
    ...
}

CommonTAParameters ::= SEQUENCE {
    epochTime               OCTET STRING,
    taInfo                  OCTET STRING,
    iE-Extensions           ProtocolExtensionContainer {{ CommonTAParameters-ExtIEs}}            OPTIONAL,
    ...
}

CommonTAParameters-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}
```

ETSI

```
-- D

DL-Bandwidth-EUTRA ::= ENUMERATED {
    bw6,
    bw15,
    bw25,
    bw50,
    bw75,
    bw100,
    ...
}

DL-PRS ::= SEQUENCE {
    prsid                   PRS-ID,
    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}|
```

```
    { ID id-MobileAccessPointLocation   CRITICALITY ignore EXTENSION Mobile-TRP-LocationInformation  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 ::= {
    {ID id-ReportingGranularitykminus1  CRITICALITY ignore TYPE ReportingGranularitykminus1 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus2  CRITICALITY ignore TYPE ReportingGranularitykminus2 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus3  CRITICALITY ignore TYPE ReportingGranularitykminus3 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus4  CRITICALITY ignore TYPE ReportingGranularitykminus4 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus5  CRITICALITY ignore TYPE ReportingGranularitykminus5 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus6  CRITICALITY ignore TYPE ReportingGranularitykminus6 PRESENCE mandatory},
    ...
}

-- 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,
    uE-Rx-Tx-Time-Diff
}

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  }|
    { ID id-UE-Rx-Tx-Time-Diff  CRITICALITY ignore  TYPE UE-Rx-Tx-Time-Diff PRESENCE optional   },
    ...
}

Mobile-TRP-LocationInformation ::= SEQUENCE {
    location-Information             OCTET STRING,
    velocity-Information             OCTET STRING    OPTIONAL,
```

```
      location-time-stamp                TimeStamp   OPTIONAL,
      iE-Extensions                      ProtocolExtensionContainer { { Mobile-TRP-LocationInformation-ExtIEs} } OPTIONAL,
      ...
}

Mobile-TRP-LocationInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
      ...
}

Mobile-IAB-MT-UE-ID ::= OCTET STRING

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 ::= {
      ...
}

MeasuredFrequencyHops ::= ENUMERATED {singleHop, multiHop, ...}

-- 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,
    posSibType1-4,
    posSibType6-5,
    posSibType6-6
}

PRSBWAggregationRequestIndication ::= ENUMERATED {true, ...}

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 ::= {
    { ID id-TxHoppingConfiguration  CRITICALITY ignore  EXTENSION TxHoppingConfiguration    PRESENCE optional},
    ...
}


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 ::= {
    { ID id-PosSRSResourceSet-Aggregation-List  CRITICALITY ignore EXTENSION PosSRSResourceSet-Aggregation-List    PRESENCE optional },
    ...
}

PosSRSResourceSet-Aggregation-List ::= SEQUENCE (SIZE (1.. maxnoaggregatedPosSRS-ResourceSets)) OF PosSRSResourceSet-Aggregation-Item


PosSRSResourceSet-Aggregation-Item ::= SEQUENCE {
    pointA            INTEGER (0..3279165),
    pCI-NR            INTEGER(0..1007)        OPTIONAL,
    possrsResourceSetID INTEGER(0..15),
    iE-Extensions        ProtocolExtensionContainer { { PosSRSResourceSet-Aggregation-Item-ExtIEs} } OPTIONAL,
    ...
}

PosSRSResourceSet-Aggregation-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                 PRS-ID,
    pRS-Resource-Set-IDPos    PRS-Resource-Set-ID,
    pRS-Resource-IDPos        PRS-Resource-ID 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 ::= {
    { ID id-ExtendedResourceSymbolOffset      CRITICALITY ignore EXTENSION ExtendedResourceSymbolOffset  PRESENCE optional},
    ...
}

ExtendedResourceSymbolOffset ::= INTEGER (0..13,...)

