



**5G;
NG-RAN;
NR Positioning Protocol A (NRPPa)
(3GPP TS 38.455 version 18.6.0 Release 18)**



ReferenceRTS/TSGR-0338455vi60

Keywords5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards](#) application.

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver](#) repository.

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2025.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the [ETSI IPR online database](#).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found at [3GPP to ETSI numbering cross-referencing](#).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	8
1 Scope	9
2 References	9
3 Definitions, symbols and abbreviations	10
3.1 Definitions	10
3.2 Symbols.....	10
3.3 Abbreviations	10
4 General	11
4.1 Procedure specification principles.....	11
4.2 Forwards and backwards compatibility	11
4.3 Specification notations	11
5 NRPPa services	12
5.1 NRPPa procedure modules.....	12
5.2 Parallel transactions.....	12
6 Services expected from lower layer	12
7 Functions of NRPPa	12
8 NRPPa procedures.....	13
8.1 Elementary procedures	13
8.2 Location Information Transfer Procedures.....	14
8.2.1 E-CID Measurement Initiation	14
8.2.1.1 General	14
8.2.1.2 Successful Operation.....	15
8.2.1.3 Unsuccessful Operation	15
8.2.1.4 Abnormal Conditions	16
8.2.2 E-CID Measurement Failure Indication.....	16
8.2.2.1 General	16
8.2.2.2 Successful Operation.....	16
8.2.2.3 Unsuccessful Operation	16
8.2.2.4 Abnormal Conditions	16
8.2.3 E-CID Measurement Report	16
8.2.3.1 General	16
8.2.3.2 Successful Operation.....	16
8.2.3.3 Unsuccessful Operation	17
8.2.3.4 Abnormal Conditions	17
8.2.4 E-CID Measurement Termination	17
8.2.4.1 General	17
8.2.4.2 Successful Operation.....	17
8.2.4.3 Unsuccessful Operation	17
8.2.4.4 Abnormal Conditions	17
8.2.5 OTDOA Information Exchange.....	18
8.2.5.1 General	18
8.2.5.2 Successful Operation.....	18
8.2.5.3 Unsuccessful Operation	18
8.2.5.4 Abnormal Conditions	18
8.2.6 Positioning Information Exchange	18
8.2.6.1 General	18
8.2.6.2 Successful Operation.....	19
8.2.6.3 Unsuccessful Operation	20

8.2.6.4	Abnormal Conditions	20
8.2.7	Positioning Information Update.....	20
8.2.7.1	General	20
8.2.7.2	Successful Operation.....	20
8.2.7.3	Unsuccessful Operation	21
8.2.7.4	Abnormal Conditions	21
8.2.8	TRP Information Exchange	21
8.2.8.1	General	21
8.2.8.2	Successful Operation.....	21
8.2.8.3	Unsuccessful Operation	22
8.2.8.4	Abnormal Conditions	22
8.2.9	Positioning Activation	22
8.2.9.1	General	22
8.2.9.2	Successful Operation.....	22
8.2.9.3	Unsuccessful Operation	23
8.2.9.4	Abnormal Conditions	23
8.2.10	Positioning Deactivation.....	23
8.2.10.1	General	23
8.2.10.2	Successful Operation.....	24
8.2.10.3	Unsuccessful Operation	24
8.2.10.4	Abnormal Conditions	24
8.2.11	PRS Configuration Exchange	24
8.2.11.1	General	24
8.2.11.2	Successful Operation.....	24
8.2.11.3	Unsuccessful Operation	25
8.2.11.4	Abnormal Conditions	25
8.2.12	Measurement Preconfiguration.....	25
8.2.12.1	General	25
8.2.12.2	Successful Operation.....	25
8.2.12.3	Unsuccessful Operation	26
8.2.12.4	Abnormal Conditions	26
8.2.13	Measurement Activation.....	26
8.2.13.1	General	26
8.2.13.2	Successful Operation.....	26
8.2.13.3	Unsuccessful Operation	26
8.2.13.4	Abnormal Conditions	26
8.2.14	SRS Information Reservation Notification.....	27
8.2.14.1	General	27
8.2.14.2	Successful Operation.....	27
8.2.14.3	Unsuccessful Operation	27
8.2.14.4	Abnormal Conditions	27
8.3	Management Procedures	27
8.3.1	Error Indication.....	27
8.3.1.1	General	27
8.3.1.2	Successful Operation.....	28
8.3.1.3	Abnormal Conditions	28
8.4	Assistance Information Transfer Procedures.....	28
8.4.1	Assistance Information Control	28
8.4.1.1	General	28
8.4.1.2	Successful Operation.....	28
8.4.1.3	Abnormal Conditions	29
8.4.2	Assistance Information Feedback.....	29
8.4.2.1	General	29
8.4.2.2	Successful Operation.....	29
8.4.2.3	Abnormal Conditions	29
8.5	Measurement Information Transfer.....	30
8.5.1	Measurement.....	30
8.5.1.1	General	30
8.5.1.2	Successful Operation.....	30
8.5.1.3	Unsuccessful Operation	31
8.5.1.4	Abnormal Conditions	31
8.5.2	Measurement Report.....	31

8.5.2.1	General	31
8.5.2.2	Successful Operation.....	32
8.5.2.3	Abnormal Conditions	32
8.5.3	Measurement Update	32
8.5.3.1	General	32
8.5.3.2	Successful Operation.....	32
8.5.3.3	Unsuccessful Operation	33
8.5.3.4	Abnormal Conditions	33
8.5.4	Measurement Abort	33
8.5.4.1	General	33
8.5.4.2	Successful Operation.....	33
8.5.4.3	Unsuccessful Operation	33
8.5.4.4	Abnormal Conditions	33
8.5.5	Measurement Failure Indication	33
8.5.5.1	General	33
8.5.5.2	Successful Operation.....	34
8.5.5.3	Abnormal Conditions	34
9	Elements for NRPPa Communication	34
9.0	General	34
9.1	Message Functional Definition and Content	34
9.1.1	Messages for Location Information Transfer Procedures	34
9.1.1.1	E-CID MEASUREMENT INITIATION REQUEST	34
9.1.1.2	E-CID MEASUREMENT INITIATION RESPONSE	36
9.1.1.3	E-CID MEASUREMENT INITIATION FAILURE	36
9.1.1.4	E-CID MEASUREMENT FAILURE INDICATION.....	36
9.1.1.5	E-CID MEASUREMENT REPORT	37
9.1.1.6	E-CID MEASUREMENT TERMINATION COMMAND	37
9.1.1.7	OTDOA INFORMATION REQUEST	37
9.1.1.8	OTDOA INFORMATION RESPONSE	38
9.1.1.9	OTDOA INFORMATION FAILURE	39
9.1.1.10	POSITIONING INFORMATION REQUEST.....	39
9.1.1.11	POSITIONING INFORMATION RESPONSE.....	39
9.1.1.12	POSITIONING INFORMATION FAILURE	40
9.1.1.13	POSITIONING INFORMATION UPDATE	40
9.1.1.14	TRP INFORMATION REQUEST.....	40
9.1.1.15	TRP INFORMATION RESPONSE.....	41
9.1.1.16	TRP INFORMATION FAILURE.....	41
9.1.1.17	POSITIONING ACTIVATION REQUEST	42
9.1.1.18	POSITIONING ACTIVATION RESPONSE	42
9.1.1.19	POSITIONING ACTIVATION FAILURE	43
9.1.1.20	POSITIONING DEACTIVATION.....	43
9.1.1.21	PRS CONFIGURATION REQUEST	43
9.1.1.22	PRS CONFIGURATION RESPONSE	44
9.1.1.23	PRS CONFIGURATION FAILURE	44
9.1.1.24	MEASUREMENT PRECONFIGURATION REQUIRED	45
9.1.1.25	MEASUREMENT PRECONFIGURATION CONFIRM	45
9.1.1.26	MEASUREMENT PRECONFIGURATION REFUSE.....	46
9.1.1.27	MEASUREMENT ACTIVATION.....	46
9.1.1.28	SRS INFORMATION RESERVATION NOTIFICATION	46
9.1.2	Messages for Management Procedures	47
9.1.2.1	ERROR INDICATION	47
9.1.3	Messages for Assistance Information Transfer Procedures	47
9.1.3.1	ASSISTANCE INFORMATION CONTROL	47
9.1.3.2	ASSISTANCE INFORMATION FEEDBACK.....	47
9.1.4	Messages for Measurement Information Transfer Procedures	48
9.1.4.1	MEASUREMENT REQUEST	48
9.1.4.2	MEASUREMENT RESPONSE	50
9.1.4.3	MEASUREMENT FAILURE.....	51
9.1.4.4	MEASUREMENT REPORT	51
9.1.4.5	MEASUREMENT UPDATE.....	51
9.1.4.6	MEASUREMENT ABORT	52

9.1.4.7	MEASUREMENT FAILURE INDICATION	52
9.2	Information Element definitions.....	53
9.2.0	General.....	53
9.2.1	Cause	53
9.2.2	Criticality Diagnostics	54
9.2.3	Message Type	55
9.2.4	NRPPa Transaction ID.....	55
9.2.5	E-CID Measurement Result	55
9.2.6	NG-RAN CGI.....	59
9.2.7	CGI EUTRA	59
9.2.8	PLMN Identity	59
9.2.9	NR CGI.....	60
9.2.10	NG-RAN Access Point Position	60
9.2.11	TAC	61
9.2.12	Cell Portion ID.....	61
9.2.13	Other-RAT Measurement Result	61
9.2.14	WLAN Measurement Result.....	63
9.2.15	OTDOA Cell Information.....	63
9.2.16	PRS Muting Configuration EUTRA	66
9.2.17	PRS Frequency Hopping Configuration EUTRA	66
9.2.18	TDD Configuration EUTRA.....	67
9.2.19	Assistance Information	67
9.2.20	PosSIB Segments.....	67
9.2.21	Assistance Information Meta Data.....	68
9.2.22	Positioning SIB Type.....	68
9.2.23	Assistance Information Failure List.....	69
9.2.24	TRP ID.....	69
9.2.25	TRP Information.....	69
9.2.26	Search Window Information.....	70
9.2.27	Requested SRS Transmission Characteristics.....	71
9.2.28	SRS Configuration.....	73
9.2.29	SRS Resource	75
9.2.30	Positioning SRS Resource	76
9.2.31	SRS Resource Set	77
9.2.32	Positioning SRS Resource Set	78
9.2.33	SRS Resource Set ID	78
9.2.34	Spatial Relation Information.....	78
9.2.35	SRS Resource Trigger	79
9.2.36	Relative Time 1900.....	79
9.2.37	TRP Measurement Result	80
9.2.38	UL Angle of Arrival	81
9.2.39	UL RTOA Measurement	81
9.2.40	gNB Rx-Tx Time Difference	82
9.2.41	Additional Path List	83
9.2.42	Time Stamp.....	83
9.2.43	Measurement Quality.....	84
9.2.44	PRS Configuration.....	84
9.2.45	Spatial Direction Information	86
9.2.46	Geographical Coordinates.....	86
9.2.47	DL-PRS Resource Coordinates.....	87
9.2.48	Relative Geodetic Location.....	88
9.2.49	NG-RAN High Accuracy Access Point Position	88
9.2.50	Relative Cartesian Location	89
9.2.51	Reference Point.....	89
9.2.52	Location Uncertainty	90
9.2.53	Pathloss Reference Information.....	90
9.2.54	SSB Information	91
9.2.55	SSB Time/Frequency Configuration.....	91
9.2.56	DL-PRS Muting Pattern.....	91
9.2.57	Measurement Beam Information	92
9.2.58	NR-PRS Beam Information	92
9.2.59	Positioning Broadcast Cells	93

9.2.60	Spatial Relation Information per SRS Resource	93
9.2.61	Requested DL PRS Transmission Characteristics	94
9.2.62	Requested DL-PRS Resource List	94
9.2.63	Start Time and Duration	95
9.2.64	PRS Transmission Off Information	95
9.2.65	On-demand PRS TRP Information	96
9.2.66	UL-AoA assistance information	97
9.2.67	Z-AoA	98
9.2.68	Response Time	98
9.2.69	LCS to GCS Translation	98
9.2.70	UE Reporting Information	98
9.2.71	Multiple UL-AoA	99
9.2.72	UL SRS-RSRPP	99
9.2.73	SRS Resource type	100
9.2.74	Extended Additional Path List	100
9.2.75	ARP ID	101
9.2.76	ARP Location Information	101
9.2.77	LoS/NLoS Information	101
9.2.78	UE Tx TEG Association List	101
9.2.79	TRP Tx TEG Association	102
9.2.80	TRP TEG Information	102
9.2.81	Measurement Characteristics Request Indicator	103
9.2.82	TRP Beam Antenna Information	104
9.2.83	TRP Beam Antenna Angles	105
9.2.84	Timing Error Margin	106
9.2.85	TRP Rx TEG Information	106
9.2.86	TRP Tx TEG Information	106
9.2.87	TRP RxTx TEG Information	107
9.2.88	Mobile TRP Location Information	107
9.2.89	Common TA Parameters	107
9.2.90	Time Window Information SRS List	107
9.2.91	Time Window Information Measurement List	108
9.2.92	UL RSCP	109
9.2.93	Positioning Validity Area Cell List	109
9.2.94	Aggregated Positioning SRS Resource Set List	109
9.2.95	Aggregated PRS Resource Set List	110
9.2.96	Validity Area Specific SRS Information	110
9.2.97	Requested SRS Preconfiguration Characteristics List	111
9.2.98	SRS Preconfiguration List	112
9.2.99	SRS Periodicity	112
9.2.100	Tx Hopping Configuration	112
9.2.101	PRS Bandwidth Aggregation Request Information List	113
9.2.102	Validity Area Specific SRS Information Extended	114
9.3	Message and Information Element Abstract Syntax (with ASN.1)	115
9.3.1	General	115
9.3.2	Usage of Private Message Mechanism for Non-standard Use	115
9.3.3	Elementary Procedure Definitions	115
9.3.4	PDU Definitions	122
9.3.5	Information Element definitions	141
9.3.6	Common definitions	212
9.3.7	Constant definitions	213
9.3.8	Container definitions	218
9.4	Message transfer syntax	222
9.5	Timers	222
10	Handling of unknown, unforeseen and erroneous protocol data	222
Annex A (informative):	Change history	223
History		225

Foreword

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

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

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

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

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
- [3] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".
- [4] Void.
- [5] 3GPP TR 25.921 (version.7.0.0): "Guidelines and principles for protocol description and error handling".
- [6] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER) ".
- [7] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Base Station (BS) radio transmission and reception".
- [8] 3GPP TS 23.032: "Technical Specification Group Services and System Aspects; Universal Geographical Area Description (GAD)".
- [9] 3GPP TS 36.133: "Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management".
- [10] 3GPP TS 36.211: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Physical Channels and Modulation".
- [11] IEEE Std 802.11™-2012, IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area network.
- [12] 3GPP TS 36.455: " Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa)".
- [13] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".
- [14] 3GPP TS 37.355: " Technical Specification Group Radio Access Network; LTE Positioning Protocol (LPP)".
- [15] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".
- [16] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".
- [17] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer (PHY); Measurements".