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,..., n128, n256, n512},
    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,...,n1},
    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 ::= {
```

```
    ...
}


PosValidityAreaCellList ::= SEQUENCE (SIZE (1..maxnoVACell)) OF PosValidityAreaCell-Item


PosValidityAreaCell-Item    ::= SEQUENCE {
    nR-CGI              CGI-NR,
    nR-PCI              NR-PCI     OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { PosValidityAreaCell-Item-ExtIEs} }   OPTIONAL,
    ...
}


PosValidityAreaCell-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}



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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,
```

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```
    ...
}


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 ::= {
    {ID id-ReportingGranularitykminus1AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus1AdditionalPath PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus2AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus2AdditionalPath PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus3AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus3AdditionalPath PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus4AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus4AdditionalPath PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus5AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus5AdditionalPath PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus6AdditionalPath    CRITICALITY ignore TYPE ReportingGranularitykminus6AdditionalPath PRESENCE mandatory},
    ...
}


RepetitionFactorExtended ::=  ENUMERATED {n3, n5, n6, n7, n8, n10, n12, n14, ...}


ReportCharacteristics ::= ENUMERATED {
    onDemand,
    periodic,
    ...
}


ReportingGranularitykminus1 ::= INTEGER(0..3940097)ReportingGranularitykminus2 ::= INTEGER(0..7880193)
ReportingGranularitykminus3 ::= INTEGER(0..15760385)
ReportingGranularitykminus4 ::= INTEGER(0..31520769)
ReportingGranularitykminus5 ::= INTEGER(0..63041537)
```

```
ReportingGranularitykminus6 ::= INTEGER(0..126083073)

ReportingGranularitykminus1AdditionalPath ::= INTEGER(0..32701)
ReportingGranularitykminus2AdditionalPath ::= INTEGER(0..65401)
ReportingGranularitykminus3AdditionalPath ::= INTEGER(0..130801)
ReportingGranularitykminus4AdditionalPath ::= INTEGER(0..261601)
ReportingGranularitykminus5AdditionalPath ::= INTEGER(0..523201)
ReportingGranularitykminus6AdditionalPath ::= INTEGER(0..1046401)


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 ::= {
    { ID id-PRSBWAggregationRequestIndication   CRITICALITY ignore  EXTENSION PRSBWAggregationRequestIndication PRESENCE optional},
    ...
}

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,..., n128, n256 ,n512}   OPTIONAL,
    resourceRepetitionFactor    ENUMERATED{rf1,rf2,rf4,rf6,rf8,rf16,rf32,...}        OPTIONAL,
    resourceNumberofSymbols     ENUMERATED{n2,n4,n6,n12,...,n1}                      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 }|
    { ID id-Bandwidth-Aggregation-Request-Indication   CRITICALITY ignore EXTENSION Bandwidth-Aggregation-Request-Indication  PRESENCE optional }|
    { ID id-PosValidityAreaCellList                 CRITICALITY ignore EXTENSION PosValidityAreaCellList                      PRESENCE optional }|
    { ID id-ValidityAreaSpecificSRSInformation      CRITICALITY ignore EXTENSION ValidityAreaSpecificSRSInformation          PRESENCE optional },
    ...
}


ResourceMapping ::= SEQUENCE {
    startPosition           INTEGER (0..13),
    nrofSumbols             ENUMERATED {n1, n2, n4, n8, n12},
    iE-Extensions       ProtocolExtensionContainer { { ResourceMapping-ExtIEs} }    OPTIONAL,
    ...
}

ResourceMapping-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}


RequestedSRSPreconfigurationCharacteristics-List  ::= SEQUENCE (SIZE (1..maxnoPreconfiguredSRS)) OF RequestedSRSPreconfigurationCharacteristics-
Item

RequestedSRSPreconfigurationCharacteristics-Item ::= SEQUENCE {
    requestedSRSTransmissionCharacteristics     RequestedSRSTransmissionCharacteristics,
    iE-Extensions           ProtocolExtensionContainer {{ RequestedSRSPreconfigurationCharacteristics-Item-ExtIEs}}     OPTIONAL,
    ...
}

RequestedSRSPreconfigurationCharacteristics-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}


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,
```

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```
    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 {
sRSPeriodicity          SRSPeriodicity,
offset               INTEGER(0..81919, ...),
    iE-Extensions        ProtocolExtensionContainer { { ResourceTypePeriodicPos-ExtIEs} }    OPTIONAL,
    ...
}

ResourceTypePeriodicPos-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResourceTypeSemi-persistentPos ::= SEQUENCE {
sRSPeriodicity          SRSPeriodicity,
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,
```

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```
    ...
}

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,
```

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```
    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,
    ...
}
```

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```
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-480 ::= INTEGER(0..319)
```

```
SCS-960 ::= INTEGER(0..639)


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)


SlotOffsetForRemainingHopsList ::= SEQUENCE (SIZE (1..maxnoofHopsMinusOne)) OF SlotOffsetForRemainingHopsItem


SlotOffsetForRemainingHopsItem ::= SEQUENCE {
    slotOffsetRemainingHops       SlotOffsetRemainingHops,
    iE-Extensions                 ProtocolExtensionContainer { { SlotOffsetForRemainingHopsItem-ExtIEs} } OPTIONAL,
    ...
}


SlotOffsetForRemainingHopsItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

SlotOffsetRemainingHops ::= CHOICE {
    aperiodic          SlotOffsetRemainingHopsAperiodic,
    semi-persistent    SlotOffsetRemainingHopsSemiPersistent,
    periodic           SlotOffsetRemainingHopsPeriodic,
    choice-extension        ProtocolIE-Single-Container {{ SlotOffsetRemainingHops-ExtIEs }}
}

SlotOffsetRemainingHops-ExtIEs NRPPA-PROTOCOL-IES ::= {
```

```
    ...
}

SlotOffsetRemainingHopsAperiodic ::= SEQUENCE {
    slotOffset          INTEGER (1..32)          OPTIONAL,
    startPosition       INTEGER (0..13)          OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { SlotOffsetRemainingHopsAperiodic-ExtIEs} } OPTIONAL,
    ...
}

SlotOffsetRemainingHopsAperiodic-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

SlotOffsetRemainingHopsSemiPersistent ::= SEQUENCE {
    sRSperiodicity      SRSPeriodicity,
    offset              INTEGER(0..81919, ...),
    iE-Extensions       ProtocolExtensionContainer { { SlotOffsetRemainingHopsSemiPersistent-ExtIEs} }  OPTIONAL,
    ...
}

SlotOffsetRemainingHopsSemiPersistent-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

SlotOffsetRemainingHopsPeriodic ::= SEQUENCE {
    sRSperiodicity      SRSPeriodicity,
    offset              INTEGER(0..81919, ...),
    iE-Extensions       ProtocolExtensionContainer { { SlotOffsetRemainingHopsSemiPeriodic-ExtIEs} } OPTIONAL,
    ...
}

SlotOffsetRemainingHopsSemiPeriodic-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}


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 {
    sRSResourceSetID1              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 ::= {
    ...
}


SymbolIndex ::= INTEGER (0..13)

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 ::= {
    ...
}

SRSReservationType::= ENUMERATED {reserve, release, ...}


SRSPreconfiguration-List  ::= SEQUENCE (SIZE (1.. maxnoPreconfiguredSRS)) OF SRSPreconfiguration-Item

SRSPreconfiguration-Item ::= SEQUENCE {
    sRSConfiguration        SRSConfiguration,
    posValidityAreaCellList PosValidityAreaCellList,
    iE-Extensions           ProtocolExtensionContainer {{ SRSPreconfiguration-Item-ExtIEs}}      OPTIONAL,
    ...
}

SRSPreconfiguration-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

SRSPeriodicity ::= 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}


-- 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 ::= {
    { ID id-SymbolIndex  CRITICALITY ignore     EXTENSION SymbolIndex   PRESENCE optional },
```

```
    ...
}

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 ::= {
    { ID id-SCS-480    CRITICALITY reject  TYPE SCS-480 PRESENCE mandatory}|
    { ID id-SCS-960    CRITICALITY reject  TYPE SCS-960 PRESENCE mandatory},

    ...
}

TimeWindowDurationMeasurement ::= CHOICE {
    durationSlots       ENUMERATED {n1, n2, n4, n6, n8, n12, n16, ...},
    choice-extension        ProtocolIE-Single-Container { { TimeWindowDurationMeasurement-ExtIEs} }
}

TimeWindowDurationMeasurement-ExtIEs NRPPA-PROTOCOL-IES ::= {
    ...
}

TimeWindowDurationSRS ::= CHOICE {
    durationSymbols     ENUMERATED {n1, n2, n4, n8, n12, ...},
    durationSlots       ENUMERATED {n1, n2, n4, n6, n8, n12, n16, ...},
    choice-extension        ProtocolIE-Single-Container { { TimeWindowDurationSRS-ExtIEs} }
}

TimeWindowDurationSRS-ExtIEs NRPPA-PROTOCOL-IES ::= {
    ...
}

TimeWindowPeriodicityMeasurement ::= ENUMERATED {ms160, ms320, ms640, ms1280, ms2560, ms5120, ms10240, ms20480, ms40960, ms61440, ms81920,
ms368640, ms737280, ms1843200, ...}

TimeWindowPeriodicitySRS ::= ENUMERATED {ms0dot125, ms0dot25, ms0dot5, ms0dot625, ms1, ms1dot25, ms2, ms2dot5, ms4, ms5, ms8, ms10, ms16, ms20,
ms32, ms40, ms64, ms80, ms160, ms320, ms640, ms1280, ms2560, ms5120, ms10240, ...}

TimeWindowStartSRS ::= SEQUENCE {
    systemFrameNumber       SystemFrameNumber,
    slotNumber              SlotNumber,
    symbolIndex             INTEGER (0..13),
    iE-Extension            ProtocolExtensionContainer { { TimeWindowStartSRS-ExtIEs} } OPTIONAL,
    ...
}

TimeWindowStartSRS-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}
```