- [18] 3GPP TS 38.305: "NG Radio Access Network (NG-RAN); Stage 2 functional specification of User Equipment (UE) positioning in NG-RAN".
- [19] 3GPP TS 38.215: "NR; Physical layer (PHY); Measurements".
- [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 <i>Information Element Name</i> 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. <i>Cause</i> 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

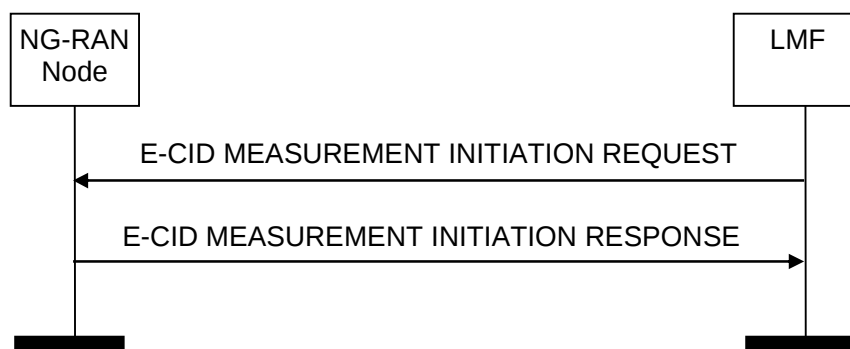


Figure 8.2.1.2-1: E-CID Measurement Initiation procedure, successful operation

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

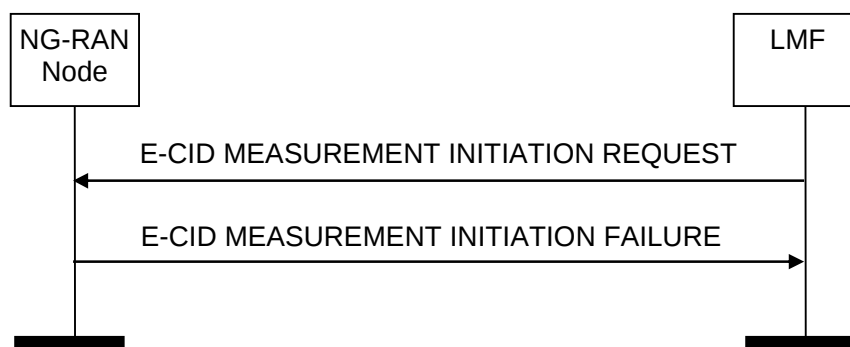


Figure 8.2.1.3-1: E-CID Measurement Initiation procedure, unsuccessful operation

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

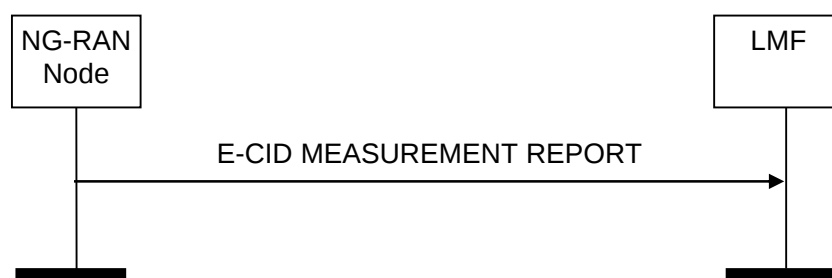


Figure 8.2.3.2-1: E-CID Measurement Report procedure, successful operation

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

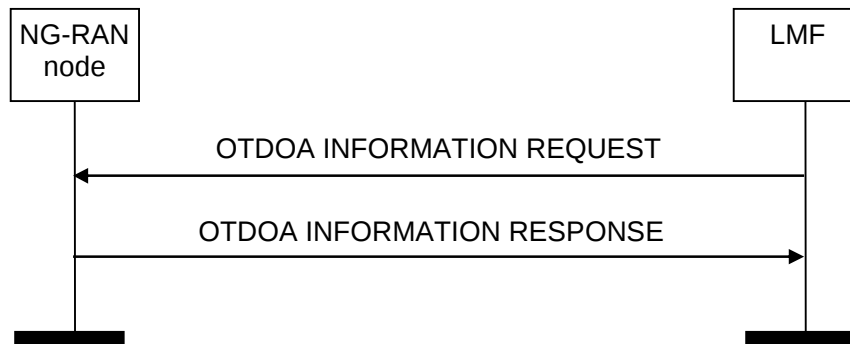


Figure 8.2.5.2-1: OTDOA Information Exchange procedure, successful operation

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

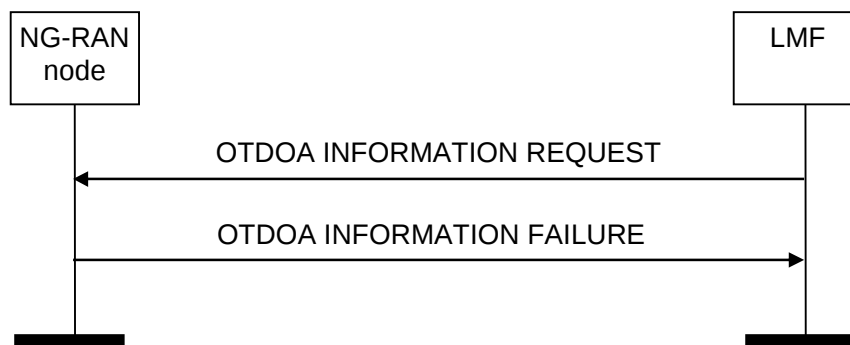


Figure 8.2.5.3-1: OTDOA Information Exchange procedure, unsuccessful operation

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

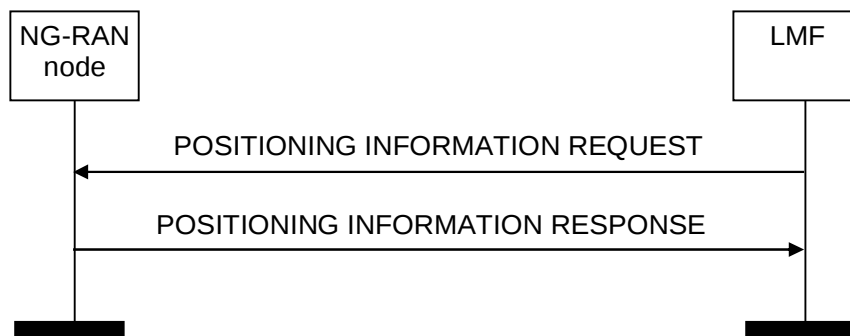


Figure 8.2.6.2-1: Positioning Information Exchange procedure, successful operation

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 validity area, and it shall, if supported, 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.

If the *Remote UE-Indication Request* IE is included in the POSITIONING INFORMATION REQUEST message, the NG-RAN node shall, if supported, include the *Remote UE-Indication* IE in the POSITIONING INFORMATION RESPONSE message. If the *Remote UE-Indication* IE is set to "L2 U2N Remote", the LMF shall consider that the configured UE operates as a Layer 2 UE-to-Network Remote UE.

8.2.6.3 Unsuccessful Operation

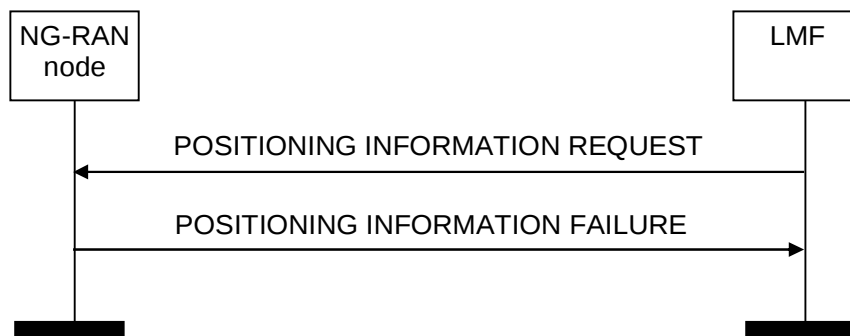


Figure 8.2.6.3-1: Positioning Information Exchange procedure, unsuccessful operation

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

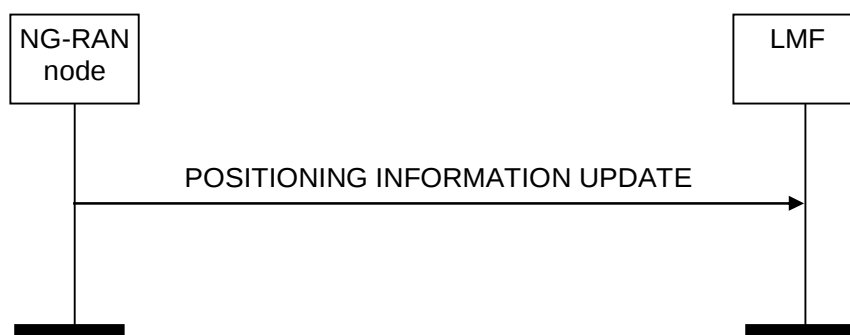


Figure 8.2.7.2-1: Positioning Information Update procedure, successful operation

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 *SRS Transmission Status* IE is set to "area-specific SRS activated", the LMF shall consider the area-specific (pre-)configured SRS is activated in the current serving cell.

If the *Remote UE Status* IE is included in the POSITIONING INFORMATION UPDATE message and set to "L2 U2N Remote", the LMF shall consider that the UE is operating as a Layer 2 UE-to-Network Remote UE. If the *Remote UE Status* IE is set to "no", the LMF shall consider that the UE is not operating as a Layer 2 UE-to-Network Remote UE..

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

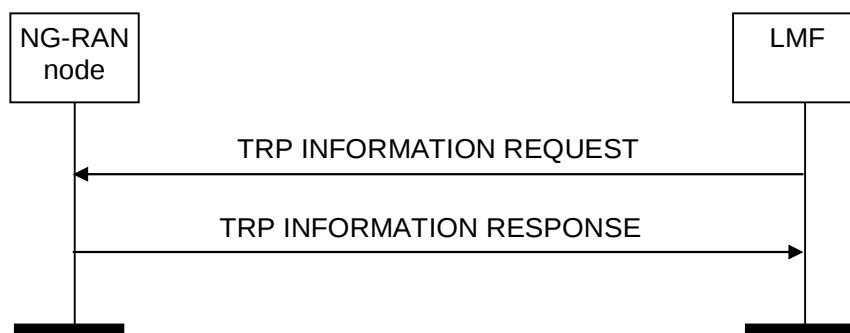


Figure 8.2.8.2-1: TRP Information Exchange procedure, successful operation

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 *Aggregated PRS Resource Set List* IE is included in the *PRS Configuration* IE in the TRP INFORMATION RESPONSE message, the LMF may take it into account as the PRS resource sets linked for PRS bandwidth aggregation.

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

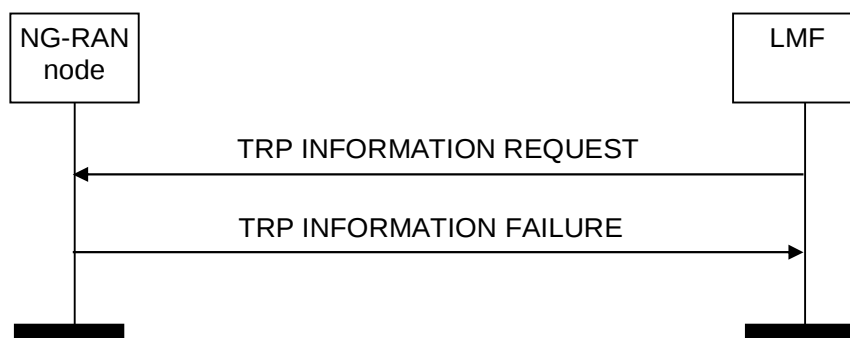


Figure 8.2.8.3-1: TRP Information Exchange procedure, unsuccessful operation

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

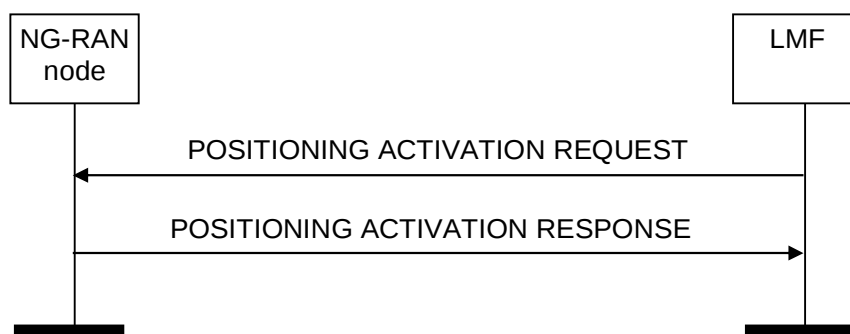


Figure 8.2.9.2-1: Positioning Activation procedure, successful operation

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.

If the *Aggregated Positioning SRS Resource Set List* IE is included in POSITIONING ACTIVATION REQUEST message and SRS bandwidth aggregation is configured in the UE, the NG-RAN node shall, if supported, activate the indicated SRS resource set(s) in the UE.

8.2.9.3 Unsuccessful Operation

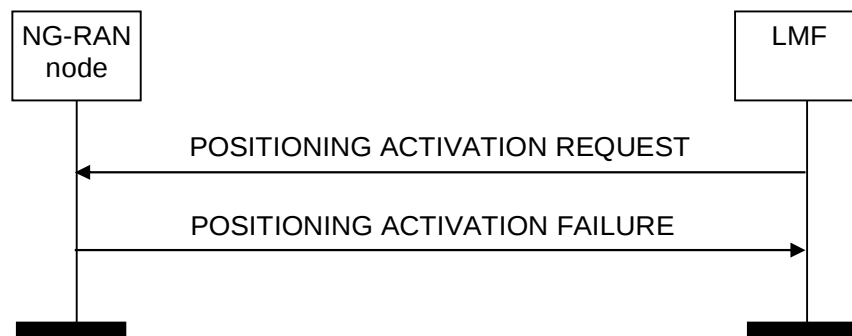


Figure 8.2.9.3-1: Positioning Activation procedure, unsuccessful operation

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(s) 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

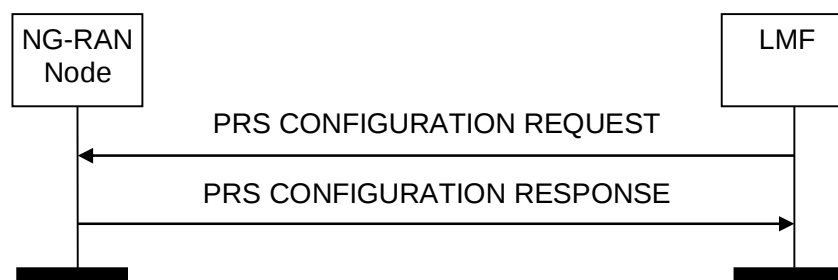


Figure 8.2.11.2-1: PRS Configuration Exchange procedure, successful operation

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

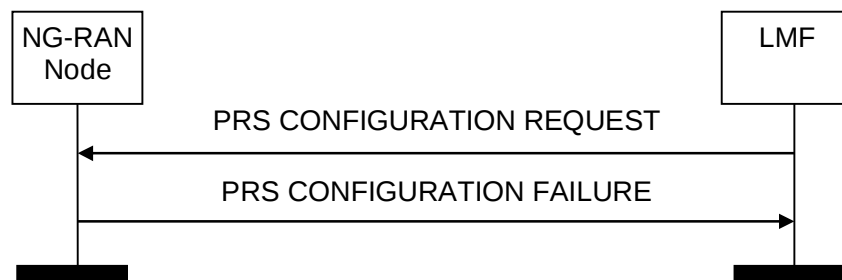


Figure 8.2.11.3-1: PRS Configuration Exchange procedure, unsuccessful operation

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

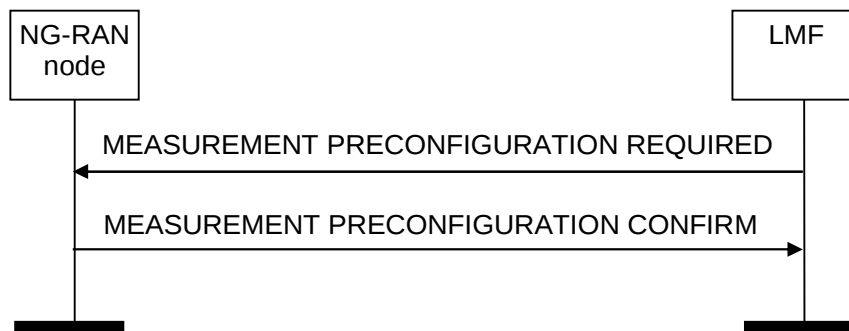


Figure 8.2.12.2-1: Measurement Preconfiguration procedure, successful operation

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

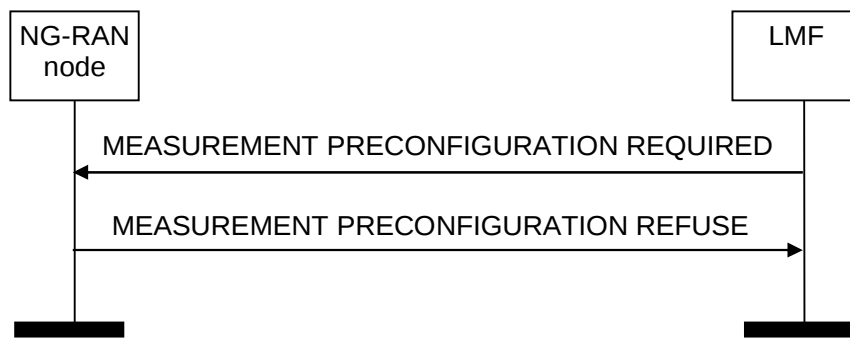


Figure 8.2.12.3-1: Measurement Preconfiguration procedure, unsuccessful operation

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 (preconfigured) SRS information in the cells indicated 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 (preconfigured) 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

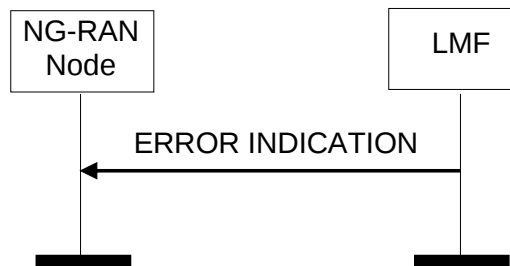


Figure 8.3.1.2-1: Error Indication procedure, LMF originated, successful operation

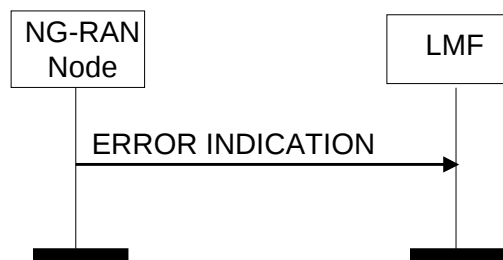


Figure 8.3.1.2-2: Error Indication procedure, NG-RAN node originated, successful operation

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 replace any previously received assistance information with the newly received information, and use the newly 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 Node shall, if supported, consider that the procedure is applicable only to the indicated cells in this IE.

8.4.1.3 Abnormal Conditions

If the *Broadcast* IE is set to "start", and the *Assistance Information* IE is not included, the NG-RAN Node shall consider the procedure as failed.

If the *Broadcast* IE is not 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

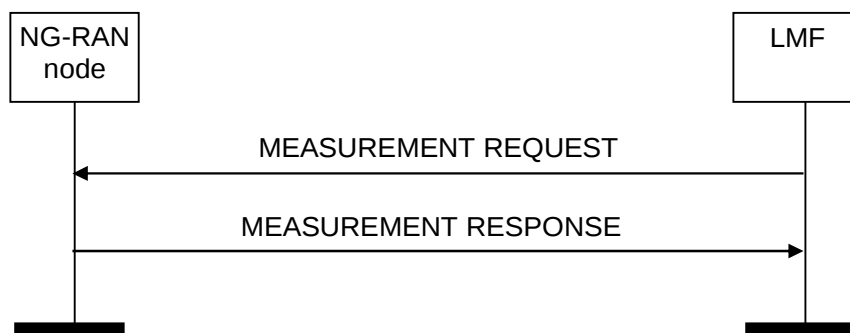


Figure 8.5.1.2.1: Measurement procedure. Successful operation.

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, if supported, 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, consider this as the time window(s) within which to perform the positioning measurements, as specified in TS 38.305 [18].

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

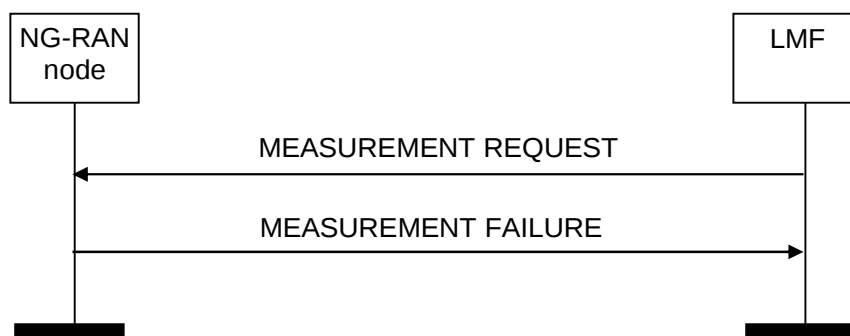


Figure 8.5.1.3.1: Measurement procedure. Unsuccessful operation.

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

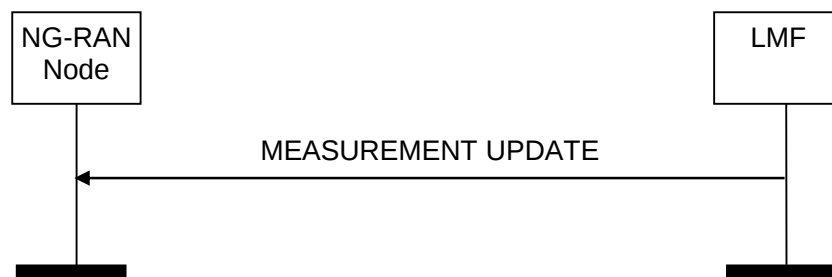


Figure 8.5.3.2.1: Measurement Update: Successful Operation.

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- ifReportCh aracteristi csPeriodic		ENUMERATED (120ms, 240ms, 480ms, 640ms, 1024ms, 2048ms,	The codepoint 60min applies only for ng-eNB. The codepoint	YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			5120ms, 10240ms, 1min, 6min, 12min, 30min, 60min,..., 20480ms, 40960ms, extended)	"extended" is not applicable. This IE is not applicable to NR Angle of Arrival.		
Measurement Quantities		1			YES	reject
>Measurement Quantities Item		1..<maxno Meas>			EACH	reject
>>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- ifReportCharacteristicPeriodicAndMeasQuantityItemAoA		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 <i>Report Characteristics</i> IE is set to the value "Periodic".
ifReportCharacteristicsPeriodicAndMeasQuantityItemAoA	This IE shall be present if the <i>Report Characteristics</i> IE is set to the value "Periodic" and the <i>Measurement Quantities Value</i> IE in the <i>Measurement Quantities</i> 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		-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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 .. <maxnoO TDOAtype			EACH	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>OTDOA Information Item	M	S>	ENUMERATED (pci, cellid, tac, earfcn, prsBandwidth, prsConfigIndex, cpLength, noDIFrames, noAntennaPorts, sFNInitTime, nG-RANAccessPointPosition, prsmutingconfiguration, prsid, tpid, tpType, crsCPLength, dlBandwidth, multipleprsConfigurationsperCell, prsOccasionGroup, prsFrequencyHoppingConfiguration, ..., tddConfig)		-	

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

9.1.1.8 OTDOA INFORMATION RESPONSE

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

Direction: NG-RAN node → LMF.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.3		YES	reject
NRPPa Transaction ID	M		9.2.4		-	
OTDOA Cells		1 .. <maxCellinRANnode>		Served cells/TPs that broadcast PRS. May be used to signal multiple PRS configurations per cell/TPs (up to 3 are supported in this release).	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	ignore
Requested SRS Preconfiguration Characteristics List	O		9.2.97		YES	ignore
Remote UE-Indication Request	O		ENUMERATED (true, ...)		YES	ignore

Condition	Explanation
ifUeTegInfoReqPeriodic	This IE shall be present if the <i>UE TEG Information Request</i> 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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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
Remote UE-Indication	O		ENUMERATED (L2 U2N Remote, ...)		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, ..., area-specific SRS activated)		YES	ignore
New Cell Identity	O		NR CGI 9.2.9		YES	ignore
Remote UE Status	O		ENUMERATED (L2 U2N Remote, no,...)		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		<i>0 ..1</i>			YES	ignore
>TRP Item		<i>1 .. <maxnoTRPs></i>			-	
>>TRP ID	M		9.2.24		-	
TRP Information Type List		<i>1</i>			YES	reject
>TRP Information Type Item		<i>1 .. <maxnoTRPInfoTypes></i>			EACH	reject
>>TRP Information Type Item	M		ENUMERATED (nr pci, ng-ran cgi, nr arfcn, prs config, ssb config, sfn init time, spatial direction info, geo-coordinates, ..., trp type, on-demand prs, trp tx teg, beam antenna info, 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		<i>1</i>			YES	ignore
>TRP Information Item	M	<i>1 .. <maxnoTRPs></i>			-	
>>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 <i>SRS type</i>	M				YES	reject
> <i>Semi-persistent</i>						
>>SRS Resource Set ID	M		9.2.33	This IE is ignored if the <i>Aggregated Positioning SRS Resource Set List</i> IE below is present.	-	
>>SRS Spatial Relation	O		Spatial Relation Information 9.2.34	This IE is ignored if the <i>Spatial Relation Information per SRS Resource</i> IE is present.	YES	ignore
>>Spatial Relation Information per SRS Resource	O		9.2.60		YES	ignore
>>Aggregated Positioning SRS Resource Set List	O		9.2.94		YES	ignore
> <i>Aperiodic</i>						
>>Aperiodic	M		ENUMERATED (true,...)		-	
>>SRS Resource Trigger	O		9.2.35		-	
>>Aggregated Positioning SRS Resource Set List	O		9.2.94		YES	ignore
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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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 <i>Abort Transmission</i>	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		
>Deactivate aggregated SRS Resource Set						
>>Aggregated Positioning SRS Resource Set List	M		9.2.94		YES	ignore

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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 <i>PRS Configuration Request Type</i> IE is set to the value "configure".
ifOff	This IE shall be present if the <i>PRS Configuration Request Type</i> 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

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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 .. <maxnoP RSTRPs>			-	
>>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	YES	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
				'not preconfigured'.		
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		<i>0..1</i>			YES	Ignore
>PRS Measurement Info Item		<i>1 .. < maxFreqLayers></i>			-	
>>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	reject
SRS Information	O		Requested SRS Transmission Characteristics 9.2.27		YES	ignore
Preconfigured SRS Information	O		Requested SRS Preconfiguration Characteristics List 9.2.97		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		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 <i>Assistance Information Failure List</i> 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 of MeasTRPs>			-	
>>TRP ID	M		9.2.24		-	
>>Search Window Information	O		9.2.26		-	
>>Cell ID	O		NR CGI 9.2.9	The Cell ID of the TRP identified by the <i>TRP ID</i> IE.	YES	ignore
>>AoA Search Window Information	O		UL-AoA Assistance Information 9.2.66		YES	ignore
>>Number of TRP Rx TEGs	O		ENUMERATED (2, 3, 4, 6, 8, ...)		YES	ignore
>>Number of TRP RxTx TEGs	O		ENUMERATED (2, 3, 4, 6, 8, ...)		YES	ignore
Report Characteristics	M		ENUMERATED (OnDemand, Periodic, ...)		YES	reject
Measurement Periodicity	C- ifReportCharacteristicsPeriodic		ENUMERATED (120ms, 240ms, 480ms, 640ms, 1024ms, 2048ms, 5120ms, 10240ms, 1min, 6min, 12min, 30min, 60min,..., 20480ms, 40960ms, extended)	The codepoint 120ms, 240ms, 480ms, 1024ms, 2048ms, 1min, 6min, 12min, 30min, and 60min are not applicable	YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
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)	The UL-RSCP measurement is applicable only when the UL-RTOA and/or gNB-RxTxTimeDiff measurement(s) is also requested.	-	
>>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
Measurement Beam Information Request	O		ENUMERATED (true,...)	This IE is ignored when the <i>Measurement Characteristics Request Indicator</i> 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 <i>Report Characteristics</i> IE is set to "periodic".	YES	ignore
Measurement Characteristics Request Indicator	O		9.2.81		YES	ignore
Measurement Time	O		ENUMERATED		YES	ignore

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Occasion			(o1, o4, ...)			
Measurement Amount	O		ENUMERATED (0, 1, 2, 4, 8, 16, 32, 64)	This IE is ignored if the <i>Report Characteristics</i> 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 <i>Report Characteristics</i> IE is set to the value "Periodic".
ifMeasPerExt	This IE shall be present if the <i>Measurement Periodicity</i> 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 ofMeasTRPs>			-	
>>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 <i>TRP ID</i> 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 of MeasTRPs>			-	
>>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 <i>TRP ID</i> 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		0..1			YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Update List						
>TRP Measurement Update Item		1..<maxno ofMeasTRPs>			-	
>>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			
<i>>Radio Network Layer</i>				
>>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)	
<i>>Protocol</i>				
>>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), ...)	
<i>>Misc</i>				
>>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/Group Name	Presence	Range	IE type and reference	Semantics description
>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 maxNrOfErrors 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	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
				geographical position of the antenna of the cell. If the <i>Geographical Coordinates</i> IE is used, the <i>NG-RAN Access Point Position</i> IE shall be ignored.		
Measured Results		0..1		Measurement results of the serving RAT.	-	
>CHOICE <i>Measured Results Value</i>		1 ..<maxno Meas>			-	
>>Value <i>Angle of Arrival EUTRA</i>			INTEGER (0..719)	According to mapping in TS 36.133 [9]		
>>Value <i>Timing Advance Type 1 EUTRA</i>			INTEGER (0..7690)	As defined in TS 36.214 [17]		
>>Value <i>Timing Advance Type 2 EUTRA</i>			INTEGER (0..7690)	As defined in TS 36.214 [17]		
>>Result <i>RSRP EUTRA</i>						
>>>Result <i>RSRP EUTRA Item</i>		1 ..<maxCell Report>			-	
>>>>PCI <i>EUTRA</i>	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 <i>EUTRA</i>	O		9.2.7	Cell Global Identifier of the reported E-UTRA cell	-	
>>>>Value <i>RSRP EUTRA</i>	M		INTEGER (0..97, ...)		-	
>>Result <i>RSRQ EUTRA</i>						
>>>Result <i>RSRQ EUTRA Item</i>		1 ..<maxCell Report>			-	
>>>>PCI <i>EUTRA</i>	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 <i>EUTRA</i>	O		9.2.7	Cell Global Identifier of the reported E-UTRA cell	-	
>>>>Value <i>RSRQ EUTRA</i>	M		INTEGER (0..34, ...)		-	
>>Result <i>SS-RSRP</i>					YES	ignore

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>>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- RSRQ PerSSB Resource Item		1 .. <maxInde xesReport >			-	
>>>>>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 .. <maxCell ReportNR >			-	
>>>>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	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
				level		
>>>>CSI-RSRP per CSI-RS Resource		0..1			-	
>>>>>CSI-RSRP per CSI-RS Resource Item		1.. <maxIndicesReport>			-	
>>>>>>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.. <maxIndicesReport>			-	
>>>>>>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
>>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
Measured Results Associated Information List		0..1		The <i>Measured Results Associated Information Item</i> IEs are in the same order as the <i>Measured Results</i> IEs.	YES	ignore

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>Measured Results Associated Information Item		<i>1..<maxno Meas></i>			-	
>>Time Stamp	O		9.2.42	Time Stamp of the corresponding measured result.	-	
>>Measurement Quality	O		9.2.43	Measurement Quality of the corresponding measured result.	-	
>>DL Reference Signal for UE Rx-Tx Time Difference	O		ENUMERATED (csi-rs, prs, ...)	Indicates the reference signal used for the UE Rx-Tx Time Difference measurement.	-	

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 <i>NG-RAN Cell</i>	M			
> <i>E-UTRAN Cell</i>				
>>E-UTRAN Cell Identifier	M		BIT STRING (28)	
> <i>NR Cell</i>				
>>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.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
				Two digits per octet: - bits 4 to 1 of octet n encoding digit 2n-1 - bits 8 to 5 of octet n encoding digit 2n PLMN Identity consists of 3 digits from MCC followed by either: - a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or - 3 digits from MNC (in case of 3 digit MNC).