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```
TimingReportingGranularityFactorExtended ::=INTEGER(-6..-1, ...)

TimeWindowInformation-Measurement-List ::= SEQUENCE (SIZE (1.. maxnoofTimeWindowMeas)) OF TimeWindowInformation-Measurement-Item

TimeWindowInformation-Measurement-Item ::= SEQUENCE {
    timeWindowDurationMeasurement       TimeWindowDurationMeasurement,
    timeWindowType                      ENUMERATED {single, periodic, ...},
    timeWindowPeriodicityMeasurement    TimeWindowPeriodicityMeasurement       OPTIONAL,
    iE-Extension            ProtocolExtensionContainer { { TimeWindowInformation-Measurement-Item-ExtIEs} }  OPTIONAL,
    ...
}

TimeWindowInformation-Measurement-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

TimeWindowInformation-SRS-List ::= SEQUENCE (SIZE (1.. maxnoofTimeWindowSRS)) OF TimeWindowInformation-SRS-Item

TimeWindowInformation-SRS-Item ::= SEQUENCE {
    timeWindowStartSRS              TimeWindowStartSRS,
    timeWindowDurationSRS           TimeWindowDurationSRS,
    timeWindowType                  ENUMERATED {single, periodic, ...},
    timeWindowPeriodicitySRS        TimeWindowPeriodicitySRS                OPTIONAL,
    iE-Extension            ProtocolExtensionContainer { { TimeWindowInformation-SRS-Item-ExtIEs} } OPTIONAL,
    ...
}