9.2.9 NR CGI

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

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

9.2.10 NG-RAN Access Point Position

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Latitude Sign	M		ENUMERATED (North, South)	
Degrees Of Latitude	M		INTEGER (0..2 ²³ -1)	The IE value (N) is derived by this formula: $N \leq 2^{23} \times X / 90 < N+1$ 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: $N \leq 2^{24} \times X / 360 < N+1$ 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				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 <i>Other-RAT Measured Results Value</i>		1.. <maxnoMeas>			-	
>>Result GERAN						
>>>Result GERAN Item		1.. <maxGERANMeasurements>			-	
>>>>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.. <maxUTRANMeasurements>			-	
>>>>UARFCN	M		INTEGER (0..16383, ...)		-	
>>>>CHOICE <i>Physical CellId UTRA</i>	M				-	
>>>>>Physical CellId UTRA FDD			INTEGER (0..511, ...)			
>>>>>Physical CellId UTRA			INTEGER (0..127, ...)			

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
<i>TDD</i>						
>>>>UTRA RSCP	O		INTEGER (-5..91, ...)		-	
>>>>UTRA EcNo	O		INTEGER (0..49, ...)	This IE applies to FDD only.	-	
>>Result NR					YES	ignore
>>>Result NR Item		1..<maxN RMeas>			-	
>>>>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..<maxEUTRAMeasures>			-	
>>>>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		<i>1</i>		
>WLAN Measurement Result Item		<i>1..<maxnoMeas></i>		
>>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		<i>0..1</i>		
>>>WLAN Channel List Item		<i>1..<maxWLAN channels></i>		
>>>>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		<i>1</i>			-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned criticality
Information item		<i><maxnoOfTDOAs></i>				
>>PCI EUTRA	M		INTEGER (0..503, ...)	Physical Cell ID of the reported E-UTRA cell.	-	
>>CGI EUTRA	M		9.2.7	Cell Global Identifier of the E-UTRA cell.	-	
>>TAC	M		9.2.11	Tracking Area Code	-	
>>EARFCN	M		INTEGER (0..262143, ...)	Corresponds to NDL for FDD and NDL/UL for TDD in ref. TS 36.104 [7].	-	
>>PRS Bandwidth EUTRA	M		ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...)	Transmission bandwidth of PRS	-	
>>PRS Configuration Index EUTRA	M		INTEGER (0..4095, ...)	PRS Configuration Index, ref TS 36.211 [10]	-	
>>CP Length EUTRA	M		ENUMERATED (Normal, Extended, ...)	Cyclic prefix length of the PRS	-	
>>Number of DL Frames EUTRA	M		ENUMERATED (sf1, sf2, sf4, sf6, ...)	Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10]	-	
>>Number of Antenna Ports EUTRA	M		ENUMERATED (n1-or-n2, n4, ...)	Number of used antenna ports, where n1-or-n2 corresponds to 1 or 2 ports, n4 corresponds to 4 ports	-	
>>SFN Initialisation Time EUTRA	M		BIT STRING (64)	Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The fraction part is expressed with a granularity of $1/2^{*32}$ second.	-	
>>NG-RAN Access Point Position	M		9.2.10	The configured estimated geographical position of the antenna of the	-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned criticality
				cell/TP.		
>>PRS Muting Configuration EUTRA	M		9.2.16	The configuration of positioning reference signals muting pattern.	-	
>>PRS-ID EUTRA	M		INTEGER (0..4095, ...)	PRS ID, ref TS 36.211 [10].	-	
>>TP-ID EUTRA	M		INTEGER (0..4095, ...)	Identity of the transmission point. This IE together with the PCI and/or PRS-ID may be used to identify the transmission point in case the same physical cell ID is shared by multiple transmission points.	-	
>>TP Type EUTRA	M		ENUMERATED (prs-only-tp, ...)	A TP which transmits PRS only.	-	
>>Number of DL Frames-Extended EUTRA	M		INTEGER (1..160, ...)	Number of consecutive downlink subframes NPRS with PRS, ref TS 36.211 [10].	-	
>>CRS CP Length EUTRA	M		ENUMERATED (Normal, Extended, ...)	Cyclic prefix length of the CRS.	-	
>>DL Bandwidth EUTRA	M		ENUMERATED (bw6, bw15, bw25, bw50, bw75, bw100, ...)	DL transmission bandwidth expressed in units of resource blocks NRB, ref TS 36.104 [7].	-	
>>PRS Occasion Group EUTRA	M		ENUMERATED (og2, og4, og8, og16, og32, og64, og128, ...)	PRS occasion group in a PRS period, ref TS 36.211 [10].	-	
>>PRS Frequency Hopping Configuration EUTRA	M		9.2.17	PRS frequency hopping configuration.	-	
>>TDD Configuration EUTRA	M		9.2.18	TDD specific physical channel configuration.	YES	ignore
>>NR CGI	M		9.2.9	Cell Global Identifier of the NR cell.	YES	ignore
>>SFN Initialisation Time NR	M		BIT STRING (64)	Time in seconds relative to 00:00:00 on 1 January 1900 (calculated as continuous time without leap seconds and traceable to a common time reference) where binary encoding of the integer part is	YES	ignore

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

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 <i>PRS Muting Configuration</i>	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 <i>posSI-Periodicity</i> contained in the <i>PosSI-SchedulingInfo</i> 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 <i>assistanceDataSIBElement</i> IE as defined in TS 37.355 [14]

Range bound	Explanation
maxNrOfSegments	Maximum number of positioning SIB segments (in case of <i>Assistance Information Element</i> 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 <i>encrypted</i> contained in the <i>PosSI-SchedulingInfo</i> IE as defined in TS 38.331 [13]
GNSS ID	O		ENUMERATED (gps, sbas, qzss, galileo, glonass, bds, navic ...)	Corresponds to information provided in <i>gnss-id</i> contained in the <i>PosSI-SchedulingInfo</i> IE as defined in TS 38.331 [13]
SBAS ID	O		ENUMERATED (waas, egnos, msas, gagan, ...)	Corresponds to to information provided in <i>sbas-id</i> contained in the <i>PosSI-SchedulingInfo</i> 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,	

IE/Group Name	Presence	Range	IE type and reference	Semantics description
			posSibType3-1, posSibType4-1, posSibType5-1, posSibType6-1, posSibType6-2, posSibType6-3, ..., posSibType1-9, posSibType1-10, posSibType6-4, posSibType6-5, posSibType6-6, posSibType1-11, posSibType1-12, posSibType2-17a, posSibType2-18a, posSibType2-20a, posSibType2-26, posSibType2-27, posSibType6-7, posSibType7-1, posSibType7-2, posSibType7-3, posSibType7-4)	

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		<i>1..<maxnoAssistInfoFailureListItems></i>		
>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		-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
TRP Information Type		<i>1 .. <maxnoTRPInfoTypes></i>			-	
>CHOICE <i>TRP Information Item</i>	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 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 <i>TRP type</i> 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				Reference Time. The UL RTOA Reference Time for a target SRS is defined as $T_0 + t_{\text{SRS}}$, where - T_0 is the SFN Initialisation Time - $t_{\text{SRS}} = (10n_f + n_{\text{sf}}) \times 10^{-3}$, where n_f and n_{sf} are the system frame number and the subframe number of the SRS, respectively. Granularity 4Ts, where $T_s = 1/(15 \cdot 10^3 \cdot 2048)$ seconds. Centre of the search window.
Delay Uncertainty	M		INTEGER (1..246,...)	Indicates the uncertainty of the expected SRS arrival time at the TRP Granularity 4Ts, where $T_s = 1/(15 \cdot 10^3 \cdot 2048)$ 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- ifResource TypePeriodic		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 <i>Bandwidth</i>	M				-	
>FR1			ENUMERATED (5mHz, 10mHz, 20mHz, 40mHz, 50mHz, 80mHz, 100mHz, ... , 160mHz, 200mHz, 15mHz, 25mHz, 30mHz, 60mHz , 35mHz, 45mHz, 70mHz, 90mHz)			
>FR2			ENUMERATED (50mHz, 100mHz, 200mHz, 400mHz,..., 600mHz, 800mHz, 1600mHz, 2000mHz)			
SRS Resource Set List		0.. 1			-	
>SRS Resource Set		1..<			-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Item		<i>maxnoSRS-ResourceSets</i>				
>>Number of SRS Resources Per Set	O		INTEGER (1..16,...)	The number of SRS Resources per resource set for SRS transmission.	-	
>>Periodicity List		0.. 1			-	
>>>Periodicity List Item		1..<maxnoSRS-ResourcePerSet>			-	
>>>>PeriodicitySRS	M		ENUMERATED (0.125, 0.25, 0.5, 0.625, 1, 1.25, 2, 2.5, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 160, 320, 640, 1280, 2560, 5120, 10240, ...)	Milli-seconds	-	
>>Spatial Relation Information	O		9.2.34	This IE is ignored if the <i>Spatial Relation Information per SRS Resource</i> IE is present.	-	
>>Pathloss Reference Information	O		9.2.53		-	
>>Spatial Relation Information per SRS Resource	O		9.2.60		-	
SSB Information	O		9.2.54		-	
SRS Frequency	O		INTEGER(0..3279165)	NR ARFCN The carrier frequency of SRS transmission bandwidth.	YES	ignore
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	This IE is ignored if the <i>Validity Area Specific SRS Information Extended</i> IE is present.	YES	ignore
Validity Area Specific SRS Information Extended	O		9.2.102		YES	ignore

Condition	Explanation
ifResourceTypePeriodic	This IE shall be present if the <i>Resource Type</i> 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	Criticality	Assigned Criticality
SRS Carrier List		1			-	
> SRS Carrier List Item		1..<maxno SRS-Carriers>			-	
>>Point A	M		INTEGER (0..3279165)	NR ARFCN	-	
>> Uplink Channel BW-PerSCS-List		1		Corresponds to sCS-SpecificCarrierList in TS 38.331 [13]	-	
>>> SCS Specific Carrier		1..<maxnoSCSs>			-	
>>>>Offset To Carrier	M		INTEGER(0..2199, ...)	First usable RB to Point A in the number of PRBs	-	
>>>>Subcarrier Spacing	M		ENUMERATED (kHz15, kHz30, kHz60, kHz120,..., kHz480, kHz960)		-	
>>>>Carrier Bandwidth	M		INTEGER(1..275,...)		-	
>> Active UL BWP		1		Only the configuration in the active UL BWP is needed.	-	
>>>Location And Bandwidth	M		INTEGER(0..37949,...)	Corresponds to information provided in locationAndBandwidth contained in BWP IE as defined in TS 38.331 [13]	-	
>>>Subcarrier Spacing	M		ENUMERATED (kHz15, kHz30, kHz60, kHz120,..., kHz480, kHz960)		-	
>>>Cyclic Prefix	M		ENUMERATED (Normal, Extended)		-	
>>>Tx Direct Current Location	M		INTEGER(0..3301,...)		-	
>>>Shift7dot5kHz	O		ENUMERATED (true,...)		-	
>>>>SRS Config		1		Corresponds to information provided in SRS-Config IE as defined in TS 38.331 [13]	-	
>>>> SRS Resource List		0..<maxno SRS-Resources>			-	
>>>>>SRS	M		9.2.29	Corresponds to	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Resource				information provided in <i>SRS-Resource</i> contained in <i>SRS-Config</i> 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 <i>SRS-PosResource</i> contained in <i>SRS-Config</i> 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 <i>SRS-ResourceSet</i> contained in <i>SRS-Config</i> 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 <i>SRS-PosResourceSet</i> contained in <i>SRS-Config</i> 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	-	
Aggregated Positioning SRS Resource Set List	O		9.2.94		YES	ignore

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 <i>Transmission Comb</i>	M				-	
> <i>Comb Two</i>						
>>Comb Offset	M		INTEGER(0..1)		-	
>>Cyclic Shift	M		INTEGER(0..7)		-	
> <i>Comb Four</i>						
>>Comb Offset	M		INTEGER(0..3)		-	
>>Cyclic Shift	M		INTEGER(0..11)		-	
> <i>Comb Eight</i>	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 <i>Number of Symbols Extended</i> IE is included	-	
Repetition Factor	M		ENUMERATED (r1,r2,r4)	This IE is ignored if the <i>Repetition Factor Extended</i> 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 <i>Resource Type</i>	M				-	
> <i>Periodic</i>					-	
>>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, ...)		-	
> <i>Semi-persistent</i>						
>>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 <i>Transmission Comb</i>	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)		-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
CHOICE <i>Resource Type Positioning</i>	M				-	
> <i>periodic</i>						
>>SRS Periodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..81919,...)		-	
>>SRS PosPeriodicConfigHyperSFN Index	O		ENUMERATED (even0, odd1)	Indicates even or odd hyper SFN in which the SRS for positioning is transmitted for the periodicity value of 20480ms	YES	ignore
> <i>semi-persistent</i>						
>>SRS Periodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..81919,...)		-	
>>SRS PosPeriodicConfigHyperSFN Index	O		ENUMERATED (even0, odd1)	Indicates even or odd hyper SFN in which the SRS for positioning is transmitted for the periodicity value of 20480ms	YES	ignore
> <i>aperiodic</i>						
>>slot offset	M		INTEGER(0..32)		-	
Sequence ID	M		INTEGER(0..65535)		-	
CHOICE Spatial Relation Positioning	O				-	
> <i>SSB</i>						
>>NR PCI	M		INTEGER (0..1007)		-	
>>SSB index	O		INTEGER(0..63)		-	
> <i>PRS</i>						
>>PRS ID	M		INTEGER(0..255)		-	
>>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		<i>1..<maxnoSRS - ResourcePerSet></i>		
>SRS Resource ID	M		INTEGER(0..63)	
CHOICE <i>Resource Set Type</i>	M			
> <i>periodic</i>				
>>periodicSet	M		ENUMERATED(true,...)	

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

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

9.2.33 SRS Resource Set ID

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
SRS Resource Set ID	M		INTEGER (0..15, ...)	Corresponds to information provided in <i>SRS-ResourceSetId</i> contained in <i>SRS-Config</i> 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		<i>1..<maxnoSpatialRelations></i>		According to TS 38.321 [15] and corresponds to information provided in <i>SRS-SpatialRelationInfoPos</i> contained in <i>SRS-Config</i> IE as defined in TS 38.331 [13]
>CHOICE <i>Reference Signal</i>	M			
>>NZIP CSI-RS				
>>>NZIP CSI-RS Resource ID	M		INTEGER (0..191)	
>>SSB				
>>>NR PCI	M		INTEGER (0..1007)	
>>>SSB Index	O		INTEGER (0..63)	
>>SRS				
>>>SRS Resource ID	M		INTEGER (0..63)	
>>Positioning SRS				
>>>Positioning SRS Resource ID	M		INTEGER (0..63)	
>>DL-PRS				
>>>DL-PRS ID	M		INTEGER (0..255)	
>>>DL-PRS Resource Set ID	M		INTEGER (0..7)	
>>>DL-PRS Resource ID	O		INTEGER (0..63)	

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

9.2.35 SRS Resource Trigger

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Aperiodic SRS Resource Trigger List		<i>1..<maxnoSRS - TriggerStates></i>		Corresponds to information provided in <i>aperiodicSRS-ResourceTriggerList</i> contained in <i>SRS-Config</i> 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 Initialisation 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				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 Positioning SRS resources across aggregated carriers.	YES	ignore

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>Aggregated Positioning SRS Resource ID Item		<i>2..<maxnoaggregatedPosSRS-Resources></i>			-	
>>>Positioning SRS Resource ID	M		INTEGER (0..63)			
>>>Point A	M		INTEGER (0..3279165)		YES	ignore
>>>SCS Specific Carrier		<i>1</i>			YES	ignore
>>>>Offset To Carrier	M		INTEGER (0..2199, ...)			
>>>>Subcarrier Spacing	M		ENUMERATED (kHz15, kHz30, kHz60, kHz120, ..., kHz480, kHz960)			
>>>>Carrier Bandwidth	M		INTERGER (1..275, ...)			
>>>PCI	O		INTEGER (0..1007)		YES	ignore
>Measurement Based On Aggregated Resources	O		ENUMERATED (true, ...)		YES	ignore

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>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 <i>Extended Additional Path List</i> 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 gNB 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..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 <i>Extended Additional Path</i>	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
				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		<i>1..<maxno path></i>			-	
>CHOICE <i>Relative Path Delay</i>	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		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 <i>Slot Index</i>	M				-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>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 <i>Measurement Quality</i>	M				-	
> <i>Timing Measurement Quality</i>				Corresponds to information provided in <i>NR-TimingQuality</i> IE as defined in TS 37.355 [14]		
>>Measurement Quality	M		INTEGER(0..31)		-	
>>Resolution	M		ENUMERATED (0.1m, 1m, 10m, 30m, ...)		-	
> <i>Angle Measurement Quality</i>						
>>Azimuth Quality	M		INTEGER(0..255)		-	
>>Zenith Quality	O		INTEGER(0..255)		-	
>>Resolution	M		ENUMERATED (0.1deg, ...)		-	
> <i>Phase Quality</i>				Corresponds to information provided in <i>NR-PhaseQuality</i> IE as defined in TS 37.355 [14].	YES	ignore
>>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 of PRS resourceSet>			-	
>>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 Pattern	M		DL-PRS Muting Pattern 9.2.56	Muting pattern option 2 is used to mute the selected repetition of the resource set (within the period)	-	
>>PRS Resource Transmit Power	M		INTEGER(-60..50)		-	
>>PRS Resource List		1		Corresponds to information provided in <i>NR-DL-PRS-Resource</i> contained in <i>NR-DL-PRS-Info</i> IE as defined in TS	-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
				37.355 [14]		
>>>PRS Resource Item		<i>1..<maxno of PRS resources></i>			-	
>>>>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 <i>Extended Resource Symbol Offset</i> 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		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	M				-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
<i>Definition Type</i>						
> <i>Direct</i>						
>>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.	-	
> <i>Referenced</i>						
>>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	<i>1..<maxPRS-ResourceSets></i>		
>DL-PRS Resource Set ID	M		INTEGER (0..7)	
>CHOICE <i>DL-PRS Resource Set ARP Location</i>	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.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>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- ResourcesPer Set>		
>>DL-PRS Resource ID	M		INTEGER (0..63)	
>>CHOICE DL-PRS Resource ARP Location	M			Relative to the DL-PRS Resource Set ARP Location. If this IE is absent, the Relative Location is zero for the indicated DL-PRS Resource ID.
>>>Geodetic				
>>>>TRP Position Relative Geodetic	M		Relative Geodetic Location 9.2.48	
>>>Cartesian				
>>>>TRP Position Relative Cartesian	M		Relative Cartesian Location 9.2.50	

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

9.2.48 Relative Geodetic Location

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

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

9.2.49 NG-RAN High Accuracy Access Point Position

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

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

9.2.50 Relative Cartesian Location

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
XYZ unit	M		ENUMERATED (mm, cm, dm,...)	
X value	M		INTEGER (-2 ¹⁶ .. 2 ¹⁶ -1)	Positive value represents easting from reference point, in units of <i>XYZ Unit</i> IE.
Y value	M		INTEGER (-2 ¹⁶ .. 2 ¹⁶ -1)	Positive value represents northing from reference point in units of <i>XYZ Unit</i> IE.
Z value	M		INTEGER (-2 ¹⁵ .. 2 ¹⁵ -1)	Height with respect to reference point in units of <i>XYZ Unit</i> 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	Criticality	Assigned Criticality
CHOICE <i>ReferencePoint</i>	M			Reference point to which relative location information is related to	-	
> <i>Coordinate ID</i>						
>>Coordinate ID	M		INTEGER(0..2 ⁹ -1,...)	Referential ID mapped via OAM	-	
> <i>Reference Point Coordinates</i>						
>>Reference Point Position	M		NG-RAN Access Point Position 9.2.10		-	
> <i>Reference Point Coordinates High Accuracy</i>						

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>Reference Point High Accuracy Access Position	M		NG-RAN High Accuracy Access Point Position 9.2.49		-	
>LocalOrigin					YES	ignore
>>Coordinate ID	M		INTEGER(0..2 ⁹ -1,...)	Referential ID mapped via OAM	-	
>>Horizontal Axes Orientation	M		INTEGER (0..3599)	Indicates the local coordinate system horizontal orientation angle clockwise from northing. Scale factor 0.1 degrees.	-	
>>Reference Point High Accuracy Access Position	O		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		<i>1</i>		
>SSB Info Item		<i>1...<maxNoSSBs></i>		
>>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))	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>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 >			-	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>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.
maxnlcs-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		<i>1 .. <maxnoBcast Cell></i>		
>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		<i>1</i>		
>Spatial Relation per SRS Resource Item		<i>1..<maxnoSRS - ResourcePerSet></i>		
>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)	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>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 of PRS resourceSet>			-	
>>PRS bandwidth	O		INTEGER(1..63)	24,28,...,272 PRBs	-	
>>Comb Size	O		ENUMERATED (2, 4, 6, 12, ...)		-	
>>Resource Set Periodicity	O		ENUMERATED (4,5,8,10,16,20,32,40,64,80,160,320,640,1280,2560,5120,10240,20480,40960,81920,...,128,256, 512)	Slots	-	
>>Resource Repetition Factor	O		ENUMERATED (rf1,rf2,rf4,rf6,rf8,rf16,rf32,...)		-	
>>Resource Number of Symbols	O		ENUMERATED (n2,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 <i>Start Time and Duration</i> IE is present	-	
Number of Frequency Layers	O		INTEGER(1..4)		-	
Start Time and Duration	O		9.2.63		-	
PRS Bandwidth Aggregation Request Information List	O		9.2.101		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		<i>1</i>		Corresponds to information provided in <i>NR-DL-PRS-Resource</i> contained in <i>NR-DL-PRS-Info</i> IE as defined in TS 37.355 [14]
>Requested DL-PRS Resource Item		<i>1..<maxnoofPRSresource></i>		
>>CHOICE <i>QCL Info</i>	O			
>>>SSB				
>>>>NR PCI	M		INTEGER(0..1007)	
>>>>SSB Index	O		INTEGER(0..63)	
>>>DL-PRS				
>>>>QCL Source PRS Resource Set ID	M		INTEGER(0..7)	
>>>>QCL Source PRS Resource ID	O		INTEGER(0..63)	

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

9.2.63 Start Time and Duration

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

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

9.2.64 PRS Transmission Off Information

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

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>>>>>>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 tenth bit: PRS Bandwidth Aggregation 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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
				Bandwidth values are allowed to be requested.
Allowed Resource Repetition Factor Values	O		BIT STRING (SIZE(8))	This IE applies only if the third bit of the On-demand PRS Request Allowed IE is set to '1'. Each position in the bitmap represents a value of the Resource Repetition Factor IE defined in subclause 9.2.61, first bit = rf1 and so on. Bit 8 is reserved for future use. Value '1' indicates 'request allowed', Value '0' indicates 'request not allowed'. If this IE is absent, all Resource Repetition Factor values are allowed to be requested.
Allowed Resource Number of Symbols Values	O		BIT STRING (SIZE(8))	This IE applies only if the fourth bit of the On-demand PRS Request Allowed IE is set to '1'. Each position in the bitmap represents a value of the Resource Number of Symbols IE defined in subclause 9.2.61, first bit = n2 and so on. Bits 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 <i>AngleMeasurement</i>	M			
>Expected UL Angle of Arrival				
>>Expected Azimuth AoA		1		Defined as ($\phi_{AOA} - \Delta\phi_{AOA}/2$, $\phi_{AOA} + \Delta\phi_{AOA}/2$)
>>>Expected Azimuth AoA Value	M		INTEGER(0..3599)	ϕ_{AOA} component of Expected Azimuth AoA
>>>Expected Azimuth	M		INTEGER(0..3599)	$\Delta\phi_{AOA}$ component of Expected

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
AoA Uncertainty Range				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 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	Criticality	Assigned Criticality
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. This IE is ignored when the <i>Reporting Interval in Milliseconds</i> IE is present.	-	
Reporting Interval in Milliseconds	O		INTEGER (1..999)	Indicates the interval between location information reports and the response time requirement for the first location information report in milliseconds. Unit: milliseconds.	YES	ignore

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 <i>AngleMeasurement</i>	M			
>>>UL <i>Angle of Arrival</i>				
>>>>UL <i>Angle of Arrival</i>	M		9.2.38	
>>>UL <i>Zenith Angle of Arrival</i>				
>>>>UL <i>Zenith Angle of Arrival</i>	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 <i>Reference Signal</i>	M				-	
> <i>SRS</i>						
>>SRS Resource ID	M		INTEGER(0..63)		-	
> <i>Positioning SRS</i>						
>>Positioning SRS Resource ID	M		INTEGER(0..63)		-	
SRS Port Index	O		ENUMERATED (id1000, id1001, id1002, id1003, ...)	This IE may be present if the <i>SRS Resource ID</i> 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		<i>1..<maxNoPathExtended></i>			-	
>CHOICE <i>Relative Path Delay</i>	M				-	
>> <i>k0</i>			INTEGER(0..16351)	TS 38.133 [16]		
>> <i>k1</i>			INTEGER(0..8176)	TS 38.133 [16]		
>> <i>k2</i>			INTEGER(0..4088)	TS 38.133 [16]		
>> <i>k3</i>			INTEGER(0..2044)	TS 38.133 [16]		
>> <i>k4</i>			INTEGER(0..1022)	TS 38.133 [16]		
>> <i>k5</i>			INTEGER(0..511)	TS 38.133 [16]		
>> <i>kminus1</i>			INTEGER (0..32701)	TS 38.133 [16]	YES	ignore
>> <i>kminus2</i>			INTEGER (0..65401)	TS 38.133 [16]	YES	ignore
>> <i>kminus3</i>			INTEGER(0..130801)	TS 38.133 [16]	YES	ignore
>> <i>kminus4</i>			INTEGER(0..261601)	TS 38.133 [16]	YES	ignore
>> <i>kminus5</i>			INTEGER(0..523201)	TS 38.133 [16]	YES	ignore
>> <i>kminus6</i>			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		<i>1</i>		
>ARP Location Information Item		<i>1..<maxnoARPs></i>		
>>ARP ID	M		9.2.75	
>>CHOICE ARP Location Type	M			
>>>geodetic				
>>>>ARP Position Relative Geodetic	M		Relative Geodetic Location 9.2.48	
>>>cartesian				
>>>>ARP Position Relative Cartesian	M		Relative Cartesian Location 9.2.50	

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

9.2.77 LoS/NLoS Information

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

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

9.2.78 UE Tx TEG Association List

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

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

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

9.2.79 TRP Tx TEG Association

This information element contains the TRP Tx TEG information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
TRP TEG item		<i>1..<maxnoTRP TEGs></i>		
>TRP Tx TEG Information	M		9.2.86	
>DL-PRS Resource Set ID	M		INTEGER (0..7)	
>DL-PRS Resource ID List		<i>0..1</i>		
>>DL-PRS Resource ID Item		<i>1..<maxPRS-ResourcesPerSet></i>		
>>>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 <i>TRP TEG</i>	M			
> <i>RxTx TEG</i>				
>>TRP RxTx TEG Information	M		9.2.87	
>>TRP Tx TEG Information	O		9.2.86	
> <i>Rx TEG</i>				
>>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: SRS bandwidth aggregation used for joint UL positioning measurement. Twelfth bit: Aggregated Positioning 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 <i>TRP Beam Antenna Info Item</i>	M			
>Reference				
>>Associated TRP ID	M		TRP ID 9.2.24	This IE specifies the <i>TRP ID</i> of the associated TRP from which the beam information parameters are adopted in Local Coordinate System (LCS).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>Explicit				
>>TRP Beam Antenna Angles	M		9.2.83	
>>LCS to GCS Translation	O		9.2.69	Included if the azimuth and elevation are not provided in GCS.
>No Change			NULL	No change compared to the previously signalled configuration for this TRP.

9.2.83 TRP Beam Antenna Angles

The IE provides the beam antenna information of the TRP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
TRP Beam Antenna Angles Item		<i>1..<maxnoAzimuthAngles></i>		
>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		<i>1</i>		
>>TRP Elevation Angle Item		<i>1..<maxnoElevationAngles></i>		
>>>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		<i>1</i>		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		<i>2..<maxNumResourcesPerAngle></i>		

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>>>>PRS Resource Set ID	O		INTEGER (0..7)	DL-PRS Resource Set ID of the DL-PRS Resource for which the Relative Power is provided. If this field is absent, the DL-PRS Resource Set ID for this instance of the Beam Power List is the same as the DL-PRS Resource Set ID of the previous instance in the Beam Power List. This field shall be included at least in the first instance of the Beam Power List.
>>>>>PRS Resource ID	M		INTEGER (0..63)	DL-PRS Resource for which the Relative Power is provided.
>>>>>TRP Beam Relative Power	M		INTEGER (0..30)	The power values span from -30 to 0dB
>>>>>TRP Beam Relative Power "fine"	O		INTEGER (0..9)	Relative Power with 0.1dB resolution. The power spans from -0.9 to 0dB

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

9.2.84 Timing Error Margin

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

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

9.2.85 TRP Rx TEG Information

This information element contains the TRP Rx TEG information.

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

9.2.86 TRP Tx TEG Information

This information element contains the TRP Tx TEG information.

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

9.2.87 TRP RxTx TEG Information

This information element contains the TRP RxTx TEG information.