TimeWindowInformation-SRS-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}



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 ::= {
    ...
}
```

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```
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        TRPMeasurementType,
```

```
    timingReportingGranularityFactor    INTEGER (0..5) OPTIONAL,
    iE-Extensions             ProtocolExtensionContainer {{ TRPMeasurementQuantitiesList-Item-ExtIEs}}    OPTIONAL,
    ...
}

TRPMeasurementQuantitiesList-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    {ID id-TimingReportingGranularityFactorExtended CRITICALITY ignore EXTENSION TimingReportingGranularityFactorExtended PRESENCE optional},
    ...
}

TRPMeasurementType::= ENUMERATED {
    gNB-RxTxTimeDiff,
    uL-SRS-RSRP,
    uL-AoA,
    uL-RTOA,
    ...,
    multiple-UL-AoA,
    uL-SRS-RSRPP,
    ul-RSCP
}

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 }|
    { ID id-Mobile-TRP-LocationInformation  CRITICALITY ignore EXTENSION Mobile-TRP-LocationInformation PRESENCE optional }|
    { ID id-MeasuredFrequencyHops         CRITICALITY ignore EXTENSION MeasuredFrequencyHops          PRESENCE optional }|
    { ID id-AggregatedPosSRSResourceID-List CRITICALITY ignore EXTENSION AggregatedPosSRSResourceID-List  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}|
    { ID id-UL-RSCPMeas     CRITICALITY reject TYPE UL-RSCPMeas PRESENCE mandatory},
```

```
    ...
}

TrpMeasurementQuality ::= CHOICE {
    timingMeasQuality       TrpMeasurementTimingQuality,
    angleMeasQuality        TrpMeasurementAngleQuality,
    choice-Extension        ProtocolIE-Single-Container {{ TrpMeasurementQuality-ExtIEs}}

}

TrpMeasurementQuality-ExtIEs NRPPA-PROTOCOL-IES ::= {
    {ID id-TRPPhaseQuality  CRITICALITY ignore TYPE TRPPhaseQuality PRESENCE mandatory },
    ...
}

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 ::= {
    ...
}

TRPPhaseQuality ::= SEQUENCE {
    phaseQualityIndex   INTEGER(0..179),
    resolution              ENUMERATED {deg0dot1, deg1, ...},
    iE-extensions           ProtocolExtensionContainer { { TRPPhaseQuality-ExtIEs } } OPTIONAL,
    ...
}

TRPPhaseQuality-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 ::= {
    { ID id-Mobile-IAB-MT-UE-ID        CRITICALITY reject EXTENSION Mobile-IAB-MT-UE-ID        PRESENCE optional},
--This IE shall be present if the TRP type IE is set to the value "mobile trp"
    ...
}

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 }|
    { ID id-Mobile-TRP-LocationInformation  CRITICALITY ignore TYPE Mobile-TRP-LocationInformation   PRESENCE mandatory }|
    { ID id-CommonTAParameters         CRITICALITY reject TYPE CommonTAParameters           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,
        mobile-trp-location-info,
        commonTA
}

TRPList ::= SEQUENCE (SIZE(1.. maxnoTRPs)) OF TRPItem

TRPItem ::= SEQUENCE {
    tRP-ID       TRP-ID,
    iE-Extensions   ProtocolExtensionContainer { {TRPItem-ExtIEs} } OPTIONAL,
        ...
}

TRPItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    { ID id-PRSBWAggregationRequestIndication   CRITICALITY ignore  EXTENSION PRSBWAggregationRequestIndication PRESENCE optional},
        ...
}

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 ::= {
```

ETSI

```
    ...
}


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,
    ...,
    mobile-trp
}
```