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

9.2.88 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 <i>locationEstimate</i> IE as defined in TS 37.355 [14]
Velocity Information	O		OCTET STRING	Velocity of the mobile TRP, Includes the <i>velocityEstimate</i> 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 <i>EpochTime</i> IE as defined in TS 38.331[13]
TA Info	M		OCTET STRING	Includes the <i>TA-Info</i> 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		<i>1..<maxnoofTimeWindowSR S></i>		
>>Time Window Start		1		
>>>System Frame Number	M		INTEGER(0..1023)	
>>>Slot Number	M		INTEGER(0..79)	
>>>Symbol Index	M		INTEGER(0..13)	
>>CHOICE <i>Time</i>	M			

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
<i>Window Duration</i>				
>>>>Symbols				
>>>>Duration in Symbols	M		ENUMERATED (1, 2, 4, 8, 12, ...)	
>>>>Slots				
>>>>Duration in Slots	M		ENUMERATED (1, 2, 4, 6, 8, 12, 16, ...)	
>>Time Window Type	M		ENUMERATED (single, periodic, ...)	
>>Time Window Periodicity	C- ifTimeWin dowTypeP eriodic		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 <i>Time Window Type</i> 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..<maxnoofTimeWindowMeasureas>		
>>CHOICE <i>Time Window Duration</i>	M			
>>>>Slots				
>>>>Duration in Slots	M		ENUMERATED (1, 2, 4, 6, 8, 12, 16, ...)	
>>Time Window Type	M		ENUMERATED (single, periodic, ...)	
>>Time Window Periodicity	C- ifTimeWin dowTypeP eriodic		ENUMERATED (160, 320, 640, 1280, 2560, 5120, 10240, 20480, 40960, 61440, 81920, 368640, 737280, 1843200, ...)	Unit: Milli-seconds
>>Time Window Start		1		
>>>>System Frame Number	M		INTEGER(0..1023)	
>>>>Slot Number	M		INTEGER(0..79)	
>>>>Symbol Index	M		INTEGER(0..13)	

Condition	Explanation
ifTimeWindowTypePeriodic	This IE shall be present if the <i>Time Window Type</i> 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		<i>1 .. <maxnoVACell></i>		
>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 List		<i>1</i>		
>Aggregated SRS Positioning Resource Set Item		<i>1..<maxnoAggregatedPosSRSCombinations></i>		
>>Combined Positioning SRS Resource Set List		<i>1</i>		
>>>Combined Positioning SRS Resource Set Item		<i>2..<maxnoaggregatedPosSRS-ResourceSets></i>		
>>>>Point A	M		INTEGER (0..3279165)	NR ARFCN
>>>>NR PCI	O		INTEGER(0..1007)	
>>>>Positioning SRS Resource Set ID	M		INTEGER(0..15)	
>>>>SCS Specific Carrier		<i>1</i>		

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>>>>Offset To Carrier	M		INTEGER (0..2199, ...)	
>>>>Subcarrier Spacing	M		ENUMERATED(kHz 15, kHz30, kHz60, kHz120, ... , kHz480, kHz960)	
>>>>Carrier Bandwidth	M		INTERGER (1..275, ...)	

Range bound	Explanation
maxnoaggregatedPosSRS-ResourceSets	Maximum no of aggregated SRS Positioning Resource Sets among 2~3 Carriers. Value is 3.
maxnoAggregatedPosSRSCombinations	Maximum no of Aggregated SRS Positioning Resource Set Combinations. Value is 32.

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 PRS Resource Set Item		<i>1..<maxnoAgg Combinations></i>		
>DL-PRS Resource Set List		<i>1</i>		
>>DL-PRS Resource Set Item		<i>1.. < maxnoAggPos PRSResource Sets></i>		
>>>DL-PRS Resource Set Index			INTEGER(1..8)	This IE specifies the PRS Resource Set linked for DL-PRS bandwidth aggregation. The Integer Value defines an index to an PRS Resource Set Item of the <i>PRS Resource Set Item</i> IE within the <i>PRS Configuration</i> (9.2.44). I.e., Integer value 1 corresponds to the first entry in <i>PRS Resource Set Item</i> IE, Integer value 2 corresponds to the second entry in <i>PRS Resource Set Item</i> IE, and so on.

Range bound	Explanation
maxnoAggCombinations	Maximum number of aggregated frequency layer (carrier) combinations. Value is 2.
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 <i>Transmission Comb</i>	O				-	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>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			-	
>Start Position	M		INTEGER(0..13)		-	
>Number of Symbols	M		ENUMERATED (n1,n2,n4, n8, n12)		-	
Frequency Domain Shift	O		INTEGER(0..268)		-	
C-SRS	O		INTEGER(0..63)		-	
CHOICE Resource Type Positioning	O				-	
>periodic						
>>SRSPeriodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..81919,...)		-	
>>SRS PosPeriodicConfigHyperSFN Index	O		ENUMERATED (even0, odd1)	Indicates even or odd hyper SFN in which the SRS for positioning is transmitted for the periodicity value of 20480ms	YES	ignore
>semi-persistent						
>>SRSPeriodicity	M		9.2.99		-	
>>Offset	M		INTEGER(0..81919,...)		-	
>>SRS PosPeriodicConfigHyperSFN Index	O		ENUMERATED (even0, odd1)	Indicates even or odd hyper SFN in which the SRS for positioning is transmitted for the periodicity value of 20480ms	YES	ignore
>aperiodic				Not applicable if the <i>Positioning Validity Area Cell List</i> IE is included	-	
>>slot offset	M		INTEGER(0..32)		-	
Sequence ID	O		INTEGER(0..65535)		-	

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..<maxnoPreconfiguredSRS>		
>Requested SRS	M		9.2.27	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Transmission Characteristics				

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		<i>1..<maxnoPreconfiguredSRS></i>		
>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 SRS Tx frequency 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(2..6)	
Slot Offset for Remaining Hops List		<i>1</i>		

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
>Slot Offset for Remaining Hops Item		<i>1..<maxnoofHopsMinusOne></i>		
>>CHOICE slot offset remaining hops	M			
>>>aperiodic				
>>>>Slot Offset	O		INTEGER(1..32)	
>>>>Start Position	O		INTEGER(0..13)	In symbols
>>>semi-persistent				
>>>>SRS Periodicity	M		9.2.99	
>>>>Offset	M		INTEGER(0..81919, ...)	In slots
>>>>Start Position	O		INTEGER(0..13)	In symbols
>>>periodic				
>>>>SRS Periodicity	M		9.2.99	
>>>>Offset	M		INTEGER(0..81919, ...)	
>>>>Start Position	O		INTEGER(0..13)	In symbols

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

9.2.101 PRS Bandwidth Aggregation Request Information List

This IE contains the aggregated DL-PRS configuration information requested.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
PRS Bandwidth Aggregation Request Information List		<i>1</i>		
>PRS Bandwidth Aggregation Request Information Item		<i>1..<maxnoAggCombinations></i>		
>>DL-PRS Bandwidth Aggregation Request Information List		<i>1</i>		
>>>DL-PRS Bandwidth Aggregation Request Information Item		<i>2..<maxnoAggPosPRSResourceSets></i>		
>>>>Requested DL-PRS Resource Set Index	M		INTEGER(1..8)	This IE specifies which of the indicated <i>Requested DL-PRS Resource Set Item</i>'s are requested for aggregation. The Integer Value defines an index to the <i>Requested DL-PRS Resource Set Item</i> in IE <i>Requested DL PRS Transmission Characteristics</i> (9.2.61). Integer value 1 defines the first entry in <i>Requested DL-PRS Resource Set Item</i>, Integer value 2 defines the second entry in <i>Requested DL-PRS Resource Set Item</i> and so on.

Range bound	Explanation
maxnoAggCombinations	Maximum number of aggregated frequency layer (carrier) combinations. Value is 2.
maxnoAggPosPRSResourceSets	Maximum no of PRS resources sets aggregated. Value is 3.

9.2.102 Validity Area Specific SRS Information Extended

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

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Positioning SRS Resource List		0..1		
>Positioning SRS Resource Item		1..<maxnoSRS-PosResources>		
>>Positioning SRS Resource	M		9.2.30	Corresponds to information provided in <i>SRS-PosResource</i> contained in <i>SRS-Config</i> IE as defined in TS 38.331 [13]
Positioning SRS Resource Set List		0..1		
>Positioning SRS Resource Set Item		1..<maxnoSRS-PosResourceSets>		
>>Positioning SRS Resource Set	M		9.2.32	Corresponds to information provided in <i>SRS-PosResourceSet</i> contained in <i>SRS-Config</i> IE as defined in TS 38.331 [13]

Range bound	Explanation
maxnoSRS-PosResources	Maximum no of positioning SRS resources per UL BWP. Value is 64.
maxnoSRS-PosResourceSets	Maximum no of positioning SRS resource sets per UL BWP. Value is 16.

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,
PosSRSResourceSet-Aggregation-List,
Remote-UE-Indication-Request,
Remote-UE-Indication,
Remote-UE-Status

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-NewNR CGI,
id-TimeWindowInformation-SRS-List,

```

id-TimeWindowInformation-Measurement-List,
id-PosValidityAreaCellList,
id-SRSReservationType,
id-NewCellIdentity,
id-RequestedSRSPreconfigurationCharacteristics-List,
id-SRSPreconfiguration-List,
id-SRSInformation,
id-PosSRSResourceSet-Aggregation-List,
id-PreconfiguredSRSInformation,
id-Remote-UE-Indication-Request,
id-Remote-UE-Indication,
id-Remote-UE-Status

```

```
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 the value "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 the value "periodic" and the Measurement Quantities Value IE in the
    Measurement Quantities IE is set to the value "NR Angle of Arrival" --
    ...
}

```

```

-- *****
--
-- 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 }|
    -- This IE shall be present if the UE TEG Information Request IE is set to the value "periodic".
    { ID id-TimeWindowInformation-SRS-List CRITICALITY ignore TYPE TimeWindowInformation-SRS-List PRESENCE optional }|
    { ID id-RequestedSRSPreconfigurationCharacteristics-List CRITICALITY ignore TYPE RequestedSRSPreconfigurationCharacteristics-List PRESENCE optional }|
    { ID id-Remote-UE-Indication-Request CRITICALITY ignore TYPE Remote-UE-Indication-Request 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-NewNR CGI 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 }|
    { ID id-Remote-UE-Indication CRITICALITY ignore TYPE Remote-UE-Indication 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}|
    { ID id-Remote-UE-Status CRITICALITY ignore TYPE Remote-UE-Status 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 Characteristics IE is set to the value "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}|
    { ID id-PosSRSResourceSet-Aggregation-List  CRITICALITY ignore  EXTENSION PosSRSResourceSet-Aggregation-List  PRESENCE optional},
    ...
}

AperiodicSRS ::= SEQUENCE {
    aperiodic                ENUMERATED{true,...},
    srsResourceTrigger        SRSResourceTrigger OPTIONAL,
    iE-Extensions            ProtocolExtensionContainer { {AperiodicSRS-ExtIEs} } OPTIONAL,
    ...
}

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

-- *****
--
-- 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 reject TYPE SRSReservationType PRESENCE mandatory}|
    { ID id-SRSInformation      CRITICALITY ignore TYPE RequestedSRSTransmissionCharacteristics PRESENCE optional}|
    { ID id-PreconfiguredSRSInformation CRITICALITY ignore TYPE RequestedSRSPreconfigurationCharacteristics-List PRESENCE optional},
    ...
}

```

```
END
-- ASN1STOP
```

9.3.5 Information Element definitions

```
-- ASN1START
-- *****
--
-- Information Element Definitions
--
-- *****

NRPPA-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) nrppa (4) version1 (1) nrppa-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    id-MeasurementQuantities-Item,
    id-CGI-NR,
    id-SFNInitialisationTime-NR,
    id-GeographicalCoordinates,
    id-ResultSS-RSRP,
    id-ResultSS-RSRQ,
    id-ResultCSI-RSRP,
    id-ResultCSI-RSRQ,
    id-AngleOfArrivalNR,
    id-ResultNR,
    id-ResultEUTRA,
    maxCellinRANnode,
    maxCellReport,
    maxNrOfErrors,
    maxNoMeas,
    maxnoOTDOAtypes,
    maxServCell,
    id-OtherRATMeasurementQuantities-Item,
    id-WLANMeasurementQuantities-Item,
    maxGERANMeas,
    maxUTRANMeas,
    maxWLANchannels,
    maxnoFreqHoppingBandsMinusOne,
    id-TDD-Config-EUTRA-Item,
    maxNrOfPosSImessage,
    maxnoAssistInfoFailureListItems,
    maxNrOfSegments,
    maxNrOfPosSIBs,
    maxnoPosMeas,
```

maxnoTRPs,
maxnoTRPInfoTypes,
maxNoOfMeasTRPs,
maxNoPath,
maxnoofAngleInfo,
maxnoIcs-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,
maxnoAggCombinations,
maxnoAggregatedPosSRSSCombinations,
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-PRSBWAggregationRequestInfoList,
id-AggregatedPosSRSResourceID-List,
id-AggregatedPRSRResourceSetList,
id-TRPPhaseQuality,
id-ValidityAreaSpecificSRSInformation,
id-TxHoppingConfiguration,
id-MeasuredFrequencyHops,
id-ReportingGranularitykminus1AdditionalPath,
id-ReportingGranularitykminus2AdditionalPath,
id-ReportingGranularitykminus3AdditionalPath,
id-ReportingGranularitykminus4AdditionalPath,

```

id-ReportingGranularitykminus5AdditionalPath,
id-ReportingGranularitykminus6AdditionalPath,
id-MeasuredResultsAssociatedInfoList,
id-PointA,
id-NR-PCI,
id-SCS-SpecificCarrier,
id-MeasBasedOnAggregatedResources,
id-UEReportingInterval-milliseconds,
id-LocalOrigin,
id-DL-reference-signal-UErxTx-TD,
id-SRSPosPeriodicConfigHyperSFNIndex,
id-ValidityAreaSpecificSRSInformationExtended

```

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 ::= {
    { ID id-PosSRSResourceSet-Aggregation-List CRITICALITY ignore TYPE PosSRSResourceSet-Aggregation-List PRESENCE mandatory },
    ...
}

```

```

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 (2..maxnoaggregatedPosSRS-Resources)) OF AggregatedPosSRSResourceID-Item

AggregatedPosSRSResourceID-Item ::= SEQUENCE {
    sRSPosResource-ID      SRSPosResourceID,
    iE-Extensions          ProtocolExtensionContainer { { AggregatedPosSRSResourceID-Item-ExtIEs } } OPTIONAL,
    ...
}

AggregatedPosSRSResourceID-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    { ID id-PointA          CRITICALITY ignore EXTENSION PointA PRESENCE mandatory}|
    { ID id-SCS-SpecificCarrier CRITICALITY ignore EXTENSION SCS-SpecificCarrier PRESENCE mandatory}|
    { ID id-NR-PCI          CRITICALITY ignore EXTENSION NR-PCI PRESENCE optional},
    ...
}

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

AggregatedPRSResourceSet-Item ::= SEQUENCE {
    dl-PRS-ResourceSet-List DL-PRS-ResourceSet-List,
    iE-Extensions          ProtocolExtensionContainer { { AggregatedPRSResourceSet-Item-ExtIEs } } OPTIONAL,
    ...
}

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

DL-PRS-ResourceSet-List ::= SEQUENCE (SIZE (1..maxnoAggPosPRSResourceSets)) OF DL-PRS-ResourceSet-Item

```

```
DL-PRS-ResourceSet-Item ::= SEQUENCE {
    dl-prs-ResourceSetIndex    INTEGER (1..8),
    iE-Extensions              ProtocolExtensionContainer { { DL-PRS-ResourceSet-Item-ExtIEs } } OPTIONAL,
    ...
}
```

```
DL-PRS-ResourceSet-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, ...)