ETSI

```
TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

TxHoppingConfiguration ::= SEQUENCE {
    overlapValue                        ENUMERATED {rb0, rb1, rb2, rb4},
    numberOfHops                        INTEGER (1..6),
    slotOffsetForRemainingHopsList      SlotOffsetForRemainingHopsList,
    iE-extensions       ProtocolExtensionContainer { { TxHoppingConfiguration-ExtIEs } }    OPTIONAL,
    ...
}

TxHoppingConfiguration-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}



-- 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-Rx-Tx-Time-Diff ::= INTEGER (0..61565)

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},
     ...
```

```
}

UL-RSCPMeas ::= SEQUENCE {
    uLRSCP              INTEGER (0..3599),
    iE-extensions       ProtocolExtensionContainer { { UL-RSCPMeas-ExtIEs } }   OPTIONAL,
    ...
}

UL-RSCPMeas-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}


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 ::= {
    {ID id-ReportingGranularitykminus1  CRITICALITY ignore TYPE ReportingGranularitykminus1 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus2  CRITICALITY ignore TYPE ReportingGranularitykminus2 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus3  CRITICALITY ignore TYPE ReportingGranularitykminus3 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus4  CRITICALITY ignore TYPE ReportingGranularitykminus4 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus5  CRITICALITY ignore TYPE ReportingGranularitykminus5 PRESENCE mandatory}|
    {ID id-ReportingGranularitykminus6  CRITICALITY ignore TYPE ReportingGranularitykminus6 PRESENCE mandatory},
    ...
}

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)


ValidityAreaSpecificSRSInformation ::= SEQUENCE {
    transmissionCombPos          TransmissionCombPos    OPTIONAL,
    resourceMapping              ResourceMapping        OPTIONAL,
    freqDomainShift              INTEGER (0..268)       OPTIONAL,
    c-SRS                        INTEGER (0..63)        OPTIONAL,
    resourceTypePos              ResourceTypePos        OPTIONAL,
    sequenceIDPos                INTEGER (0..65535)     OPTIONAL,
    iE-extensions      ProtocolExtensionContainer { { ValidityAreaSpecificSRSInformation-ExtIEs } } OPTIONAL,
    ...
}


ValidityAreaSpecificSRSInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}



-- 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,
```

ETSI

```
    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
id-sRSInformationReservationNotification                ProcedureCode ::= 22
```

```
-- **************************************************************
--
-- 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
maxnoVACell                                         INTEGER ::= 32
maxnoaggregatedPosSRS-Resources                     INTEGER ::= 3
maxnoaggregatedPosSRS-ResourceSets                  INTEGER ::= 48
maxnoAggPosPRSResourceSets                          INTEGER ::= 3
maxnoofTimeWindowSRS                                INTEGER ::= 16
maxnoofTimeWindowMeas                               INTEGER ::= 16
maxnoPreconfiguredSRS                               INTEGER ::= 16
maxnoofHopsMinusOne                                 INTEGER ::= 5




-- ************************************************************
--
-- 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
id-ExtendedResourceSymbolOffset                            ProtocolIE-ID ::= 112
id-NewNRCGI                                                ProtocolIE-ID ::= 113
id-Mobile-TRP-LocationInformation                          ProtocolIE-ID ::= 114
id-Mobile-IAB-MT-UE-ID                                     ProtocolIE-ID ::= 115
id-MobileAccessPointLocation                               ProtocolIE-ID ::= 116
id-CommonTAParameters                                      ProtocolIE-ID ::= 117
id-UE-Rx-Tx-Time-Diff                                      ProtocolIE-ID ::= 118
id-SCS-480                                                 ProtocolIE-ID ::= 119
id-SCS-960                                                 ProtocolIE-ID ::= 120
id-Bandwidth-Aggregation-Request-Indication                ProtocolIE-ID ::= 121
id-PosSRSResourceSet-Aggregation-List                      ProtocolIE-ID ::= 122
id-TimingReportingGranularityFactorExtended                ProtocolIE-ID ::= 123
id-TimeWindowInformation-SRS-List                          ProtocolIE-ID ::= 124
id-TimeWindowInformation-Measurement-List                  ProtocolIE-ID ::= 125
id-UL-RSCPMeas                                             ProtocolIE-ID ::= 126
id-SymbolIndex                                             ProtocolIE-ID ::= 127
id-PosValidityAreaCellList                                 ProtocolIE-ID ::= 128
id-SRSReservationType                                      ProtocolIE-ID ::= 129
id-PRSBWAggregationRequestIndication                       ProtocolIE-ID ::= 130
id-AggregatedPosSRSResourceID-List                         ProtocolIE-ID ::= 131
id-AggregatedPRSResourceSetList                            ProtocolIE-ID ::= 132
id-TRPPhaseQuality                                         ProtocolIE-ID ::= 133
id-NewCellIdentity                                         ProtocolIE-ID ::= 134
id-ValidityAreaSpecificSRSInformation                      ProtocolIE-ID ::= 135
id-RequestedSRSPreconfigurationCharacteristics-List        ProtocolIE-ID ::= 136
id-SRSPreconfiguration-List                                ProtocolIE-ID ::= 137
id-SRSInformation                                          ProtocolIE-ID ::= 138
id-TxHoppingConfiguration                                  ProtocolIE-ID ::= 139
id-MeasuredFrequencyHops                                   ProtocolIE-ID ::= 140
id-ReportingGranularitykminus1                             ProtocolIE-ID ::= 141
id-ReportingGranularitykminus2                             ProtocolIE-ID ::= 142
```

```
id-ReportingGranularitykminus3                              ProtocolIE-ID ::= 143
id-ReportingGranularitykminus4                              ProtocolIE-ID ::= 144
id-ReportingGranularitykminus5                              ProtocolIE-ID ::= 145
id-ReportingGranularitykminus6                              ProtocolIE-ID ::= 146
id-ReportingGranularitykminus1AdditionalPath                ProtocolIE-ID ::= 147
id-ReportingGranularitykminus2AdditionalPath                ProtocolIE-ID ::= 148
id-ReportingGranularitykminus3AdditionalPath                ProtocolIE-ID ::= 149
id-ReportingGranularitykminus4AdditionalPath                ProtocolIE-ID ::= 150
id-ReportingGranularitykminus5AdditionalPath                ProtocolIE-ID ::= 151
id-ReportingGranularitykminus6AdditionalPath                ProtocolIE-ID ::= 152



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	17.1.1

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
						- oTDOACell-Information-Item-Extension -> choice-Extension - otherRATMeasuredResultsValue-Extension -> choice-Extension - pRSMutingConfiguration-EUTRA-Extension -> choice-Extension	
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
2023-12	RAN#102	RP-233850	0116	-	A	Correction of NR E-CID for OnDemand measurements	17.6.0
2023-12	RAN#102	RP-233850	0118	-	F	Correction to NRPPa for the misalignment on DL PRS	17.6.0
2023-12	RAN#102	RP-233834	0101	9	B	Support for mobile TRP Location Information	18.0.0
2023-12	RAN#102	RP-233845	0102	3	B	Support 1-symbol PRS [1symbol_PRS]	18.0.0
2023-12	RAN#102	RP-233845	0109	3	B	Support of Inactive Positioning in SDT without UE context relocation case [POS_SDT]	18.0.0
2023-12	RAN#102	RP-233827	0125	1	B	Introduction of Common TA Parameters for NR NTN	18.0.0
2024-03	RAN#103	RP-240620	0113	7	B	Support of NR Positioning Enhancements	18.1.0
2024-03	RAN#103	RP-240646	0124	3	F	Introduction of NR UE Rx-Tx time difference measurement in NR UL E-CID	18.1.0
2024-03	RAN#103	RP-240637	0126	2	F	Clarify the Assigned Criticality for mobile IAB related IE	18.1.0
2024-03	RAN#103	RP-240637	0127	-	F	Correction on mobile TRP location information	18.1.0
2024-03	RAN#103	RP-240617	0132	1	D	NRPPa Rapporteur corrections	18.1.0
2024-03	RAN#103	RP-240642	0138	-	A	Correction on Time Stamp and FR2	18.1.0

History

Document history		
V18.1.0	May 2024	Publication