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, mHz15, mHz25, mHz30, mHz60, mHz35, mHz45, mHz70,
mHz90},
    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 ::= {
    ...
}

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

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

-- 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 ::= {
    ...
}

DL-reference-signal-UERxTx-TD ::= ENUMERATED {csirs, prs, ...}

-- 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 }|
    { ID id-MeasuredResultsAssociatedInfoList CRITICALITY ignore EXTENSION MeasuredResultsAssociatedInfoList 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                GNB-RxTxTimeDiffMeas,
    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,
    ...
}

LocalOrigin ::= SEQUENCE {

```

```

        relativeCoordinateID      CoordinateID,
        horizontalAxesOrientation  INTEGER (0..3599),
        referencePointCoordinateHA  NGRANHighAccuracyAccessPointPosition  OPTIONAL,
        iE-Extensions              ProtocolExtensionContainer { { LocalOrigin-ExtIEs } } OPTIONAL,
        ...
    }

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

    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

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

    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 {01, 04, ...}

MeasurementCharacteristicsRequestIndicator ::= BIT STRING (SIZE (16))

MeasuredResults ::= SEQUENCE (SIZE (1.. maxNoMeas)) OF MeasuredResultsValue

MeasuredResultsAssociatedInfoList ::= SEQUENCE (SIZE (1..maxNoMeas)) OF MeasuredResultsAssociatedInfoItem

MeasuredResultsAssociatedInfoItem ::= SEQUENCE {
    timeStamp TimeStamp OPTIONAL,
    measurementQuality TrpMeasurementQuality OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { MeasuredResultsAssociatedInfoItem-ExtIES} } OPTIONAL,
    ...
}

MeasuredResultsAssociatedInfoItem-ExtIES NRPPA-PROTOCOL-EXTENSION ::= {
    { ID id-DL-reference-signal-UERxTx-TD CRITICALITY ignore EXTENSION DL-reference-signal-UERxTx-TD PRESENCE optional},
    ...
}

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 mandatory },
...
}

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)

-- 0

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 OPTIONAL,
    broadcastPriority          INTEGER (1..16,...) OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { PosSIBs-ExtIEs } } OPTIONAL,
    ...
}

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

PosSIB-Segments ::= SEQUENCE (SIZE (1.. maxNrOfSegments)) OF SEQUENCE {
    assistanceDataSIBelement    OCTET STRING,
    iE-Extensions              ProtocolExtensionContainer { { PosSIB-Segments-ExtIEs } } OPTIONAL,
    ...
}

PosSIB-Segments-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

PosSIB-Type ::= ENUMERATED {
    posSibType1-1,
    posSibType1-2,
    posSibType1-3,
    posSibType1-4,
    posSibType1-5,
    posSibType1-6,
    posSibType1-7,

```

```
posSibType1-8,  
posSibType2-1,  
posSibType2-2,  
posSibType2-3,  
posSibType2-4,  
posSibType2-5,  
posSibType2-6,  
posSibType2-7,  
posSibType2-8,  
posSibType2-9,  
posSibType2-10,  
posSibType2-11,  
posSibType2-12,  
posSibType2-13,  
posSibType2-14,  
posSibType2-15,  
posSibType2-16,  
posSibType2-17,  
posSibType2-18,  
posSibType2-19,  
posSibType2-20,  
posSibType2-21,  
posSibType2-22,  
posSibType2-23,  
posSibType2-24,  
posSibType2-25,  
posSibType3-1,  
posSibType4-1,  
posSibType5-1,  
posSibType6-1,  
posSibType6-2,  
posSibType6-3,  
...,  
posSibType1-9,  
posSibType1-10,  
posSibType6-4,  
posSibType6-5,  
posSibType6-6,  
posSibType1-11,  
posSibType1-12,  
posSibType2-17a,  
posSibType2-18a,  
posSibType2-20a,  
posSibType2-26,  
posSibType2-27,  
posSibType6-7,  
posSibType7-1,  
posSibType7-2,  
posSibType7-3,  
posSibType7-4  
}
```

PRSBWAggregationRequestInfoList ::= SEQUENCE (SIZE (1..maxnoAggCombinations)) OF PRSBWAggregationRequestInfo-Item

PRSBWAggregationRequestInfo-Item ::= SEQUENCE {
dl-PRSBWAggregationRequestInfo-List DL-PRSBWAggregationRequestInfo-List,
iE-Extensions ProtocolExtensionContainer { { PRSBWAggregationRequestInfo-Item-ExtIEs} } OPTIONAL,
...
}

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

DL-PRSBWAggregationRequestInfo-List ::= SEQUENCE (SIZE (2..maxnoAggPosPRSResourceSets)) OF DL-PRSBWAggregationRequestInfo-Item

DL-PRSBWAggregationRequestInfo-Item ::= SEQUENCE {
dl-prs-ResourceSetIndex INTEGER (1..8),
iE-Extensions ProtocolExtensionContainer { {DL-PRSBWAggregationRequestInfo-Item-ExtIEs} } OPTIONAL,
...
}

DL-PRSBWAggregationRequestInfo-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
...
}

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 ::= {
    ...
}

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

PosSRSResourceSet-Aggregation-Item ::= SEQUENCE {
    combined-possrsResourceSet-List      Combined-PosSRSResourceSet-List,
    iE-Extensions             ProtocolExtensionContainer { { PosSRSResourceSet-
Aggregation-Item-ExtIEs } } OPTIONAL,
    ...
}

PosSRSResourceSet-Aggregation-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

Combined-PosSRSResourceSet-List ::= SEQUENCE (SIZE (2..maxnoaggregatedPosSRS-ResourceSets)) OF Combined-PosSRSResourceSet-Item

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

Combined-PosSRSResourceSet-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

PosResourceSetType ::= CHOICE {
    periodic      PosResourceSetTypePeriodic,
    semi-persistent  PosResourceSetTypeSemi-persistent,
    aperiodic     PosResourceSetTypeAperiodic,
    choice-extension  ProtocolIE-Single-Container {{ PosResourceSetType-ExtIEs }}
}

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

```

```

PosResourceSetTypePeriodic ::= SEQUENCE {
    posperiodicSet      ENUMERATED{true, ...},
    iE-Extensions      ProtocolExtensionContainer { { PosResourceSetTypePeriodic-ExtIEs} } OPTIONAL,
    ...
}

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

PosResourceSetTypeSemi-persistent ::= SEQUENCE {
    possemi-persistentSet  ENUMERATED{true, ...},
    iE-Extensions      ProtocolExtensionContainer { { PosResourceSetTypeSemi-persistent-ExtIEs} } OPTIONAL,
    ...
}

PosResourceSetTypeSemi-persistent-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

PosResourceSetTypeAperiodic ::= SEQUENCE {
    sRSResourceTrigger    INTEGER(1..3),
    iE-Extensions      ProtocolExtensionContainer { { PosResourceSetTypeAperiodic-ExtIEs} } OPTIONAL,
    ...
}

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

PreconfigurationResult ::= BIT STRING (SIZE(8))

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

PRSAngleItem ::= SEQUENCE {
    nRPRSAzimuth      INTEGER (0..359),
    nRPRSAzimuthFine  INTEGER (0..9) OPTIONAL,
    nRPRSElevation    INTEGER (0..180) OPTIONAL,
    nRPRSElevationFine INTEGER (0..9) OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { PRSAngleItem-ExtIEs} } OPTIONAL,
    ...
}

PRSAngleItem-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    { ID id-PRS-Resource-ID      CRITICALITY ignore EXTENSION PRS-Resource-ID      PRESENCE optional },

```

```

    ...
}

PRSInformationPos ::= SEQUENCE {
    pRS-IDPos          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 ::= {
    { ID id-AggregatedPRSResourceSetList CRITICALITY ignore EXTENSION AggregatedPRSResourceSetList PRESENCE optional },
    ...
}

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 {
    pPRSResourceID          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 the value "configure" --
    pRSTransmissionOffInformation PRSTransmissionOffInformation OPTIONAL,
    -- The IE shall be present if the PRS Configuration Request Type IE is set to the value "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 ::= {
    ...
}

PointA ::= INTEGER (0..3279165)

-- Q

-- R

ReferenceSignal ::= CHOICE {
    nZP-CSI-RS          NZP-CSI-RS-ResourceID,
    SSB                 SSB,
    SRS                 SRSResourceID,
    positioningSRS      SRSPosResourceID,
    dL-PRS              DL-PRS,
    choice-Extension     ProtocolIE-Single-Container {{ReferenceSignal-ExtensionIE }}
}

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

```

```

ReferencePoint ::= CHOICE {
    relativeCoordinateID      CoordinateID,
    referencePointCoordinate   NG-RANAccessPointPosition,
    referencePointCoordinateHA NGRANHighAccuracyAccessPointPosition,
    choice-Extension          ProtocolIE-Single-Container { { ReferencePoint-ExtIEs } }
}

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

CoordinateID ::= INTEGER (0..511, ...)
RelativeGeodeticLocation ::= SEQUENCE {
    milli-Arc-SecondUnits    ENUMERATED {zerodot03, zerodot3, three, ...},    heightUnits    ENUMERATED {mm, cm, m, ...},
    deltaLatitude             INTEGER (-1024.. 1023),
    deltaLongitude            INTEGER (-1024.. 1023),
    deltaHeight               INTEGER (-1024.. 1023),
    locationUncertainty       LocationUncertainty,
    iE-extensions             ProtocolExtensionContainer {{RelativeGeodeticLocation-ExtIEs }} OPTIONAL,
    ...
}

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

RelativeCartesianLocation ::= SEQUENCE {
    xYZunit                  ENUMERATED {mm, cm, dm, ...},
    xvalue                   INTEGER (-65536..65535),
    yvalue                   INTEGER (-65536..65535),
    zvalue                   INTEGER (-32768..32767),
    locationUncertainty       LocationUncertainty,
    iE-Extensions            ProtocolExtensionContainer { { RelativeCartesianLocation-ExtIEs } } OPTIONAL,
    ...
}

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

RelativePathDelay ::= CHOICE {
    k0                      INTEGER(0..16351),
    k1                      INTEGER(0..8176),
    k2                      INTEGER(0..4088),
    k3                      INTEGER(0..2044),
    k4                      INTEGER(0..1022),
    k5                      INTEGER(0..511),
    choice-Extension        ProtocolIE-Single-Container { { RelativePathDelay-ExtIEs } }
}

RelativePathDelay-ExtIEs NRPPA-PROTOCOL-IES ::= {
    {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},
    ...
}

Remote-UE-Indication-Request ::= ENUMERATED {true, ...}

Remote-UE-Indication ::= ENUMERATED {l2-u2n-remote-ue, ...}

Remote-UE-Status ::= ENUMERATED {l2-u2n-remote-ue, no, ...}

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-PRSBWAggregationRequestInfoList CRITICALITY ignore EXTENSION PRSBWAggregationRequestInfoList 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 the value "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 }|
    { ID id-ValidityAreaSpecificSRSInformationExtended CRITICALITY ignore EXTENSION ValidityAreaSpecificSRSInformationExtended PRESENCE optional },
    ...
}

ResourceMapping ::= SEQUENCE {
    startPosition          INTEGER (0..13),
    nrofSmbols             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,
    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 ::= {
    { ID id-SRSPosPeriodicConfigHypersSFNIndex      CRITICALITY ignore EXTENSION SRSPosPeriodicConfigHypersSFNIndex PRESENCE optional },
    ...
}

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

ResourceTypeSemi-persistentPos-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    { ID id-SRSPosPeriodicConfigHypersSFNIndex      CRITICALITY ignore EXTENSION SRSPosPeriodicConfigHypersSFNIndex PRESENCE optional },
    ...
}

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,
    valueCSI-RSRP-Cell  ValueRSRP-NR,
    CSI-RSRP-PerCSI-RS  ResultCSI-RSRP-PerCSI-RS,
    iE-Extensions      ProtocolExtensionContainer { { ResultCSI-RSRP-Item-ExtIEs} }  OPTIONAL,
    ...
}

ResultCSI-RSRP-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultCSI-RSRP-PerCSI-RS ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultCSI-RSRP-PerCSI-RS-Item

ResultCSI-RSRP-PerCSI-RS-Item ::= SEQUENCE {
    cSI-RS-Index      INTEGER (0..95),
    valueCSI-RSRP      ValueRSRP-NR,
    iE-Extensions      ProtocolExtensionContainer { { ResultCSI-RSRP-PerCSI-RS-Item-ExtIEs} }  OPTIONAL,
    ...
}

ResultCSI-RSRP-PerCSI-RS-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultCSI-RSRQ ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultCSI-RSRQ-Item

ResultCSI-RSRQ-Item ::= SEQUENCE {
    nR-PCI      NR-PCI,
    nR-ARFCN    NR-ARFCN,

```

```

    CGI-NR          CGI-NR          OPTIONAL,
    valueCSI-RSRQ-Cell ValueRSRQ-NR          OPTIONAL,
    cSI-RSRQ-PerCSI-RS ResultCSI-RSRQ-PerCSI-RS          OPTIONAL,
    iE-Extensions    ProtocolExtensionContainer { { ResultCSI-RSRQ-Item-ExtIEs} }          OPTIONAL,
    ...
}

ResultCSI-RSRQ-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultCSI-RSRQ-PerCSI-RS ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultCSI-RSRQ-PerCSI-RS-Item

ResultCSI-RSRQ-PerCSI-RS-Item ::= SEQUENCE {
    cSI-RS-Index      INTEGER (0..95),
    valueCSI-RSRQ      ValueRSRQ-NR,
    iE-Extensions      ProtocolExtensionContainer { { ResultCSI-RSRQ-PerCSI-RS-Item-ExtIEs} }          OPTIONAL,
    ...
}

ResultCSI-RSRQ-PerCSI-RS-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultEUTRA ::= SEQUENCE (SIZE (1.. maxEUTRAMeas)) OF ResultEUTRA-Item

ResultEUTRA-Item ::= SEQUENCE {
    pCI-EUTRA          PCI-EUTRA,
    eARFCN              EARFCN,
    valueRSRP-EUTRA      ValueRSRP-EUTRA          OPTIONAL,
    valueRSRQ-EUTRA      ValueRSRQ-EUTRA          OPTIONAL,
    CGI-EUTRA            CGI-EUTRA          OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { ResultEUTRA-Item-ExtIEs} }          OPTIONAL,
    ...
}

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

ResultRSRP-EUTRA ::= SEQUENCE (SIZE (1.. maxCellReport)) OF ResultRSRP-EUTRA-Item

ResultRSRP-EUTRA-Item ::= SEQUENCE {
    pCI-EUTRA          PCI-EUTRA,
    eARFCN              EARFCN,
    CGI-EUTRA            CGI-EUTRA          OPTIONAL,
    valueRSRP-EUTRA      ValueRSRP-EUTRA,
    iE-Extensions        ProtocolExtensionContainer { { ResultRSRP-EUTRA-Item-ExtIEs} }          OPTIONAL,
    ...
}

ResultRSRP-EUTRA-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

}

ResultRSRQ-EUTRA ::= SEQUENCE (SIZE (1.. maxCellReport)) OF ResultRSRQ-EUTRA-Item

ResultRSRQ-EUTRA-Item ::= SEQUENCE {
    pCI-EUTRA          PCI-EUTRA,
    eARFCN             EARFCN,
    cGI-UTRA           CGI-EUTRA OPTIONAL,
    valueRSRQ-EUTRA    ValueRSRQ-EUTRA,
    iE-Extensions      ProtocolExtensionContainer { { ResultRSRQ-EUTRA-Item-ExtIEs} } OPTIONAL,
    ...
}

ResultRSRQ-EUTRA-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultSS-RSRP ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultSS-RSRP-Item

ResultSS-RSRP-Item ::= SEQUENCE {
    nR-PCI             NR-PCI,
    nR-ARFCN           NR-ARFCN,
    cGI-NR             CGI-NR OPTIONAL,
    valueSS-RSRP-Cell  ValueRSRP-NR OPTIONAL,
    sS-RSRP-PerSSB     ResultSS-RSRP-PerSSB OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { ResultSS-RSRP-Item-ExtIEs} } OPTIONAL,
    ...
}

ResultSS-RSRP-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultSS-RSRP-PerSSB ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultSS-RSRP-PerSSB-Item

ResultSS-RSRP-PerSSB-Item ::= SEQUENCE {
    sSB-Index          SSB-Index,
    valueSS-RSRP       ValueRSRP-NR,
    iE-Extensions      ProtocolExtensionContainer { { ResultSS-RSRP-PerSSB-Item-ExtIEs} } OPTIONAL,
    ...
}

ResultSS-RSRP-PerSSB-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultSS-RSRQ ::= SEQUENCE (SIZE (1.. maxCellReportNR)) OF ResultSS-RSRQ-Item

ResultSS-RSRQ-Item ::= SEQUENCE {
    nR-PCI             NR-PCI,
    nR-ARFCN           NR-ARFCN,
    cGI-NR             CGI-NR OPTIONAL,
    valueSS-RSRQ-Cell  ValueRSRQ-NR OPTIONAL,

```

```

    sS-RSRQ-PerSSB      ResultSS-RSRQ-PerSSB      OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { ResultSS-RSRQ-Item-ExtIEs} } OPTIONAL,
    ...
}

ResultSS-RSRQ-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultSS-RSRQ-PerSSB ::= SEQUENCE (SIZE (1.. maxIndexesReport)) OF ResultSS-RSRQ-PerSSB-Item

ResultSS-RSRQ-PerSSB-Item ::= SEQUENCE {
    sSB-Index          SSB-Index,
    valueSS-RSRQ       ValueRSRQ-NR,
    iE-Extensions      ProtocolExtensionContainer { { ResultSS-RSRQ-PerSSB-Item-ExtIEs} } OPTIONAL,
    ...
}

ResultSS-RSRQ-PerSSB-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

ResultGERAN ::= SEQUENCE (SIZE (1.. maxGERANMeas)) OF ResultGERAN-Item

ResultGERAN-Item ::= SEQUENCE {
    bCCH              BCCH,
    physCellIDGERAN   PhysCellIDGERAN,
    rSSI              RSSI,
    iE-Extensions     ProtocolExtensionContainer { { ResultGERAN-Item-ExtIEs} } OPTIONAL,
    ...
}

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

ResultNR ::= SEQUENCE (SIZE (1.. maxNRMeas)) OF ResultNR-Item

ResultNR-Item ::= SEQUENCE {
    nR-PCI            NR-PCI,
    nR-ARFCN          NR-ARFCN,
    valueSS-RSRP-Cell ValueRSRP-NR      OPTIONAL,
    valueSS-RSRQ-Cell ValueRSRQ-NR      OPTIONAL,
    sS-RSRP-PerSSB     ResultSS-RSRP-PerSSB  OPTIONAL,
    sS-RSRQ-PerSSB     ResultSS-RSRQ-PerSSB  OPTIONAL,
    CGI-NR             CGI-NR              OPTIONAL,
    iE-Extensions      ProtocolExtensionContainer { { ResultNR-Item-ExtIEs} } OPTIONAL,
    ...
}

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

```

```
}

```

```
ResultUTRAN ::= SEQUENCE (SIZE (1.. maxUTRANMeas)) OF ResultUTRAN-Item

```

```
ResultUTRAN-Item ::= SEQUENCE {
    uARFCN                UARFCN,
    physCellIDUTRAN       CHOICE {
        physCellIDUTRA-FDD PhysCellIDUTRA-FDD,
        physCellIDUTRA-TDD PhysCellIDUTRA-TDD
    },
    uTRA-RSCP              UTRA-RSCP OPTIONAL,
    uTRA-EcN0              UTRA-EcN0 OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { ResultUTRAN-Item-ExtIEs } } OPTIONAL,
    ...
}

```

```
ResultUTRAN-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {
    ...
}

```

```
RSSI ::= INTEGER (0..63, ...)

```

```
RxTxTimingErrorMargin ::= ENUMERATED {tc0dot5, tc1, tc2, tc4, tc8, tc12, tc16, tc20, tc24, tc32, tc40, tc48, tc64, tc80, tc96, tc128, ...}

```

```
-- S

```

```
SCS-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, ...),
    startPosition       INTEGER (0..13)          OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { SlotOffsetRemainingHopsSemiPersistent-ExtIEs } } OPTIONAL,
    ...
}

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

```

```

SlotOffsetRemainingHopsPeriodic ::= SEQUENCE {
    sRSPeriodicity    SRSPeriodicity,
    offset            INTEGER(0..81919, ...),
    startPosition     INTEGER (0..13) OPTIONAL,
    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 ::= {
    ...
}

SRSSConfig ::= SEQUENCE {
    sRSResource-List      SRSResource-List OPTIONAL,
    posSRSResource-List   PosSRSResource-List OPTIONAL,
    sRSResourceSet-List   SRSResourceSet-List OPTIONAL,
    posSRSResourceSet-List PosSRSResourceSet-List OPTIONAL,
    iE-Extensions         ProtocolExtensionContainer { { SRSSConfig-ExtIEs } } OPTIONAL,
    ...
}

SRSSConfig-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 ::= {

```

```

}
...

SRSCarrier-List SRSCarrier-List,
iE-Extensions ProtocolExtensionContainer { { SRSCarrier-ExtIEs } } OPTIONAL,
...
}

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

SrsFrequency ::= INTEGER (0..3279165)

SRSPortIndex ::= ENUMERATED{id1000, id1001, id1002, id1003, ...}

SRSPosPeriodicConfigHyperSFNIndex ::=ENUMERATED {even0, odd1}

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,...,area-specific-SRS-activated}

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,
    timeStampSlotIndex      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 ::= {
    ...
}

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,
-- This IE shall be present if the Time Window Type IE is set to the value "periodic". --
    timeWindowStart                    TimeWindowStart,
    iE-Extension                        ProtocolExtensionContainer { { TimeWindowInformation-Measurement-Item-ExtIEs} } OPTIONAL,
    ...
}

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

```

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

```
TimeWindowInformation-SRS-Item ::= SEQUENCE {
    timeWindowStartSRS          TimeWindowStartSRS,
    timeWindowDurationSRS       TimeWindowDurationSRS,
    timeWindowType               ENUMERATED {single, periodic, ...},
    timeWindowPeriodicitySRS     TimeWindowPeriodicitySRS OPTIONAL,
-- This IE shall be present if the Time Window Type IE is set to the value "periodic". --
    iE-Extension                 ProtocolExtensionContainer { { TimeWindowInformation-SRS-Item-ExtIEs} } OPTIONAL,
    ...
}
```

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

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

```
TimeWindowStart-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 ::= {
    ...
}

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 }|
    { ID id-MeasBasedOnAggregatedResources CRITICALITY ignore EXTENSION MeasBasedOnAggregatedResources 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-CommonTAPParameters CRITICALITY reject TYPE CommonTAPParameters 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 ::= {
    ...
}

TRP-ID ::= INTEGER (1.. maxnoTRPs, ...)

TRPPositionDefinitionType ::= CHOICE {
    direct          TRPPositionDirect,
    referenced      TRPPositionReferenced,
    choice-extension
                                ProtocolIE-Single-Container { { TRPPositionDefinitionType-ExtIEs } }
}

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

TRPPositionDirect ::= SEQUENCE {
    accuracy        TRPPositionDirectAccuracy,
    iE-extensions   ProtocolExtensionContainer { { TRPPositionDirect-ExtIEs } } OPTIONAL,
    ...
}

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

TRPPositionDirectAccuracy ::= CHOICE {
    trpPosition      NG-RANAccessPointPosition
    ,
    trpHAposition    NGRANHighAccuracyAccessPointPosition
    ,
    choice-extension
                                ProtocolIE-Single-Container { { TRPPositionDirectAccuracy-ExtIEs } }
}

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

TRPPositionReferenced ::= SEQUENCE {
    referencePoint   ReferencePoint,

```

```

        referencePointType          TRPReferencePointType,
        iE-extensions                ProtocolExtensionContainer { { TRPPositionReferenced-ExtIEs } } OPTIONAL,
        ...
    }

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

TRP-PRS-Information-List ::= SEQUENCE (SIZE(1.. maxnoPRSTRPs)) OF TRP-PRS-Information-List-Item

TRP-PRS-Information-List-Item ::= SEQUENCE {
    trp-ID          TRP-ID,
    nr-PCI          NR-PCI,
    cgi-NR          CGI-NR,
    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
}

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

```

```

TxHoppingConfiguration ::= SEQUENCE {
    overlapValue          ENUMERATED {rb0, rb1, rb2, rb4},
    numberOfHops          INTEGER (2..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 ::= {
    { ID id-UEReportingInterval-milliseconds CRITICALITY ignore EXTENSION UEReportingInterval-milliseconds PRESENCE optional },
    ...
}

UEReportingInterval-milliseconds ::= INTEGER (1..999)

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 ::= {
 ...
 }

ValidityAreaSpecificSRSInformationExtended ::= SEQUENCE {
 posSRSResource-List PosSRSResource-List OPTIONAL,
 posSRSResourceSet-List PosSRSResourceSet-List OPTIONAL,
 iE-extensions ProtocolExtensionContainer { { ValidityAreaSpecificSRSInformationExtended-ExtIEs } } OPTIONAL,
 ...
 }

ValidityAreaSpecificSRSInformationExtended-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,
    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
maxCellInRANode	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 ::= 3
maxnoAggPosPRSResourceSets	INTEGER ::= 3
maxnoofTimeWindowSRS	INTEGER ::= 16
maxnoofTimeWindowMeas	INTEGER ::= 16
maxnoPreconfiguredSRS	INTEGER ::= 16
maxnoofHopsMinusOne	INTEGER ::= 5
maxnoAggCombinations	INTEGER ::= 2
maxnoAggregatedPosSRSCombinations	INTEGER ::= 32

```
-- *****
--
-- 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-PRSTRList	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-CommonTAPParameters	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-PRSBWAggregationRequestInfoList	ProtocolIE-ID ::= 130
id-AggregatedPosSRSResourceID-List	ProtocolIE-ID ::= 131
id-AggregatedPRSResourceSetList	ProtocolIE-ID ::= 132
id-TRPPPhaseQuality	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
id-MeasuredResultsAssociatedInfoList	ProtocolIE-ID ::= 153
id-PointA	ProtocolIE-ID ::= 154
id-NR-PCI	ProtocolIE-ID ::= 155
id-SCS-SpecificCarrier	ProtocolIE-ID ::= 156
id-MeasBasedOnAggregatedResources	ProtocolIE-ID ::= 157
id-UEReportingInterval-milliseconds	ProtocolIE-ID ::= 158
id-Remote-UE-Indication-Request	ProtocolIE-ID ::= 159
id-Remote-UE-Indication	ProtocolIE-ID ::= 160
id-Remote-UE-Status	ProtocolIE-ID ::= 161
id-LocalOrigin	ProtocolIE-ID ::= 162
id-PreconfiguredSRSInformation	ProtocolIE-ID ::= 163
id-DL-reference-signal-UE-Rx-Tx-TD	ProtocolIE-ID ::= 164
id-SRSPosPeriodicConfigHyperSFNIndex	ProtocolIE-ID ::= 165
id-ValidityAreaSpecificSRSInformationExtended	ProtocolIE-ID ::= 166

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 alignment 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	Positioning 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
2024-06	RAN#104	RP-241112	0133	3	B	Introduction of Measurement Quality and Time Stamp Information to E-CID [ECIDQualTimeStamp]	18.2.0
2024-06	RAN#104	RP-241113	0139	2	D	NRPPa Rapporteur corrections	18.2.0
2024-06	RAN#104	RP-241101	0143	3	F	Correction to DL-PRS Aggregation	18.2.0
2024-06	RAN#104	RP-241101	0144	2	F	Correction on measurement report for SRS Bandwidth Aggregation	18.2.0
2024-06	RAN#104	RP-241101	0145	3	F	Various corrections on Rel-18 Positioning	18.2.0
2024-06	RAN#104	RP-241114	0147	2	A	Addition of missing positioning SIBs	18.2.0
2024-06	RAN#104	RP-241101	0148	1	F	Addition of missing positioning SIBs	18.2.0
2024-06	RAN#104	RP-241101	0149	2	F	Correction on Measurement Reporting for BWA	18.2.0
2024-06	RAN#104	RP-241101	0153	2	F	Correction on UL-RSCP	18.2.0
2024-07	RAN#104	-	-	-	-	Editorial corrections to the navigation pane for 9.3.4 and 9.3.5	18.2.1
2024-09	RAN#105	RP-241874	0140	3	F	Support of the pre-Configured SRS activation	18.3.0
2024-09	RAN#105	RP-241880	0156	1	F	NRPPa support for sub 1s location information reporting periodicity [Sub 1s periodicity]	18.3.0
2024-09	RAN#105	RP-241874	0157	1	F	Corrections to Positioning SRS BW Aggregation and Tx Hopping	18.3.0
2024-09	RAN#105	RP-241874	0160	1	F	Value UE Rx-Tx Time Difference ASN.1 presence correction	18.3.0
2024-12	RAN#106	RP-243104	0159	3	F	Support of UE specific SRS reservation	18.4.0
2024-12	RAN#106	RP-243104	0161	3	F	Correction to Requested DL PRS Transmission Characteristics	18.4.0
2024-12	RAN#106	RP-243106	0163	3	F	Support positioning of L2 UE-to-network remote UE [PosL2RemoteUE]	18.4.0
2024-12	RAN#106	RP-243108	0164	4	F	Correction of TRP Geographical coordinates [PosLocalCoords]	18.4.0
2024-12	RAN#106	RP-243104	0165	1	F	Correction to area-specific SRS activation	18.4.0
2024-12	RAN#106	RP-243104	0168	2	A	Positioning measurement correction related to "shall, if supported"	18.4.0
2024-12	RAN#106	RP-243104	0169	3	F	Correction of UE Rx-Tx Time difference measurement	18.4.0
2024-12	RAN#106	RP-243104	0173	2	A	Correction on FR1 SRS Bandwidth in Requested SRS Transmission Characteristics	18.4.0
2024-12	RAN#106	RP-243104	0175	3	A	introduction of Missing bandwidths in FR1 SRS Bandwidth	18.4.0
2024-12	RAN#106	RP-243104	0177	2	F	Correction on Positioning SRS Resource	18.4.0
2024-12	RAN#106	RP-243104	0178	1	F	Correction on Measurement Time Window	18.4.0
2024-12	RAN#106	RP-243104	0181	-	F	Correction on criticality of Time Window Information SRS	18.4.0
2025-03	RAN#107	RP-250141	0182	-	F	Correction on criticality of SRS Reservation Type	18.5.0
2025-03	RAN#107	RP-250141	0185	1	A	Correction on Assistance Information Control Procedure	18.5.0
2025-06	RAN#108	RP-251153	0192		F	Correction to SRS information	18.6.0

History

Document history		
V18.1.0	May 2024	Publication
V18.2.1	August 2024	Publication
V18.3.0	September 2024	Publication
V18.4.0	January 2025	Publication
V18.5.0	March 2025	Publication
V18.6.0	July 2025	Publication